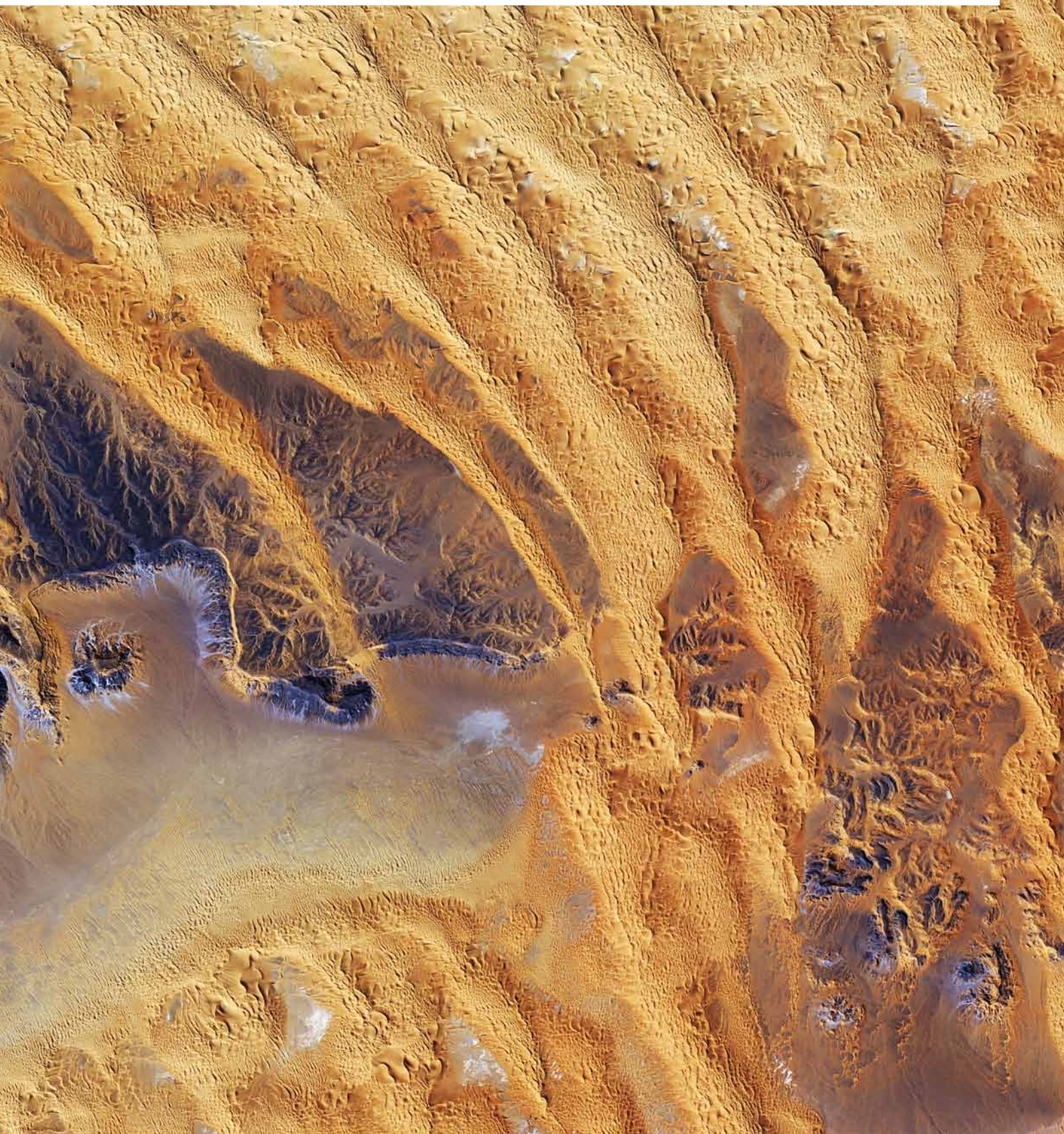
Emissions Trading Worldwide

International Carbon Action Partnership (ICAP)
Status Report 2016



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International Carbon Action Partnership (ICAP) Status Report 2016

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Foreword

Last December, the international community united in Paris to conclude a new global climate change agreement. Under the landmark Paris Agreement, all nations commit to contribute to climate change mitigation, with the goal of keeping global warming below 2°C. While the current pledges may not yet be sufficient to meet this objective, the level of international commitment to this issue has never been as strong, and regular reviews will ensure that, as technology and policy evolve, countries continue to ratchet up ambition.

More than 185 countries have now submitted their Intended Nationally Determined Contributions (INDCs), covering roughly 95% of global greenhouse gas emissions (GHG). Nearly half indicate that they will use or consider using international carbon markets to reach their climate targets. At the same time, many subnational governments engaged in the fight against climate change are either using or considering domestic carbon markets as a tool to reduce their GHG emissions. Against this background, the Paris Agreement sends a highly welcome, positive signal on carbon markets. The Agreement endorses both the option for transferring mitigation outcomes among Parties and for making use of a mechanism to support mitigation and sustainable development that will succeed the Clean Development Mechanism (CDM). This brings with it the need for a transparent and robust accounting framework to prevent double-counting so that Parties can engage in market-based cooperation on climate action while ensuring tangible emission reductions. Indeed, the Paris Agreement also delivered on this front.

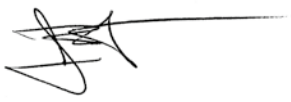
Now that countries have put forward their commitments and the international framework is in place, the focus is turning to domestic action. Each country will need to decide on the best way to meet their target, and the next few years will see a proliferation of domestic climate measures, including those that put a price on emissions. Emissions Trading Systems (ETS) are already the central element of climate policy in a number of national and subnational jurisdictions and this number will grow further in the years to come.

Also beyond COP21 in Paris, 2015 has been a good year for carbon markets. Last September, Chinese President Xi Jinping officially confirmed that China will establish a national carbon market in 2017. The fact that the world's largest emitter formally committed to strong climate action via an ETS not only strengthens the case for carbon pricing, but the announcement also gave significant momentum to the COP21 negotiations. Once operational, the Chinese national ETS will overtake the EU ETS as the world's largest carbon market.

The last year has also seen renewed interest in carbon markets in North America. With climate change moving up the political agenda in Canada, Ontario and Manitoba have both stepped forward to announce a new ETS in their respective provinces, implying that the Western Climate Initiative (WCI) carbon market of California and Québec is set to grow in the upcoming years. The approval of the Clean Power Plan in the United States has also sparked interest in emissions trading as a policy option for states to meet their compliance obligations.

Meanwhile, existing systems are initiating structural improvements. The overarching objective of these efforts is to ensure a credible carbon price signal over the longer term, a vision broadly shared by actors involved in emissions trading. For example, in the EU, policymakers are drawing on a decade of ETS experience to ensure their system continues to deliver emissions reductions and play its role as the key pillar of European climate policy. Other jurisdictions, like the Regional Greenhouse Gas Initiative (RGGI) and New Zealand are equally reviewing and adjusting their systems, in order to align with changing domestic circumstances and mitigation targets.

This year's ICAP Status Report presents an overview of all ETSs both in operation and under consideration, alongside articles from international policymakers and carbon market experts outlining the latest developments in their jurisdictions. As the report shows, the great advantage of emissions trading is that it offers policymakers a flexible tool to reduce emissions. From the city level, to the state, national, and supranational levels, an ETS can operate in a wide spectrum of political and economic settings. And as the global response to the climate challenge develops, systems will also adapt, enabling more ambitious targets to be set and eventually linking across borders to drive the global transition to a carbon-neutral economy. With the Paris Agreement providing new impetus to climate policy worldwide, we are confident that the lessons learned from existing systems can inform and inspire the next generation of ETS.



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

Marc Allessie
Co-Chair of the International Carbon Action Partnership, Steering Committee Director, Dutch Emissions Authority (NEa)

Practitioner Insights
Designing Cap-and-Trade

In this section, ETS practitioners from around the world share the latest developments in their systems and provide insights into the role that emissions trading plays in their climate policy mix. Firstly, Maja-Alexandra Dittel, Johannes Enzmann, and Dalwon Kim of the European Commission outline the latest preparations for Phase Four of the EU ETS. The issue of complexity is then taken up by Harm van de Wetering and Suzanne Beurskens of the Dutch Emissions Authority, who examine the potential for improving the EU ETS through simplification measures. Shifting to North America, William Space, Lois New and Justin Johnson discuss the role of the Regional Greenhouse Gas Initiative as a potential compliance model for the Clean Power Plan, while David Clegern and Mary Jane Coombs of the California Air Resources Board review the first phase of California's Cap-and-Trade Program and discuss prospects for linking beyond Québec. The focus then moves to Asia, whereby Qian Guoqiang and Chen Zhibin of SinoCarbon report on the latest updates in the Chinese pilot schemes and progress towards China's national ETS. Hyungsup Lee of the Korean Ministry of Environment shares his insights into the implementation of the Korean Emissions Trading Scheme. Finally, Masahiro Kimura of the Tokyo Metropolitan Government reports on the innovative measures being introduced in the Tokyo Cap-and-Trade Program.

The EU ETS
Preparing for Phase Four

Maja-Alexandra Dittel, Johannes Enzmann & Dalwon Kim
The European Commission

Background
The EU's Emissions Trading System (EU ETS) is a cornerstone of the EU's policy to fight climate change. It covers more than 11,000 installations in 31 countries (28 EU Member States, as well as Norway, Iceland and Lichtenstein) including airlines performing aviation activities between EEA airports, and has created a functioning market infrastructure and a liquid market.

Phase Four Revisions
In July 2015, the European Commission submitted a legislative proposal to the Council and European Parliament to make the EU ETS fit to enter Phase Four (2021–2030). The proposal is in line with the political agreement of the European Council of October 2014, to reduce greenhouse gas emissions by at least 40% domestically by 2030.

Cap
In order to contribute to the 2030 greenhouse gas emission reduction target, the sectors covered by the EU ETS have to reduce their emissions by 43% compared to 2005. Therefore, the overall number of emission allowances will decrease at an annual rate of 2.2% from 2021 onwards, compared to 1.74% in Phase Three (2013–2020). This means an annual reduction of 48 million tons CO_2e amounting to an additional aggregate reduction of 556 million tons CO_2e in Phase Four compared to continuing the current provisions.

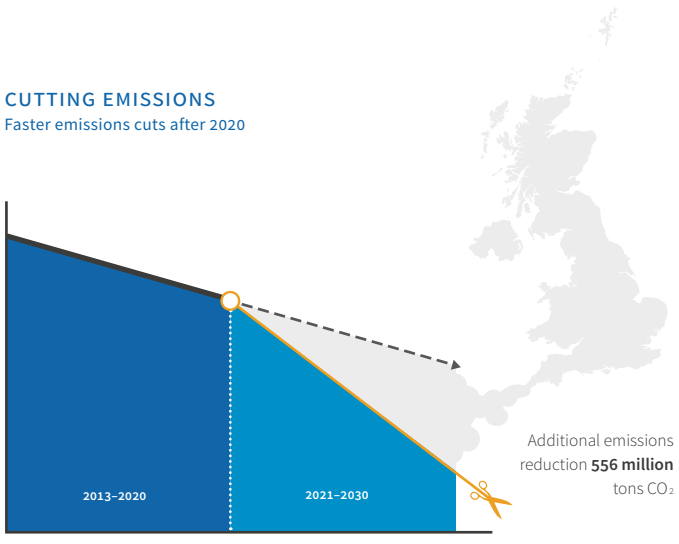


Figure 1: Emissions reductions in phase three and four of the EU ETS
©European Commission (2015), available at:
http://ec.europa.eu/clima/policies/ets/revision/docs/ets_revision_slides_en.pdf

Allocation and Carbon Leakage
In view of the decision of the European Council not to reduce the share of auctioning, 57% of allowances will be auctioned in Phase Four. It is expected that around 6.3 billion allowances will be allocated for free in Phase Four.

The proposal fully acknowledges the need to maintain the competitiveness of European industry. For this reason, it is proposed free allocation to sectors exposed to the risk of carbon leakage continues. However, the proposal aims at a more streamlined and targeted list of sectors that should benefit from free allocation under the carbon leakage provisions. Under the proposed measures, the carbon leakage list may be considerably reduced and finally only encompass around 50 sectors.

In the light of the positive experience with benchmark-based free allocation, and the fact that the ambition level of the existing benchmark values would decline over time due to technological progress, the proposal foresees that the 54 benchmark values be updated twice during the period 2021–2030 based on a methodology that rewards innovative and fast moving sectors.

> "The proposal fully acknowledges the need to maintain the competitiveness of European industry."

Promoting Low Carbon Investments
In view of the 2030 targets, the proposal is designed to promote low carbon investments and to support economic actors under the EU ETS to cope with the challenges they face in the transition to a low carbon economy.

Two funds are set up to this end:

- The Innovation Fund, under which 450 million allowances will be reserved, in order to support innovation in low carbon technologies and processes in renewable industry as well as to stimulate the development and deployment of environmentally safe carbon capture and storage of CO_2. Demonstration projects of innovative renewable energy technologies will also be eligible. Projects in the territory of all Member States could benefit from the Innovation Fund.
- The Modernisation Fund, from which lower-income Member States with a GDP per capita below 60% of the EU average will benefit. It is proposed to be financed by 2% of the total quantity of allowances between 2021 and 2030. The Fund will support investments with a view to modernizing energy systems and improving energy efficiency in the eligible Member States. The governance of the fund will involve an Investment Board with representatives of Member States, the Commission and the European Investment Bank.

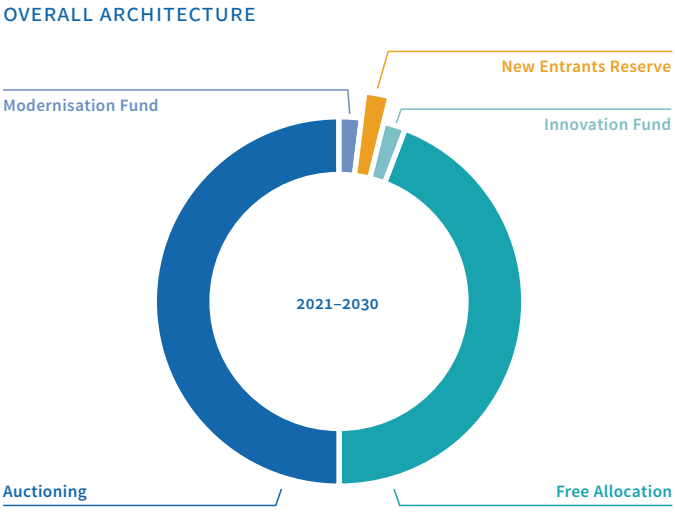


Figure 2: Overall architecture of EU allowances in phase four
©European Commission (2015), available at:
http://ec.europa.eu/clima/policies/ets/revision/docs/ets_revision_slides_en.pdf

Conclusion

Europe is looking ahead to an intense debate in 2016 and 2017 about the rules governing the EU ETS in Phase Four.

Together, the proposed measures will ensure that the EU ETS remains an effective instrument to cut emissions in the decade to come. They will enable the EU to make its fair, ambitious and cost-effective contribution to the EU 2030 targets and the new international climate agreement concluded in Paris, and to prepare the ground for the transition towards a low carbon economy in line with its long term objective of cutting emissions by 80%–95% by 2050.

"In view of the 2030 targets, the proposal is designed to promote low carbon investments and to support economic actors under the EU ETS to cope with the challenges they face in the transition to a low carbon economy."

A Simple ETS is a More Future Proof ETS

Dutch Research Project: The Administrative Burden of the EU ETS Can Be Reduced without Affecting the System's Reliability

Harm van de Wetering & Suzanne Beurskens, Dutch Emissions Authority

A degree of complexity is unavoidable in any ETS

The basic principle of emissions trading—cap and trade—is simple. The cap (an absolute limit on emissions) creates scarcity and a price incentive, which makes investment in environmental technology viable. Trading—buying and selling of allowances to emit greenhouse gases—results in participating companies abating emissions where it is most cost effective. Robust implementation of a Cap-and-Trade system, however, is less straightforward. Implementing the Cap-and-Trade principle in a way that is effective, reliable, safe, fair and enforceable requires setting up an extensive administrative system and a comprehensive regulatory framework. In other words: some degree of complexity is inevitable in an ETS.

Transaction costs and the EU ETS

Since the introduction of the European Union Emissions Trading System (EU ETS) in 2005, more rules and exceptions have been steadily introduced, in what may be considered an avoidable 'complexity creep'. Increasing the complexity of a system also increases the transaction costs and the administrative burden, especially for small emitters. A recent study into the administrative burden of the EU ETS shows that the average burden, represented as transaction costs, is relatively high for small emitters and drops sharply as emissions increase above a particular threshold (illustrated below). While the EU ETS is intended as a cost-effective vehicle for the reduction of emissions, if the administrative burden of the system ceases to be proportionate to the emissions of participating companies, its cost effectiveness is threatened.

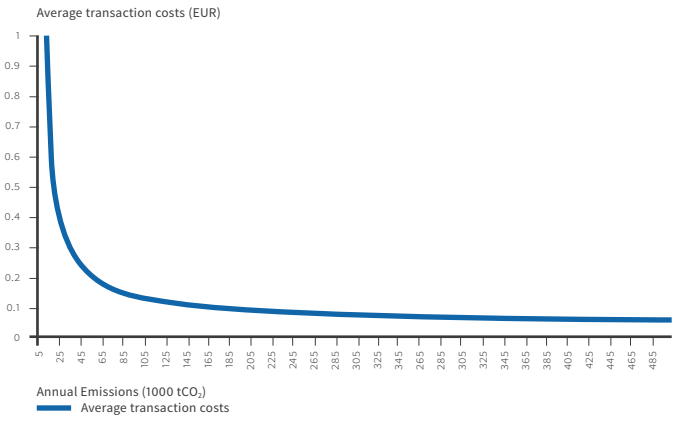


Figure 1: The average transaction costs in euros per ton of CO_2 emitted by EU ETS participants in Germany[1]

1 Peter Heindl (2012) 'Transaction Costs and Tradable Permits: Empirical Evidence from the EU Emissions Trading Scheme', Centre for European Economic Research. Available from: http://ftp.zew.de/pub/zew-docs/dp/dp12021.pdf

2 Dutch Emissions Authority (2015) 'A simple and effective EU ETS', available at: http://www.emissieautoriteit.nl/documenten/publicatie/2015/06/23/dutch-report---a-simple-and-effective-eu-ets

> "If the administrative burden of the system ceases to be proportionate to the emissions of participating companies, its cost effectiveness is threatened."

The EU ETS applies a participation threshold to exclude small emitters from the scheme (see Annex 1 of the Directive). However, the fact that installed capacity, rather than actual emissions, determines whether a company is covered by the EU ETS means that some small emitters are also included. Indeed, many EU ETS participants emit less than 25,000 tons of CO_2e per year, and in 2013, 239 of the 453 (ca. 53%) participating installations in the Netherlands were below that threshold. Such 'small emitters' collectively account for just 2.76% of all Dutch emissions covered by the EU ETS. Although the EU ETS does allow certain small emitters to voluntarily opt out, this is not possible partway through a trading period, but only once every ten years from Phase Four onwards. If small emitters were given the option to opt out partway through a trading period, then the EU ETS could be made considerably more efficient.

Voluntary compliance could be made easier

The realization of the EU ETS's climate objectives and the creation of a level playing field for all participants depend on reliable monitoring and settlement arrangements. However, certain aspects of the system are arguably disproportionate and could be simplified. For example, the rules are designed to allow complex production processes to be reliably monitored. As a result, they are exceedingly complex for companies with simple production processes, especially small and medium-sized enterprises (SMEs). Rules that are perceived to be unnecessary and disproportionate can act as a barrier to voluntary compliance. It is therefore worthwhile to investigate the proportionality of the measures for companies of various types.

Enhanced user-friendliness encourages support for the system

Application and reporting formats, the length of procedures, the registry software and the terminology used are all important aspects of the compliance cycle that have a significant impact on the perceived administrative burden. The most common concerns heard by the Dutch Emissions Authority (NEa) regarding the EU ETS are the lack of clarity, inflexibility and poor user-friendliness of the system. Application and reporting forms developed at the EU level are considered too extensive and complex, and templates do not guide users to the appropriate questions. Furthermore, the terminology of the forms does not align with what is used in practice, resulting in avoidable mistakes and non-compliance. The importance of improvements in these areas is often underestimated but they can enhance user experiences and avoid the need for corrective action to ensure compliance.

There is considerable room for simplification without affecting the robustness of the system

In response to the growing concerns of ETS participants, Wilma Mansveld, the former Dutch Minister for the Environment, posed the following question:

> "How can the European Emissions Trading System be simplified, thus reducing the administrative burden for participants and/or the implementation burden for the government, without affecting the system's reliability?"

Examining this question, a recent study by the NEa finds that there are, in fact, many ways in which an ETS could be simplified. Focusing on the EU ETS, the NEa has identified seven general simplification strategies (see box), plus 28 practical measures, which could be implemented in a wide variety of ways. According to the research, most of these measures would have no, or very little, adverse effect on the robustness of the system. It would therefore be possible to simplify the EU ETS without unacceptably detracting from the reliability, security and central principles of the system. Indeed, efficiency could be increased by striking a better balance between risk and risk-control measures, by revising existing practices, and by taking steps to increase user-friendliness.

"Seizing opportunities for simplification now can yield considerable long-term benefits. "

Two examples of simplification measures

In some cases simplification measures may apply to small emitters, while in others they rather apply to 'simple' emitters. In the Netherlands, there are numerous installations where the monitoring methodology is relatively simple and very uniform, based on fuel invoices. Most of the installations concerned use natural gas in combination with small amounts of a secondary fuel (diesel). However, these emitters have to draw up extensive monitoring plans including risk analysis and control procedures. For such companies, simplified requirements for monitoring, reporting and verification would suffice.

Another example concerns the CO_2 trading registry. Because of fraud incidents, the creation and amendment of registry accounts is subject to strict controls—and rightly so. However, many companies do not trade on a regular basis and only access the registry twice a year: once to enter their emissions and once to surrender their allowances. For them, an automated surrender of allowances managed by the registry could be introduced, much like the payment of a bill by direct debit. Such users would not need to access the account at all, and therefore would not have to meet the strict access requirements.

SEVEN GENERAL SIMPLIFICATION STRATEGIES

STRATEGY 1—MONITORING
Simpler for simple emitters, more efficient for all participants

STRATEGY 2—ALLOCATION
Shorter allocation periods, a more pragmatic approach to dealing with changes, a broader application at product benchmarks

STRATEGY 3—REPORTING AND COMPLIANCE PROCEDURES
Back to basics with facilitation and automation

STRATEGY 4—REGISTRATION
More proportionality in security measures

STRATEGY 5—VERIFICATION
Less verification where justified

STRATEGY 6—FACILITIES FOR INFORMATION TRANSFER
Clearer and easier to use

STRATEGY 7—PARTICIPATION
More logical and fairer

These and 26 other simplification measures are described in detail in the report 'A simple and effective EU ETS' [2] by the NEa. These measures will be developed further in early 2016.

A simpler ETS is a more future proof ETS

In 2015, ten years after the introduction of the EU ETS, the EU Member States and the European Commission began outlining the shape that the system will take after 2020. Therefore, it is now the ideal time to take stock, to see what lessons can be learned from the last decade and to address the task of simplifying the system.

Seizing opportunities for simplification now can yield considerable long-term benefits. For example, a simpler system would more easily allow emissions trading to be extended to other sectors with large numbers of small emitters. Simplification could also facilitate integration with ETSs in other parts of the world. Furthermore, it enhances transparency and helps build support for the system. Simplification of the EU ETS is thus an essential form of future-proofing.

The California Cap-and-Trade Program
Looking Back on the First Phase

David Clegern & Mary Jane Coombs, California Air Resources Board

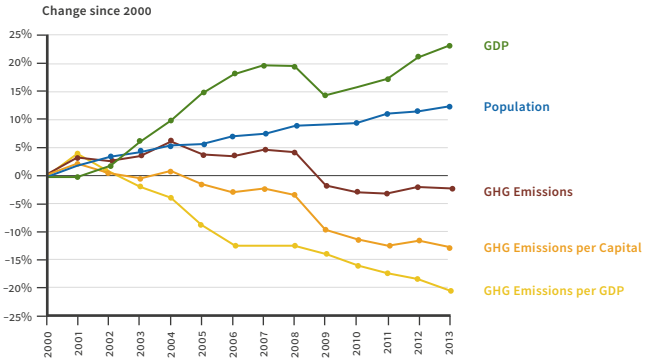
Background on California's program

Groundbreaking legislation passed in 2006 by the California State Legislature requires that the state return to 1990 levels of greenhouse gas (GHG) emissions by 2020. The economy-wide California Cap-and-Trade Program (the Program) is a key element of California's climate plan. It sets a statewide limit on sources responsible for 85% of California's GHG emissions, and establishes a price signal in order to drive long-term investment in cleaner fuels and a more efficient use of energy.

The Program is designed as part of a comprehensive set of policies. It works in concert with California's Low Carbon Fuel Standard which reduces the carbon intensity of transportation fuels, California's Advanced Clean Car Program which forces the transition to a largely zero-emission vehicle fleet, and California's Renewables Portfolio Standard which obliges electricity utilities to increase purchases of renewable electricity to 33% of their total by 2020, and to 50% by 2030. Together, these policies drive down emissions while spurring economic growth and technology development.

This combination of policies also spreads the costs and benefits of fighting climate change across the economy. They not only reduce emissions, but also encourage the development of new and more efficient businesses and generate a growing number of jobs. Since these policies have come into effect, California's carbon emissions have continued to drop while the economy has grown at a pace well beyond the national average.

"This high compliance rate demonstrates that industry can fulfill the key role it must play in California's effort to curb the impacts of climate change. It also shows that our staff has designed a program which is manageable for those who must participate."



METRIC	ASSOCIATED 2013 VALUE
GDP	2.05 trillion (2009 $)
Population	38.2 million
GHG Emissions	459.3 $MMTCO_2e$
GHG Emissions per Capital	12 metric tons CO_2e per person
GHG Emissions per GDP	224 metric tons CO_2e per million dollars

Figure 1: Change in California GDP, population and GHG emissions since 2000.
Source: California Air Resources Board Emissions Inventory; http://www.arb.ca.gov/cc/inventory/data/graph/trends/ghg_trends_00-13_20150504sm.png

The California Program has a number of design features that offer covered entities flexibility as to when, how and where emissions are reduced, including the use of offsets and multi-year compliance periods. At the same time, a progressively declining cap further serves to drive emissions reductions in line with California's climate change targets. From 2015 onwards, the cap is scheduled to be reduced by about 3% each year.[1]

The extensive coverage of the Program drives emissions reductions across the whole economy. In the first compliance period (CP1, 2013–2014), the Program covered around 450 entities, including both stationary sources[2] and importers of electricity. Last year, California became one of the few jurisdictions in the world to include the transport sector. As a result, suppliers of transportation fuels, natural gas and other fuels now have compliance obligations.

The first two-year compliance period began on 1 January 2013. Across this period, covered entities were required to meet their obligations in two stages. Firstly, in November 2014, entities had to surrender allowances[3] for 30% of their 2013 emissions. This mid-period compliance event (now an annual provision) was implemented to ensure entities keep track of their compliance obligations and to act as a kind of 'down payment' to safeguard against default. The following year (2 November 2015), entities were required to submit allowances for the remaining 70% of their 2013 emissions, and all of their 2014 emissions. Virtually all entities (402 of 404 covered facilities and importers) complied with the Program in its first period. As California Air Resources Board Chair Mary D. Nichols notes, "This high compliance rate demonstrates that industry can fulfill the key role it must play in California's effort to curb the impacts of climate change. It also shows that our staff has designed a program which is manageable for those who must participate."

1 The emissions cap for 2013 was 162.8 million metrics tons of CO_2e ($MMTCO_2e$), and for 2014 was 159.7 $MMTCO_2e$. With greater sectoral coverage, the cap more than doubled to 394.5 $MMTCO_2e$ in 2015.

2 Large sources emitting at least 25,000 $MMTCO_2e$ per year.

3 Including an optional limited number of offset credits.

4 California actually holds two auctions simultaneously: the current auction that sells allowances from the year in which the auction is held, and the advance auction that sells 10 percent of the allowances of the budget year (vintage) three years ahead.

Allowance prices are gradually rising

Allowances are issued by the Californian Air Resources Board and are sold at quarterly auctions. All bidders pay the same auction settlement price—the lowest bid above the reserve (floor price). When compliance began in 2013, the reserve price was 10.71 USD. As of 2015, this has risen to 12.10 USD and will continue to increase annually at a rate of 5% plus inflation. In the past three years, the settlement price has seen a 20% rise from 10.09 USD at the first auction held in November 2012, to 12.73 USD at the most recent, sold-out auction in November 2015. To date, the settlement price has been at or very near the floor price, which has served to keep the cost of compliance relatively modest.

During the quarterly auction, covered entities also have the option of buying allowances for future compliance.[4] This regulatory feature provides further flexibility, as companies can buy future vintage allowances while the price is low and then bank them for future use. At the most recent advance auction in November 2015, all available vintage 2018 allowances were auctioned for 12.65 USD.

"The California-Québec carbon market provides impetus for the development and use of cleaner, renewable fuels, and further evidence that weaning society from heavy use of fossil fuels need not be a painful effort."

Linking with Québec and beyond

California's Program has been linked with the Canadian Province of Québec's Cap-and-Trade system since 1 January 2014; the linked systems have held joint auctions since fall 2014. This is the first time sub-national jurisdictions have coordinated and linked their Cap-and-Trade systems. Thanks to close consultation and planning, the linking process has run smoothly. Linkage with Québec has also increased the environmental and economic benefits of both systems. Not only are more emissions being reduced, but market liquidity has also increased. This successful process provides a model for future linkage, as carbon markets continue to grow and mature across North America and the rest of the world. Looking ahead, California and Québec's joint program may expand even further with the announcement of a new Cap-and-Trade policy planned in the Canadian province of Ontario. The three jurisdictions are currently holding discussions regarding potential linkage.

California is also conducting ongoing conversations with a number of jurisdictions either already operating or planning a Cap-and-Trade program, with the goal to strengthen carbon markets

"To date, the settlement price has been at or very near the floor price, which has served to keep the cost of compliance relatively modest."

around the world. These jurisdictions include China, Japan, South Korea, the European Union's Emissions Trading System, and the Regional Greenhouse Gas Reduction Initiative. Discussions are also underway with other U.S. states, particularly in light of the Obama Administration's recently unveiled Clean Power Plan (CPP). Signed by the U.S. Environmental Protection Agency (EPA) Administrator in August 2015 and published in October 2015, the CPP regulation establishes targets for each state to reduce carbon emissions from existing power plants by 2030. With states given the flexibility to decide how to meet these targets, the California Cap-and-Trade Program may provide an attractive compliance model.

California sees its carbon market not only as a means of driving down emissions, but as a vehicle for building stringent national and international standards for quantifying carbon reductions. While the market-based approach has a number of benefits, it is viewed as a regulatory means to an end, and not an end in itself. Agreement on solid and verifiable standards for emissions reductions is critical to mitigating the worst impacts of climate change.

Conclusion

The California-Québec carbon market provides impetus for the development and use of cleaner, renewable fuels, and further evidence that weaning society from heavy use of fossil fuels need not be a painful effort. The growth in awareness of climate change issues and emissions reduction programs by private businesses, spurred on by customers and stockholders, is a strong indication the world is beginning to change direction. The fact is, none of us are 'going it alone' anymore in the battle against climate change, and a healthy carbon market provides another opportunity for us to work together to tackle a problem none of us can take on by ourselves.

The Regional Greenhouse Gas Initiative
A Model for Implementing the Clean Power Plan

Will Space, Massachusetts Department of Environmental Protection
Lois New, Office of Climate Change, New York State Department of Environmental Conservation
Justin Johnson, Office of the Governor, State of Vermont

The Clean Power Plan mandates state-wide reductions

Power plants are the largest source of carbon emissions in the United States, accounting for about one-third of domestic greenhouse gas emissions. On 3 August 2015, the U.S. Environmental Protection Agency (EPA) issued the Clean Power Plan (CPP), incorporating extensive public comments on the draft released in 2014, thereby establishing a national program to reduce carbon pollution from power plants by 32% below 2005 levels by 2030. The CPP sets a CO_2 reduction goal for each state, while giving the states considerable flexibility in how they achieve their respective goals.[1] The success of the Regional Greenhouse Gas Initiative (RGGI) states in reducing CO_2 has made the RGGI program a model for many elements of the CPP, and the structure of the final CPP could potentially foster the expansion of power-sector carbon markets across the U.S. Whether and how this will occur will not be known for several years, but regional trading could play an important role.

The CPP is a key component of President Obama's Climate Action Plan. The structure of the CCP is consistent with the U.S. Clean Air Act which requires the EPA to regulate carbon emissions from existing power plants. The CPP sets state-wide emissions reductions targets, and then allows states to decide which policies should be implemented to achieve them. For example, a state may choose to cap the total amount of emissions from in-state power plants, or instead adopt a 'rate-based' limit. No matter what policies are selected, states must demonstrate that the required emission reductions have been achieved from the power sector.

> "The CPP sets state-wide emissions reductions targets, and then allows states to decide which policies should be implemented to achieve them."

> "If enough states express interest, it is possible that these submissions will ultimately lead to the formation of a national carbon market."

The RGGI model as a means of compliance

Adopting an ETS is an obvious solution for many states, and the EPA is providing strong support for ETS development, such as model regulations, technical assistance with allowance tracking, and even the potential option for states to join an EPA-administered ETS. Many stakeholders, including environmental NGOs, electricity grid operators, and power companies support emissions trading as the preferred approach to comply with the CPP, drawing on a comprehensive library of academic literature and decades of experience with ETS. On the other hand, states may consider other approaches, such as implementing rate-based standards, or integrated resource planning in regions with regulated wholesale electricity markets. How this will play out will become clearer as states submit their compliance plans over the next few years, with initial submissions due in September 2016 and final plans due two years later. As the CPP requires the gradual reduction of CO_2 emissions over the 2022–2030 timeframe, electricity producers have time to plan business strategies to lower their emissions consistent with the CPP implementation approach taken by each state.

Because of its focus on the electricity sector, RGGI is well suited for CPP compliance. The timing of the CPP is also advantageous, as the RGGI states have recently started a previously-planned program review that will, among other aims, address any reform needed to comply with the CPP. Recent research conducted on the RGGI program will inform this review. In fact, several recent studies highlight the positive effects of the program. For example, the Analysis Group, a U.S.-based independent consultancy, documented net economic benefits from the program of more than USD 1.3 billion from 2012–2014,[2] and an assessment by researchers at Duke University affirmed RGGI's contribution to emission reductions in comparison to other factors such as weather and fuel prices.[3] These positive assessments, the planned program review, and the 2016 deadline for initial CPP submissions will ensure that over the next year RGGI continues to generate strong interest among policymakers as a model for CPP compliance across the U.S..

The RGGI carbon market remains robust with good prospects. Allowance prices have recently risen above USD 8.00 per metric ton of CO_2,[4] and a RGGI stakeholder meeting in November 2015 indicated that there is strong interest in using RGGI to comply with the CPP. Serious conversations are now underway in other states about implementing market-based approaches for CPP compliance. The situation will become clearer over the next six months as states prepare for the September deadline to submit initial

1 For details of the Clean Power Plan see: http://www.epa.gov/cleanpowerplan/clean-power-plan-existing-power-plants

2 Analysis Group (2015) 'The Economic Impacts of the Regional Greenhouse Gas Initiative on Nine Northeast and Mid-Atlantic States'. Available at: http://www.analy-sisgroup.com/news-and-events/press-releases/new-data-show-states-that-limit-carbon-emissions-through-markets-are-seeing-economic-benefits/

3 Murray, B. C. and Maniloff P. T. (2015) 'Why Have Greenhouse Emissions in RGGI States Declined? An Econometric Attribution to Economic, Energy Market, and Policy Factors' Energy Economics 51:581–589. Available at: https://nicholasinstitute.duke.edu/environment/publications/why-have-greenhouse-emissions-rggi-states-declined-econometric-attribution-economic

4 The most recent RGGI allowance auction cleared at 7.50 USD per short ton of car-bon dioxide, which corresponds to 8.27 USD per metric ton. RGGI auction results are available at http://www.rggi.org/market/co2_auctions/results

plans to the EPA indicating how each state intends to implement the CPP. If enough states express interest, it is possible that these submissions will ultimately lead to the formation of a national carbon market.

"While states are not obliged to implement an ETS, the EPA will allow states to form linked or multi-state programs, regardless of whether they are neighbors or share a common electricity market."

ICAP members may be particularly interested in how discussions about expanding emissions trading beyond RGGI and California are informed by technical knowledge on ETS design. From an academic perspective, expansion would be a positive development as it is well known that larger markets can deliver more emissions reductions at lower costs. On the other hand, issues that have been discussed in the context of linking may pose challenges, particularly when one considers the diversity of U.S. states with respect to size and power generation resources. While states are not obliged to implement an ETS, the EPA will allow states to form linked or multi-state programs, regardless of whether they are neighbors or share a common electricity market. Therefore, the size and configuration of any ETS that may be used to comply with the CPP is uncertain and will remain so for some time. It will be a busy year for regulators, stakeholders, and academics that wish to provide input, with resources such as ICAP's annual reports providing valuable evidence of the viability and adaptability of Emissions Trading Systems.

"Informed by a robust stakeholder process, the RGGI states intend to maintain their leadership role by updating the RGGI program to address the CPP's requirements, provide a model for other states, allow for an expanded carbon market, and support economic growth."

Conclusion

The ETS concept originated in the U.S., and RGGI is one of the first ETS in the world to address carbon dioxide emissions. Informed by a robust stakeholder process, the RGGI states intend to maintain their leadership role by updating the RGGI program to address the CPP's requirements, provide a model for other states, allow for an expanded carbon market, and support economic growth. The EPA's finalization of the CPP, including support for the creation of RGGI-like systems in other U.S. states, represents significant progress for RGGI and U.S. climate policy.

Emissions Trading in China
Progress on the Path Towards a Unified National System

Qian Guoqiang & Chen Zhibin, SinoCarbon Innovation & Investment Co. Ltd.

Significant breakthrough achieved in 2015

2015 marked a significant milestone on the path towards the implementation of China's national carbon market. China's intention to launch a unified national carbon market by 2017 was unequivocally confirmed at the highest political level, both in the September presidential announcement of the *Sino-US Joint Statement on Climate Change*, and in the Resolution adopted at the Fifth Plenary Session of the 18th Central Committee of the Communist Party of China in October 2015, in which 'green development' was adopted as a key element of China's development strategy. It is expected that low-carbon development and climate action will feature prominently in China's upcoming 13th Five Year Plan (2016–2020).

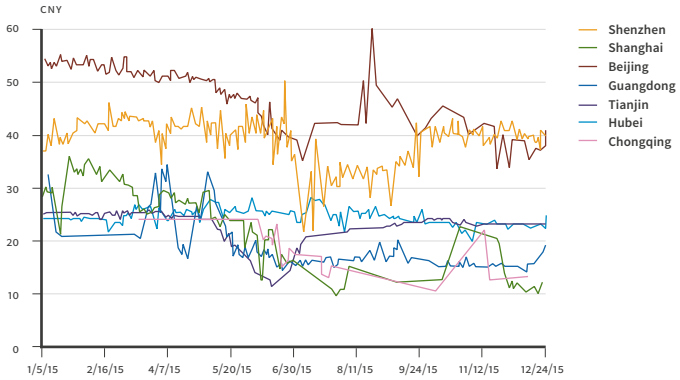


Figure 1: Carbon prices flow in China's ETS pilots in 2015

Improved pilot schemes

2015 was also the first year in which all seven of China's pilot schemes completed their annual compliance cycles. While Beijing, Tianjin, Shanghai, Guangdong and Shenzhen completed a second cycle and witnessed notable performance improvements (both better compliance rates and market liquidity than in their first year), it was the first time Hubei and Chongqing completed their compliance cycles.

Figure 1 indicates that throughout 2015 the carbon prices in the seven pilots have been relatively stable, but at different levels. There was a moderate price drop in some pilots after the compliance period [1] as a result of an economic downturn and policy uncertainty regarding the transition from pilot schemes to a national market. At the end of November 2015, allowance prices in Beijing and Shenzhen were around CNY 40 (EUR 5.7), higher than prices in the other pilots (around CNY 10–25, or EUR 1.4–3.5).

As of 31 December 2015, the accumulated secondary market trading value of the pilot schemes had reached CNY 1.41 billion (EUR 198 million), and the accumulated trading volume reached 49.79 $MtCO_2$. The Hubei pilot still has the largest market share, with a trading value of CNY 540 million and a trading volume of 22.54 $MtCO_2$.

The successful implementation and smooth operation of the pilot schemes has eased the concerns of critics. Many doubted that it would be possible to implement such a complex policy instrument as a domestic ETS in a developing country like China. The pilot schemes' improving performance shows that gaining practical experience is more important than policy debate, given the learning-by-doing nature of the piloting phase. Furthermore, the success of the pilots gives policy makers at the national level even more confidence to embark on a national unified ETS.

Each of the seven pilots still faces a common issue: they must devise a way to smoothly transition from a pilot scheme to a unified national scheme. With different regulations and rules, each pilot scheme needs a somewhat different approach. The imminent challenge is the carryover of allowances from the pilot schemes to the future national ETS when it starts in 2017.

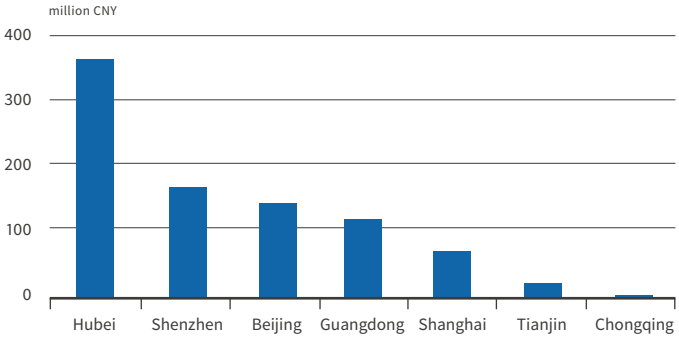


Figure 2: Accumulated trading value in secondary market of various ETS pilots in 2015

Blueprint for the national unified market is already sketched out

Based on experiences and lessons from the pilot schemes, and with high-level political support, progress on the national ETS has gained momentum in 2015 under the leadership of the National Development and Reform Commission (NDRC). The approach to designing a national unified carbon market is set to follow the principle of centralized uniform rules, including coverage standards, MRV, cap setting and allocation, compliance requirements, and trading rules. Provincial authorities will have to follow these rules, with the potential to cover more sectors or small emitters in the pilot regions.

The legal basis for the national ETS is also progressing. In August 2015, the national ETS legislation (at the State Council level) achieved a major step forward through a public hearing organized by the NDRC at the request of the Legislative Affairs Office of the

1 The deadline for covered entities to surrender allowances for the purpose of compliance varies across the pilot schemes and ranges from May to June.
2 Available online at: http://www.ndrc.gov.cn/zcfb/zcfbtz/201601/t20160122_772123.html
3 By the end of 2015, NDRC had issued reporting guidelines for 24 sectors.

"China's intention to launch a unified national carbon market by 2017 was unequivocally confirmed at the highest political level."

State Council (LAO). The NDRC are endeavoring to put the ETS legislation into the 2016 work plan of LAO, with the aim of passing a national ETS regulation in the same year.

The establishment of an offset mechanism is an important element in the development of an institutional framework for an ETS. 2015 is the first year that credits generated by China Certified Emissions Reductions (CCER) projects have been surrendered for compliance in the pilot schemes. The successful use of these credits indicates that both the offset system and the national registry are ready for the national market. As of 25 December 2015, there were 1078 CCER projects in the pipeline, of which 339 projects have been approved for registration (see Figure 4), and 83 projects with about 25 million tons of CCERs have been issued.

PILOT SCHEMES	COMPLIANCE RATE 2013	COMPLIANCE RATE 2014
SHANGHAI	**100%** (191/191)	**100%** (190/190)
SHENZHEN	**99.4%** (631/635)	**99.7%** (634/636)
GUANGDONG	**98.9%** (182/184)	**100%** (184/184)
BEIJING	**97.1%** (403/415)	**100%** (543/543)
TIANJIN	**96.5%** (110/114)	**99.1%** (111/112)

Table 1: Comparison of compliance rates in 2013 and 2014

Intense preparations needed throughout 2016

With high-level political commitment confirmed, and the national ETS legislation under development, it is critical that preparations for system design and implementation progress through 2016. In particular, historical data reporting and the preparation of an allowance allocation plan will need to be advanced. In 2015, the NDRC held a number of working conferences with provincial authorities aimed at advancing technical work at the local level. Then, on 11 January 2016, the NDRC released the landmark *Notice on Key Works in Preparation for the Launch of the National ETS* [2] (the Notice), which paves the way for local level work in preparation for the launch of the national ETS in 2017. In the Notice, the NDRC gives provincial authorities a clear mandate to prepare for the national ETS. It outlines the scope of the national system and provides important information for local level preparation, including key steps, a timeline for implementation, clear technical guidance, and templates for data reporting and verification.

The Notice defines the scope for historical data reporting and the selection of covered entities. The power sector (coal-fired and gas-fired power generation, combined heat and power generation, and grids), petrochemical production (crude oil processing, ethylene production), chemical production (ammonia, carbide, and methanol production), building materials (cement clinker and plate glass production), crude steel production, nonferrous metals (electrolytic aluminum, copper smelting), pulp and paper production, and aviation (passenger air transport, air cargo transport and airports) are the first industries to be included. Within these sectors, legal entities whose annual energy consumption exceeds

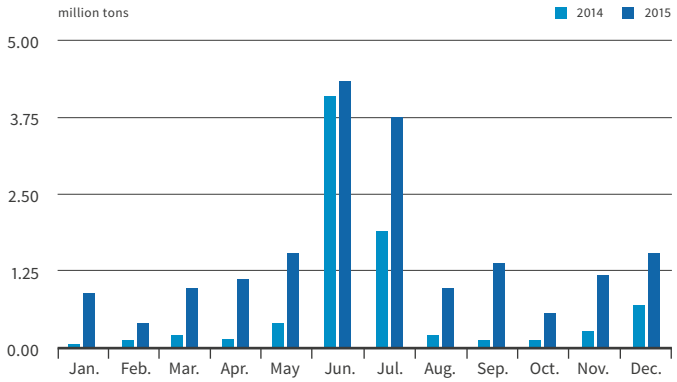


Figure 3: Monthly trading volume comparison in five pilot schemes.

10,000 tons of standard-coal-equivalent in any of the years 2013, 2014, or 2015, are to be identified by provincial authorities and compiled into a list of potential covered entities.

The provincial authorities are then requested by the NDRC to collect verified historical data reports from the potential covered entities, in order to prepare a national allocation plan. To guide this process, the NDRC has issued reporting guidelines for covered sectors. [3] The NDRC has also prepared additional reporting templates, verification guidelines and templates to facilitate historical data collection. Potential covered entities are requested to report historical data for the period from 2013–2015, and all historical data reports are to be subject to third-party verification.

To further facilitate data reporting and verification, the NDRC has created a national MRV Q&A platform. Stakeholders will be able to ask technical questions, either via an online system or a telephone helpdesk, and all official answers will be posted on the platform website. As data reporting and verification will take place in parallel across the various provinces, it is important to provide centralized guidance for using the reporting and verification guidelines and templates. Such guidance will ensure that rules are implemented consistently, ensuring, for example that "a ton is a ton" across all provinces.

Capacity building is also a critical task for 2016, considering the limited experience of stakeholders, particularly in the non-pilot regions. Both the NDRC and the provincial authorities will need to secure the necessary resources to enhance capacity building, and strengthen policy research and consultation.

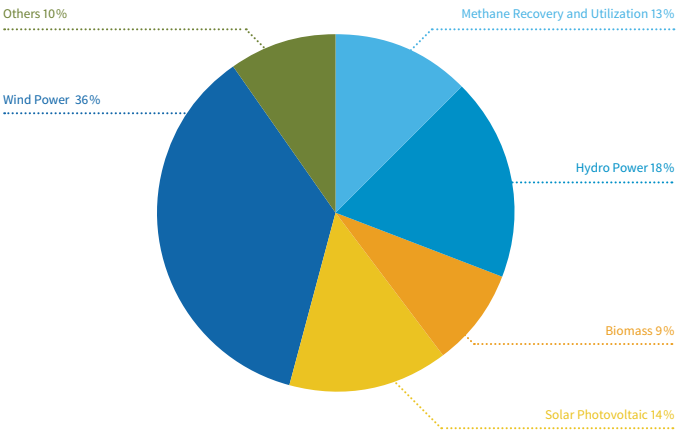


Figure 4: Distribution of registered CCER projects by category

The Korean Emissions Trading Scheme

Implementation of the Korean Emissions Trading Scheme and the Road Ahead

Hyungsup Lee, Ministry of Environment of the Republic of Korea

Background

When considering the best policy to reduce greenhouse gas (GHG) emissions, carbon pricing instruments such as Emissions Trading Systems (ETS) and carbon taxes are usually discussed. Global trends show that ETS is often the instrument of choice. It is the key climate policy instrument for a growing number of jurisdictions around the world, and is already well established in 35 countries. Since 2005, the European Union (EU) has operated the EU ETS, which is recognized for its achievements in effectively reducing GHG emissions without undermining industrial competitiveness. Now, ETS is being adopted by developing countries as well. The future carbon market is developing rapidly in Asia, and just as in other economic sectors, China draws much of the attention, with seven regional pilot systems already operating, and plans to expand the scheme nationwide starting 2017. Such developments are driven by the belief that climate change can be tackled through technological development and that proactive measures will lead to new opportunities. This belief also underpins the evolution of the Korean Emissions Trading Scheme (KETS), which last year became the first nationwide ETS in East Asia, and the second largest in the world.

Preparation

Korea implemented its ETS on 1 January 2015. The legal basis[1] was established in May 2012 after gaining bipartisan agreement in the National Assembly. Following the enactment, the Korean government made thorough preparations for implementing the KETS. For instance, a stakeholder dialogue involving experts, companies and civic groups has been in operation since June 2013 to ensure broad participation in the design phase of the scheme. Consequently, in January 2014, a basic plan was developed proposing the scheme's operational direction over the medium and long term. The Korea Exchange (KRX) was also designated as a trading platform. In September 2014, the National Allocation Plan (NAP) was finalized, based on expert review, ministerial consultation, and input from the private sector and civil society. Following this, specific guidelines were established for six areas of operation: allocation, verification, certification, early action, offsets, and trading.

> "The TMS is a unique policy for managing GHG in Korea. It has laid the ground work and enabled a smooth transition to the KETS, which similarly drives emissions reductions but delivers greater economic benefits."

In 2009, at the UNFCCC Conference of the Parties in Copenhagen (COP15), Korea announced its national medium-term GHG reduction target[2], which was reiterated in Korean national law. To attain this target, Korea implemented the Target Management Scheme (TMS) in 2012, which was mostly superseded by the KETS in 2015.[3] The TMS and the KETS are similar in many aspects, especially in terms of the allocation of allowances to installations based on a reduction target, and the measuring, reporting and verification (MRV) of emissions. However, the KETS differs from the TMS mostly in its high level of compliance flexibility. In the case of the TMS, the only way for a covered entity to achieve the allocated reduction target is to make actual GHG reductions on site. In comparison, the KETS offers various means to achieve the given target, such as allowance purchases, offsets, and, to a limited extent, through borrowing. In addition, the KETS offers strong incentives for entities to achieve reductions exceeding the target, in that surplus allowances may be sold to other entities, which is not permitted under the TMS. Furthermore, the KETS also allows entities to bank any surplus allowances to be used for surrender obligations or to be sold in the following year. The TMS is a unique policy for managing GHG in Korea. It has laid the ground work and enabled a smooth transition to the KETS, which similarly drives emissions reductions but delivers greater economic benefits.

System design

The KETS covers the power and industrial sectors, and targets large-scale sources that account for about 68% of national emissions. Covered entities include any legal entity (e.g. company) with emissions more than 125,000 tCO_2e or installations (e.g. industrial facilities) with emissions more than 25,000 tCO_2e. Indirect emissions are also covered by the KETS. That is, the KETS covers direct emissions from large electricity generators (such as coal-fired power plants), and indirect emissions from large electricity consumers (such as large commercial buildings).[4] Therefore, corresponding allowances are allocated for both direct and indirect emissions.[5] Furthermore, entities or installations with emissions below these criteria are allowed to participate in the KETS on a voluntary basis, but only if they have at least one year of experience operating under the TMS. This measure has been put in place to avoid unnecessary trial and error by limiting participation in the KETS to companies that already have experience with MRV.

1 Act on the Allocation and Trading of Greenhouse Gas Emission Permits (May 2012) and its Enforcement Decree (November 2012).

2 30% reduction against 2020 business-as-usual (BAU) projections.

3 The TMS is still operating alongside the KETS, targeting small- and mid-sized companies whose emissions fall under the threshold of KETS coverage.

4 As the price of electricity in Korea is regulated, there is no mechanism for energy companies to pass compliance costs on to consumers. Indirect emissions are therefore covered so that large energy consumers also face a price incentive.

5 Allowances allocated for indirect emissions are reflected in a higher cap. This prevents covered entities from being unfairly regulated twice for the same emissions.

6 Samsung Economic Research Institute, Korea Energy Economics Institute and Korea Environment Institute.

Meanwhile, during the first phase (2015–2017) the cap has been fixed at approximately 1,687 million Korean Allowance Units (KAUs). The cap includes allowances allocated to indirect emissions. Allocation may be made according to historic GHG emissions (Grandfathering), historic activities (Benchmarking) or expected emissions from new and additional facilities. The method is chosen based on the allocation application written and submitted by each entity. A working group comprised of non-government experts from academia and the private sector decides on the allocation method based on the allocation application, and then submits its decision to the responsible authority. Allowances are finally allocated after consultation with the involved ministries and a review by the Allocation Decision Deliberation Committee. The procedure for verifying emissions is similar to that of other systems in that emissions are confirmed by a third party verifier that looks into GHGs emitted from production activities for one year.

"The 'Stakeholder Dialogues' undertaken during the preparation phase of the KETS have been developed into the 'ETS Consultative Body', with greater scope to engage and communicate with stakeholders."

Operational status

Emissions trading began on 12 January 2015 with the opening of the Korea Exchange (KRX). As of December 2015, the total trading volume was about 4.4 million tons (transaction value of 41 million USD), including KAUs, Korean Credit Units (KCUs) and Korean Offset Credits (KOCs). The trading volume of KAUs has been relatively low, and less than that of KCUs. However, the trading of KCUs has continued to rise since they were first listed on 6 April 2015. Companies argue that the low level of transactions indicates that the KETS is poorly operated. However, this argument stems from a misunderstanding of the scheme per se. The main purpose of the scheme is not to facilitate emissions trading, but to achieve GHG reductions in a cost effective manner. Active trading is simply a result of the scheme's operation. Furthermore, the KETS is a closed market, with limited participation from financial investors until at least 2020. Therefore, there is still little trade in derivatives with allowances as underlying assets. This differs from the EU ETS carbon market, for instance, in which derivatives, including futures, make up the majority of trades. Companies also assert that meager allocation has caused the low trading volume. However, more allocation does not necessarily lead to more trading. On the contrary, if the market comprised only companies intending to sell surplus allowances, then trading would not take place at all. Indeed, the most extreme measure to stimulate trading would be to allocate allowances disproportionately, and then let market forces find the balance. However, this is without a doubt an unreasonable and unfair approach to allocation.

Already during the planning phase, companies argued that allocation levels were insufficient. Of course, if companies were to be allocated as many allowances as they requested, then the scheme would not drive any emissions reductions. In fact, it is still too early to tell whether allocation levels are either insufficient or excessive. So far, arguments are based on estimations rather than actual emissions levels and hence it would be reasonable to wait until emissions are first measured in May 2016 before making any conclusions. Here we can learn from the first phase of the EU ETS: In the first year of trading, companies' anxiety about insufficient allowances drove up the allowance price, which then plummeted in the following year when actual emissions were measured and announced. Despite the initial fears, allowances were then deemed to be excessively allocated.

The road ahead

With the implementation of the KETS now well underway, the scheme will continue to develop and evolve, with several measures planned to support this process. Firstly, it is expected that companies will begin to invest in an increasing number of offset projects, thereby achieving emissions reductions in a diverse and flexible manner. In addition, there is a plan to establish a market monitoring system to provide companies with market information on a regular basis while monitoring unfair trade. Furthermore, the 'Stakeholder Dialogues' undertaken during the preparation phase of the KETS have been developed into the 'ETS Consultative Body', with greater scope to engage and communicate with stakeholders. This new institution will encourage the participation of companies not able to take part in previous dialogues, and ensure that a range of opinions in the field are heard.

According to analysis conducted by Korea's leading economic research institutes[6] focusing on energy or climate change, the KETS will reduce mitigation costs by 44%–68% compared to the TMS. Moreover, companies will have an incentive to invest in low-carbon technology, such as renewable and highly efficient energy systems, and be encouraged to innovate. In the long term, these investments will contribute to economic growth and help Korea shift to a low-carbon economy. Yet, any such contribution can only be realized if operational factors supporting the KETS are designed reasonably. It would, however, be more than challenging to design an ideal scheme from the very beginning. Rather, it is believed that as the KETS continues to operate, over time we can achieve the gradual improvement and advancement of the scheme in line with local circumstances.

The Tokyo Cap-and-Trade Program
New Measures for the Second Compliance Period and Lessons Learned

Masahiro Kimura, Tokyo Metropolitan Government

The Tokyo Cap-and-Trade Program is a unique, pioneering city-based Emissions Trading System that is designed to fit the emissions profile and scope of the Tokyo Metropolitan Area. Typical of any major metropolitan city, Tokyo's emissions stem from the consumption rather than the production of energy. The point of regulation is therefore downstream, with compliance entities consisting of commercial and industrial energy users. Energy suppliers, such as large power plants located outside of the Tokyo Metropolitan Government's (TMG) jurisdiction, are not directly regulated. In order to meet the challenges of a city-scale system, the Tokyo Cap-and-Trade Program has a range of design features that target both the owners and the tenants of compliance facilities to promote energy efficiency and achieve ambitious targets.

After nearly five years of operation, the Tokyo Cap-and-Trade Program has now entered the second compliance period (FY2015–2019). Here at TMG, we would like to share some of the unique measures now being implemented, and reflect on our lessons learned so far.

Update on the Tokyo Cap-and-Trade Program

On 19 February 2015, the TMG announced that the Tokyo Cap-and-Trade Program achieved a 23% reduction in emissions after the fourth year of the first compliance period (FY2013) compared to base-year emissions. In 2015, the Tokyo Cap-and-Trade Program transitioned to the second compliance period (FY2015–2019). One of the biggest changes from the first compliance period (FY2010–2014) is the increase in the compliance factor for each category (commercial buildings from 8% to 17%, and industrial facilities from 6% to 15%). At the same time, we have introduced several new measures designed to support facilities in reaching the new targets, and to incentivize low-carbon energy suppliers outside of the program.

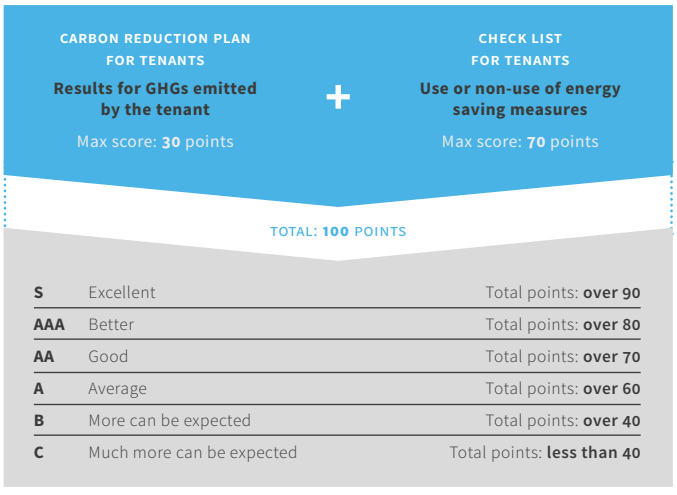


Figure 1: Appraisal and publication system for tenants, Tokyo Metropolitan Government (2015)

1. A new mechanism to encourage compliance facilities to use low-carbon energy suppliers

In order to calculate their emissions from energy use (specifically electricity and heat), compliance facilities use standard conversion factors[1] that do not distinguish between suppliers. However, a new mechanism is being introduced that enables facilities to identify low-carbon energy suppliers, and encourages their use. Under the new mechanism, energy suppliers certified by TMG will receive an individual conversion factor reflecting their improved emissions performance. Therefore, if a facility decides to use a low-carbon energy supplier, the improved conversion factor can be applied to their accounting, effectively resulting in a reduction in their annual emissions. This represents a unique and innovative demand-side approach, aimed at increasing the supply of low-carbon energy by encouraging low-carbon consumption.

> "After the Tokyo Cap-and-Trade Program was established, it was the promotion system that ensured its successful implementation … fostering a cooperative relationship between owners and tenants is vital."

2. Appraisal and publication system for tenants

In order to meet the increased compliance factors of the second period, facility owners will need to cooperate more closely with their tenants, who will also need to take a greater role in achieving reductions. Furthermore, some tenants lack the know-how and capacity to undertake energy saving measures. To address these factors, we have started a system to evaluate and publicly disclose tenants' carbon reduction measures. The main effects of this system are 1) social appraisal, 2) comparison between tenants, and 3) motivation for further reduction effort. There are six evaluation categories with tenants ranked from the bottom category (C) to the top category (S).

3. Certification system for energy efficient data centers

Data processing is an energy-intensive commercial activity on the rise in cities such as Tokyo. The combined server floor area of data centers in Tokyo makes up around half of the national total. To address emissions from data centers, TMG reached an agreement with the Japanese Data Center Council and has started the certification system for energy efficient data centers. The criteria for

1 Standard conversion factors are calculated for (a) electricity: the average carbon intensity of electric companies that supply Tokyo (average of FY2011 and FY2012); and (b) heat: the average carbon intensity of heat suppliers in Tokyo (average of FY2012).

"This represents a unique and innovative demand-side approach, aimed at increasing the supply of low-carbon energy by encouraging low-carbon consumption."

certification include the overall energy efficiency of centers, as well as specific management measures for energy efficiency, and other measures related to security management (e.g., earthquake proof, ready for power failure, data security etc.). Furthermore, for small and mid-sized facilities contracting data services, we support the cost of transferring their data to certified data centers.

Lessons learned

The Tokyo Cap-and-Trade Program is unlike other Emissions Trading Systems, and there were specific keys factors that were considered in its design and development. The following section outlines some of the lessons we have learned, and we believe these will also be helpful for other jurisdictions considering such a Cap-and-Trade program.

1. Clear goal

In general, it is important that businesses and organizations that will be affected by a new policy gain a clear understanding of the necessity to introduce a certain measure. In the case of the Tokyo Cap-and-Trade Program, we publicized the mid- and long-term carbon reduction targets and the planned compliance factors for the first and the second periods before starting the program, in order to foster awareness.

2. Establishment of the promotion system

To support facilities in meeting their compliance obligations, we engage with key actors to promote energy efficiency and emissions reductions. After the Tokyo Cap-and-Trade Program was established, it was the promotion system that ensured its successful implementation. In our experience, there are several key factors. First, the management of each company should be informed about energy efficiency as a whole and enabled to use the budget for this purpose. Secondly, General Managers and Technical Managers under the Tokyo Cap-and-Trade Program responsible for a facility's energy efficiency play an important role in the implementation of emissions reduction measures. Finally, fostering a cooperative relationship between owners and tenants is vital.

3. Capacity building

In order to successfully meet our reduction targets, it is necessary to share information and conduct capacity building, both on the side of the government and on the side of the compliance facilities. Outlined below are some of our key activities in this area:

For compliance facilities:

- TMG gives targeted feedback to compliance facilities. Feedback is based on their annual reports, which detail their energy saving measures and emissions results.
- We provide a "help desk" service to answer questions from compliance facilities and to advise them on the Cap-and-Trade program.
- TMG holds annual seminars and lectures for the compliance facilities to deepen their understanding about the Cap-and-Trade program.
- TMG disseminates brochures and best practice reports, not only for compliance facilities, but also for tenants and top-level facilities. For instance, we disclose the names of highly energy efficient facilities and share information on how they have achieved their excellent performance.

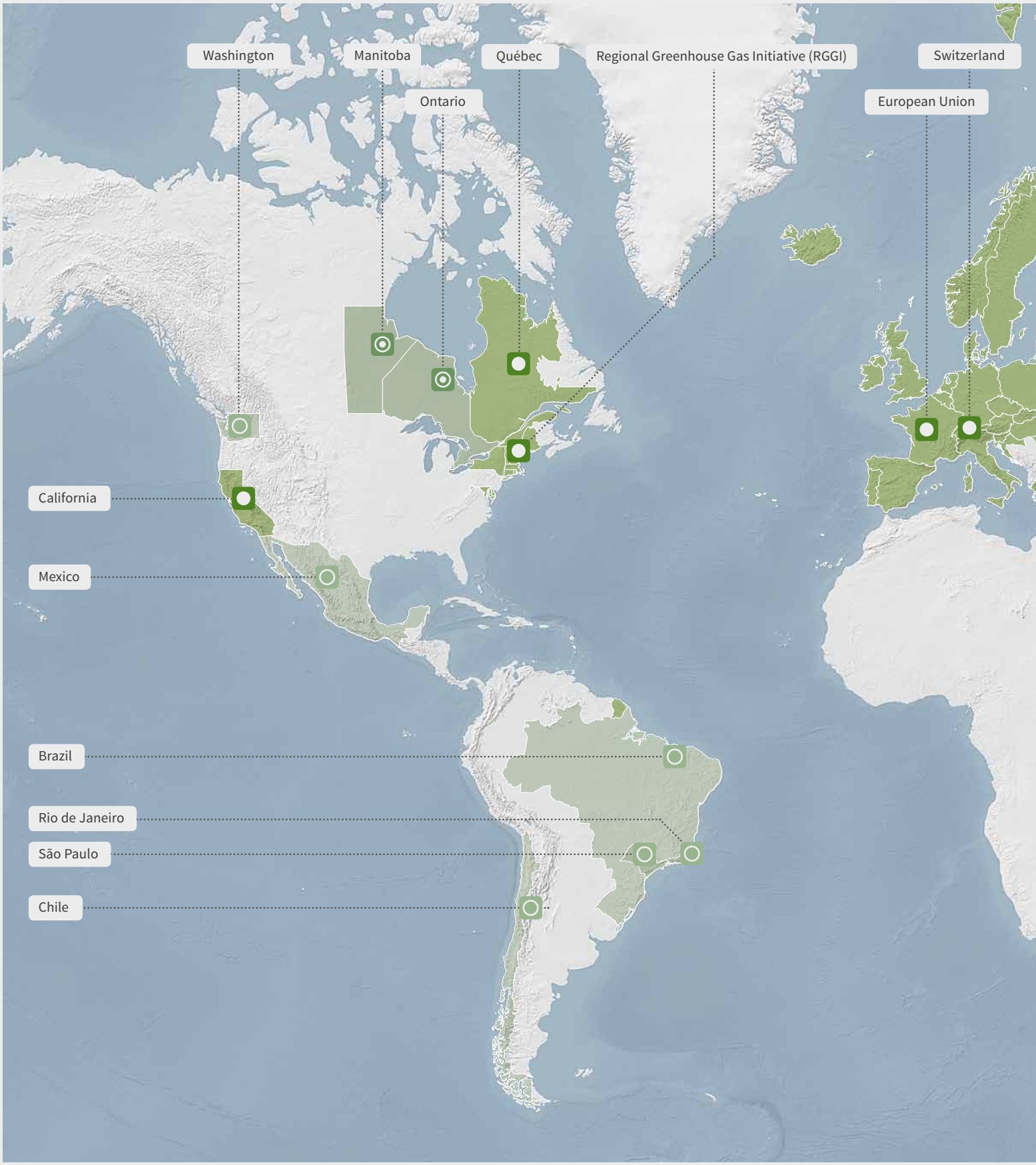
For the government:

- TMG is engaging in communication with stakeholders in order to learn about the energy saving measures currently being taken by the compliance facilities and thereby be able to prepare constructive feedback for them.
- Finally, learning from another jurisdiction's experience is always important. It allows us to reflect on and improve our own scheme, and motivates us to strive for a more ambitious target.

ETS Map

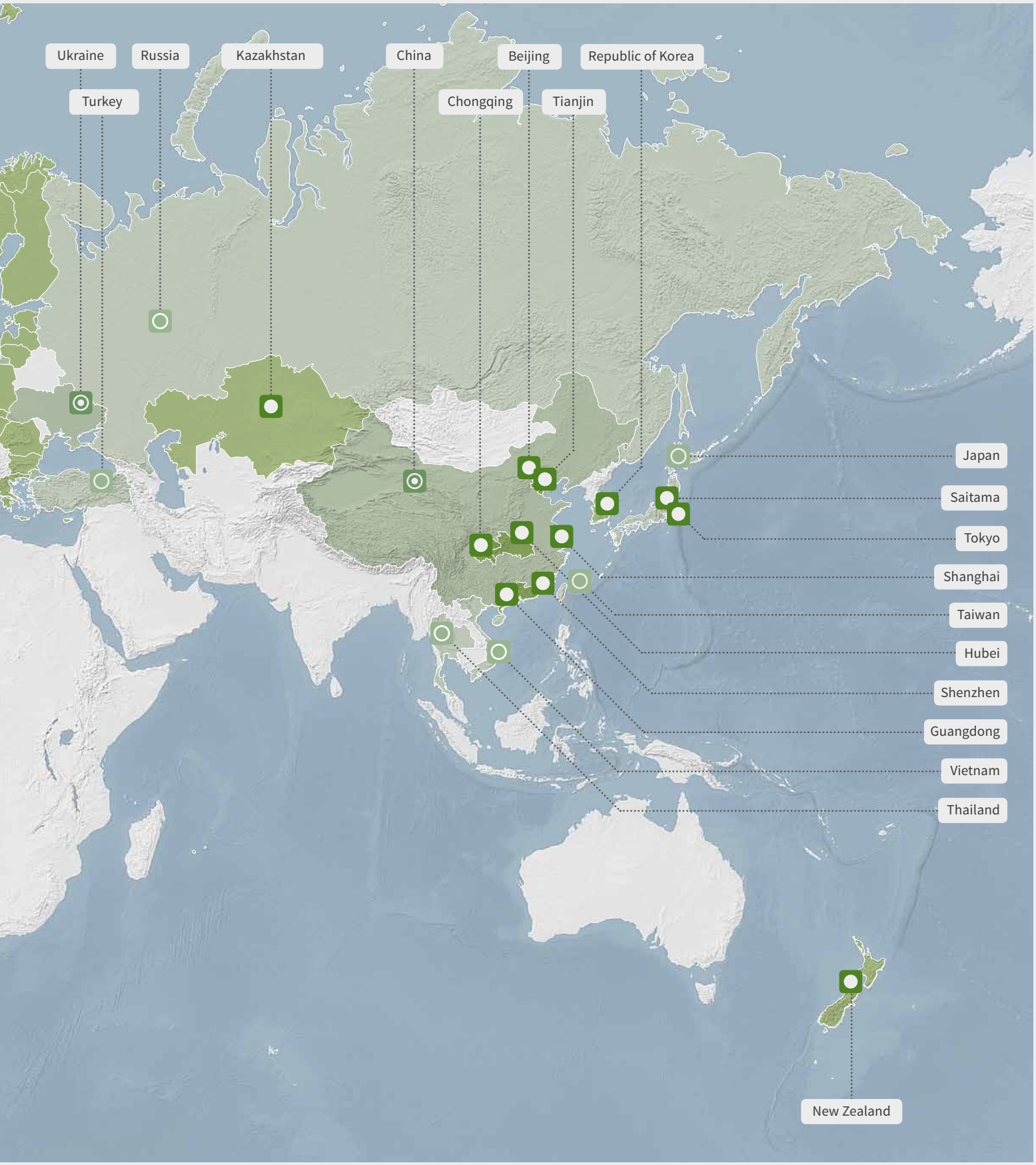
State of Play of Cap-and-Trade Worldwide

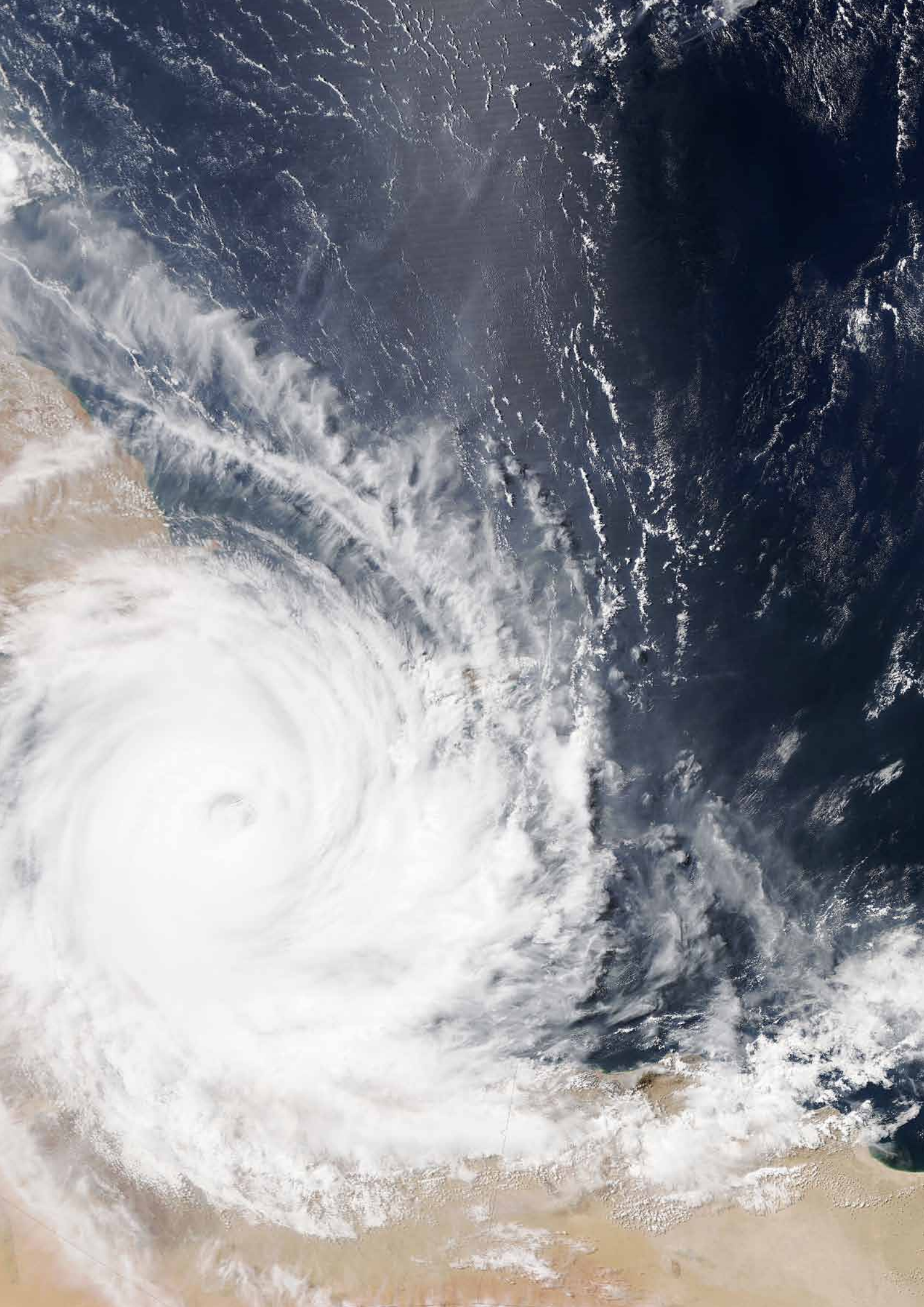
The ICAP ETS map depicts ETS for GHG in force, scheduled or under consideration around the world. 17 systems are in force to date and this past year saw announcements of planned systems in China, Ontario, Manitoba, and Ukraine. Finally, 11 governments at various levels are considering what role an ETS can play in their climate change policy mix, including Mexico, Brazil, Turkey and Washington State.



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

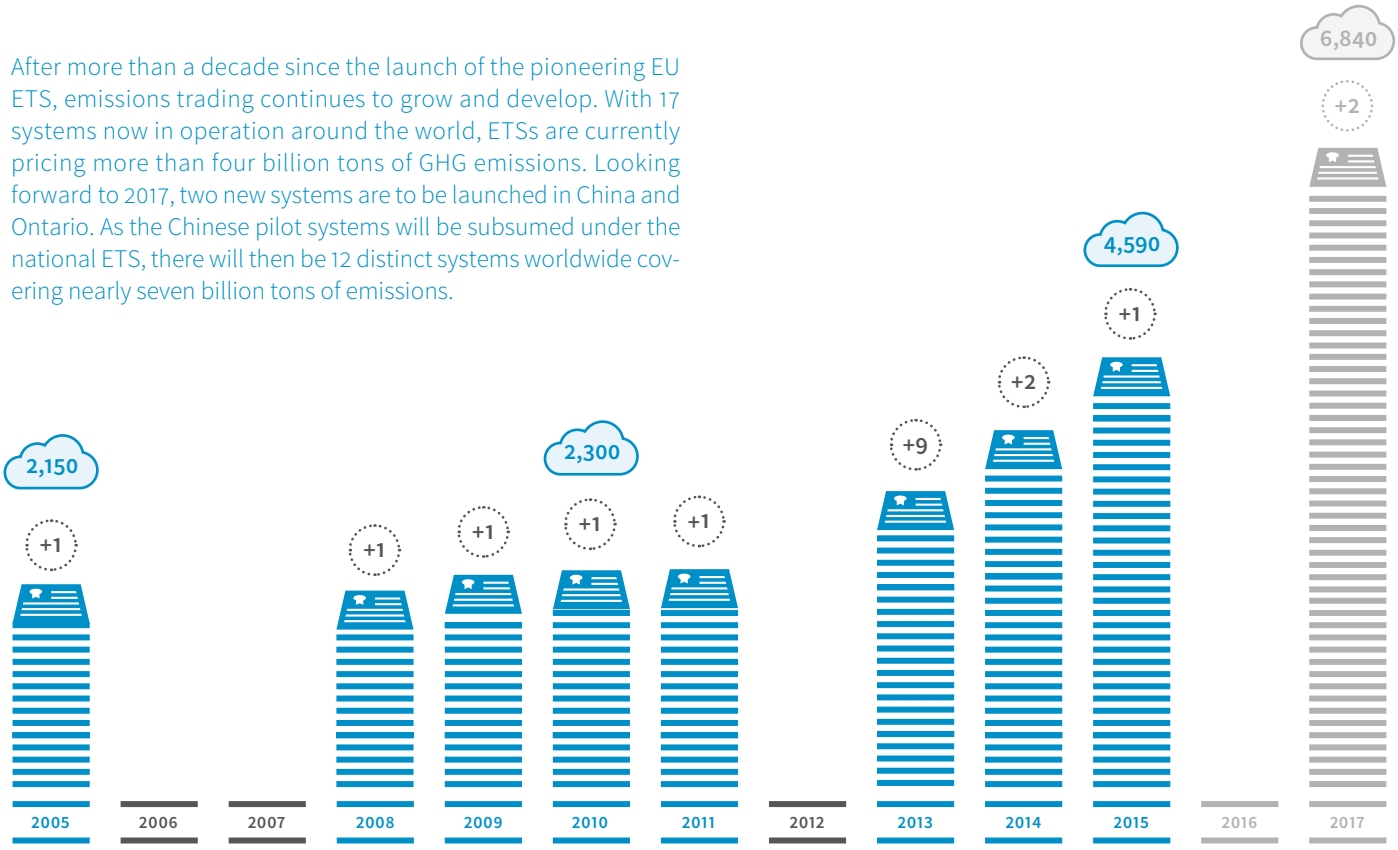
www.icapcarbonaction.com





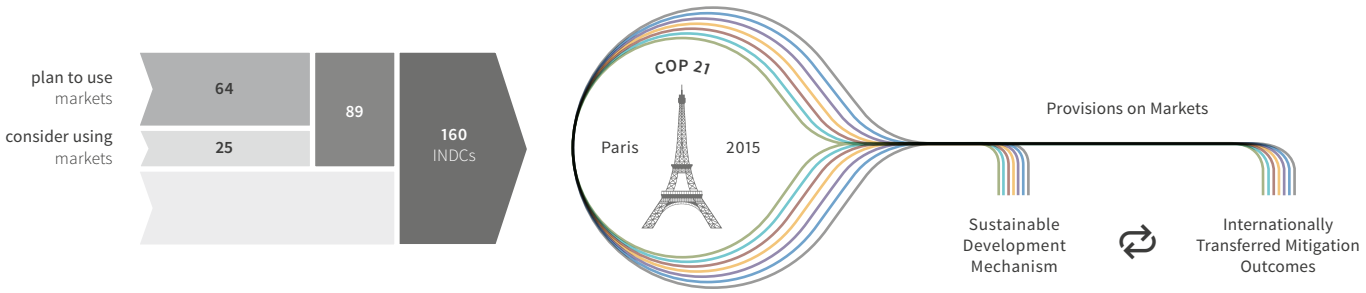
At a Glance
Global Trends in Emissions Trading

After more than a decade since the launch of the pioneering EU ETS, emissions trading continues to grow and develop. With 17 systems now in operation around the world, ETSs are currently pricing more than four billion tons of GHG emissions. Looking forward to 2017, two new systems are to be launched in China and Ontario. As the Chinese pilot systems will be subsumed under the national ETS, there will then be 12 distinct systems worldwide covering nearly seven billion tons of emissions.



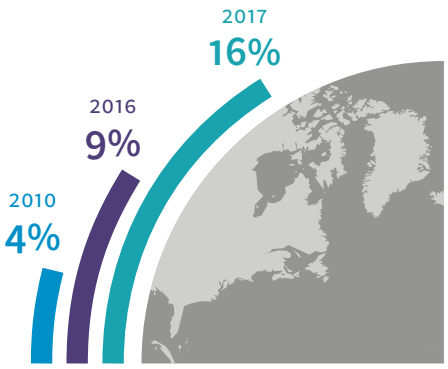
As more systems enter operation, the share of emissions covered by ETSs grows. At the same time, progressively declining caps lead to a decrease in total emissions covered in these systems, ensuring their environmental effectiveness.

More than half of INDCs
support international carbon markets

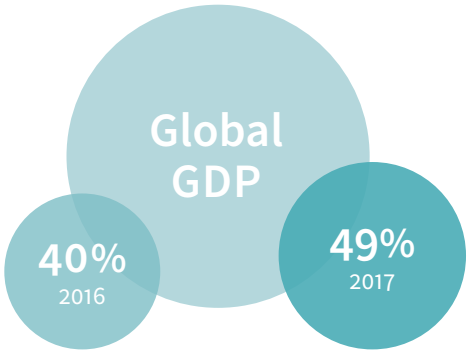


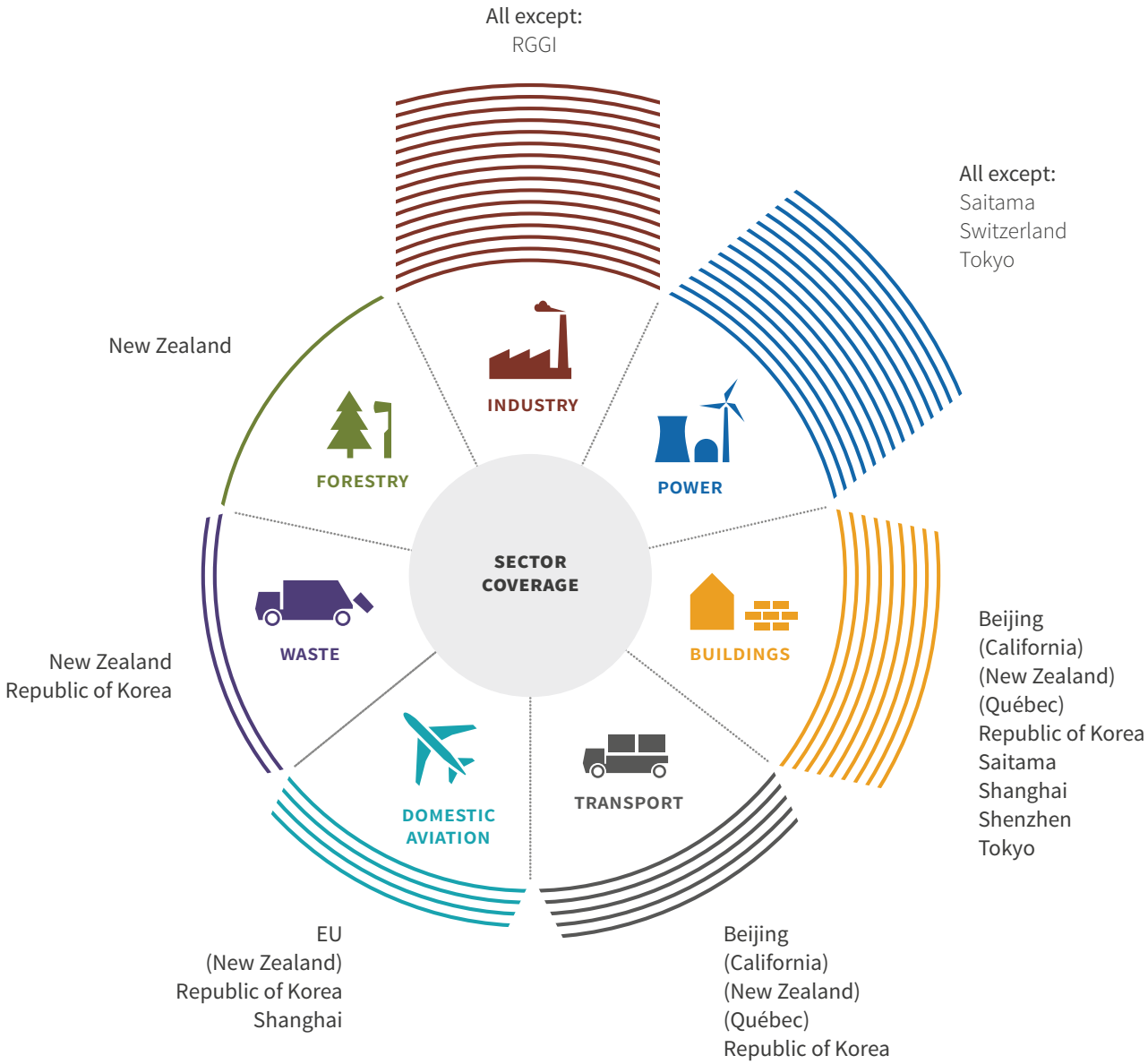
The Paris Agreement opens a new era in international climate action. Support for carbon markets is not only reflected in nearly half of Parties' Intended Nationally Determined Contributions (INDCs), but also in two elements included in the agreement itself, namely voluntary cooperation through 'internationally transferred mitigation outcomes' (ITMOs) and a UNFCCC-governed mechanism to support mitigation and sustainable development. The Paris outcome thus provides new impetus for a dynamic global carbon market and the further proliferation of domestic carbon pricing systems post-2020.

Global GHG emissions covered by ETS



Jurisdictions with an ETS cover

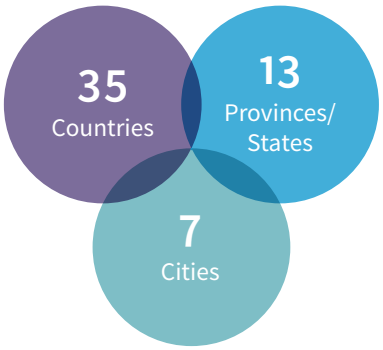




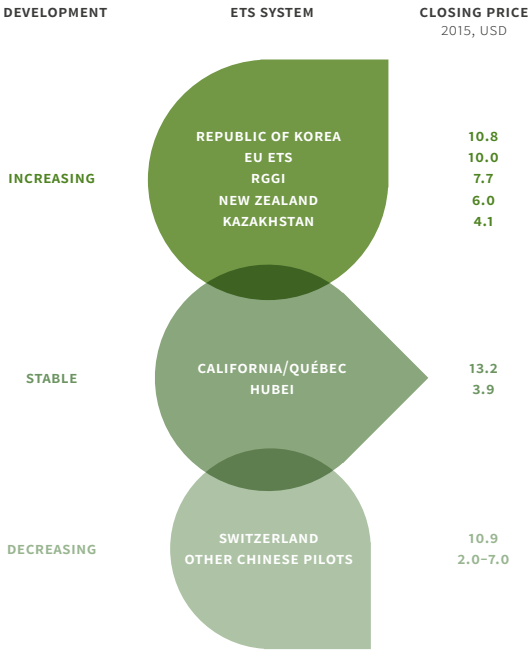
Jurisdictions in brackets represent upstream coverage.

There is no one-size-fits-all approach to designing and implementing an ETS. As the graphics graphics on this page illustrate, systems currently operate at a range of administrative levels, from megacities such as Tokyo, to U.S. states and Canadian provinces, and the supranational level in the EU. Governments can tailor their ETS to suit local conditions, and target the sectors most relevant to their emissions profile. Carbon prices also differ across the various systems given local circumstances and system design.

ETS can be found across
4 continents

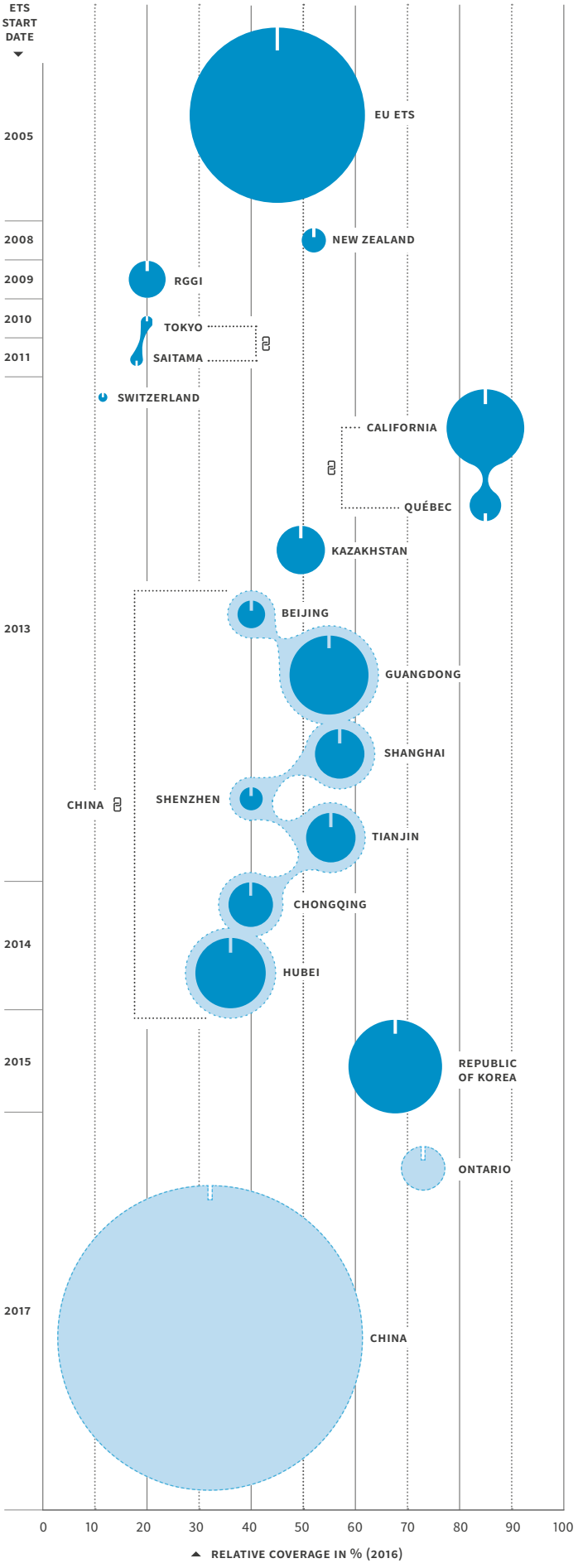


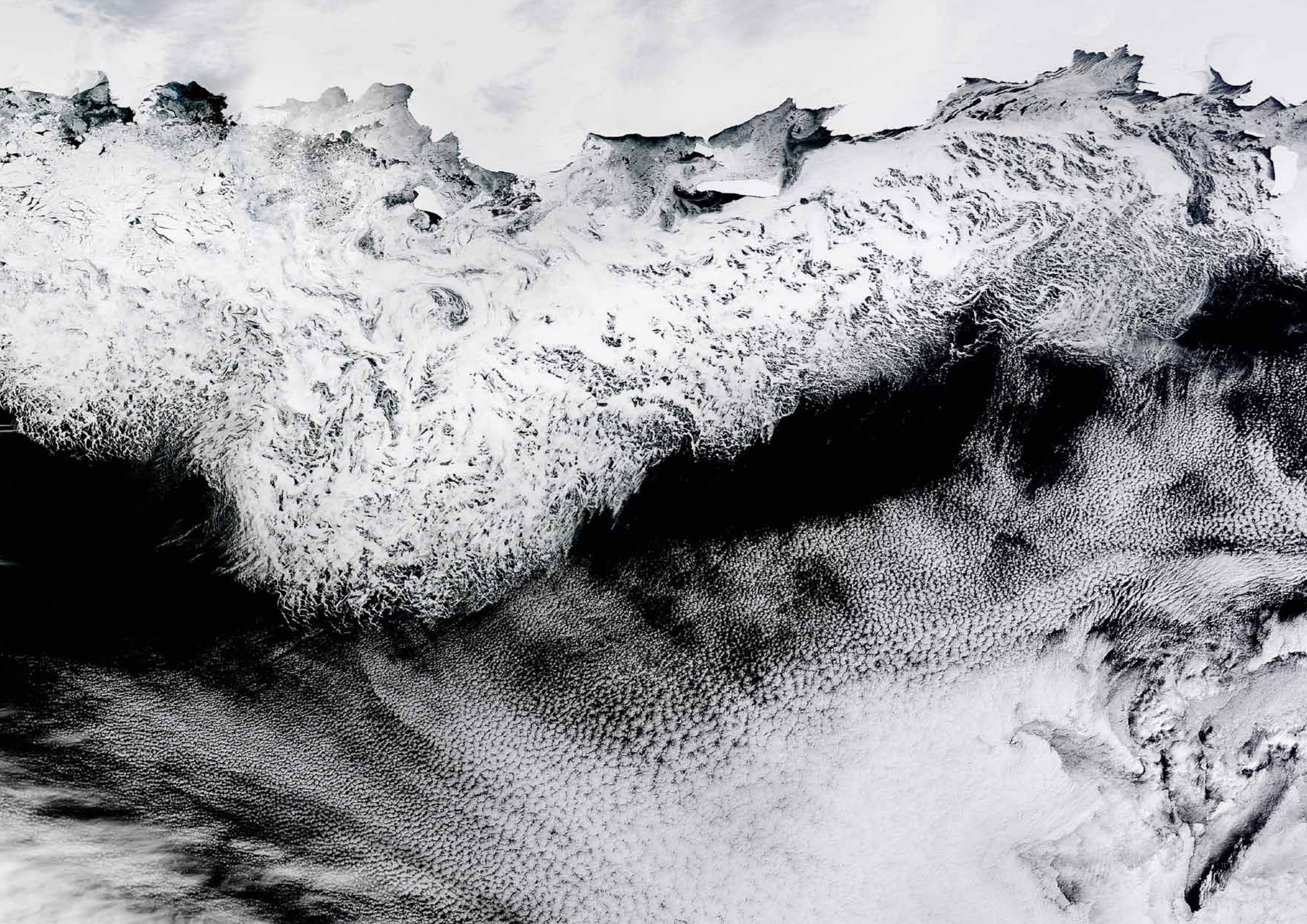
ETS price development 2014–2015



Price development in existing ETS shows the difference in the average price of allowances in 2014 and 2015. Prices are considered stable if the change from 2014–2015 is less than 10%. As the Korean ETS has only been in operation since January 2015, the graphic only indicates price development in 2015.

The size of the bubbles gives a rough estimate of the size of the system based on the amount of emissions covered. The bubble's position on the x-axis indicates the proportion of the jurisdiction's emissions covered by the ETS.





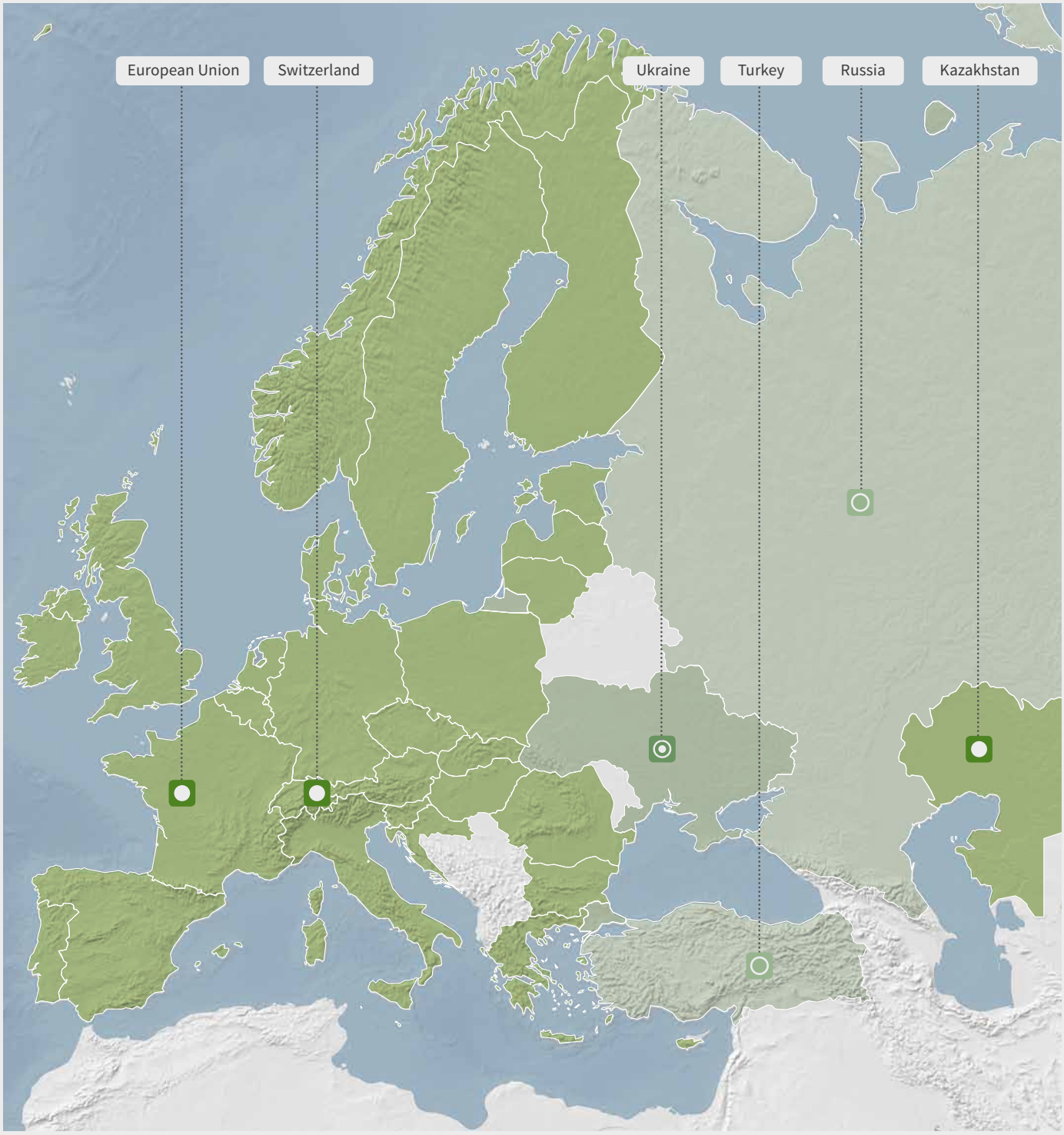
Diving into the Details

Planned and Operating Emissions Trading Systems Around the World

Europe and Central Asia

More than a decade after its launch, the EU ETS is now undergoing revisions in preparation for its fourth phase. In parallel, a link with the Swiss ETS has been negotiated. Meanwhile, neighboring countries like Ukraine are also taking steps towards cap-and-trade, while Turkey sees their first year of mandatory emission reporting.

ETS in force
ETS scheduled
ETS considered



The European Union Emissions Trading System (EU ETS) in force

28 EU MEMBER STATES, ICELAND, LIECHTENSTEIN AND NORWAY

EMISSIONS COVERAGE ($MtCO_2e$, 2015)	LIABLE ENTITIES
2,007.8	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 and largest GHG trading system and represents the central pillar of the European Union's (EU) climate change policy. In 2015, a decision to create a Market Stability Reserve (MSR) was adopted, one of the structural measures addressing the large accumulated allowance surplus, which depressed the allowance price in recent years. The MSR, which will start operating in January 2019, aims at neutralizing the negative impacts of the existing allowance surplus and improving 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. 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 also be placed directly into the reserve.

The focus for the EU ETS now turns to the revision for Phase four (2021–2030), which was proposed by the European Commission in July 2015. The proposed amendments aim to align the cap with the EU's 2030 targets, provide for better targeted carbon leakage rules and to further support low-carbon innovation and energy sector modernization.

BACKGROUND INFORMATION

OVERALL EU GHG EMISSIONS (EXCL. LULUCF) 4,611.6 $MtCO_2e$ (2012)

OVERALL EU GHG EMISSIONS BY SECTOR $MtCO_2e$

- INDUSTRIAL PROCESSES (330.6)
- AGRICULTURE (474.2)
- WASTE (142.4)
- SOLVENT & OTHER PRODUCT USE (10.2)
- ENERGY (3645.1)

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% of the midpoint of the cap in phase 2). 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 2016, the issuance of allowances has been adjusted accordingly. **PHASE FOUR (2021–2030):** According to the Commission's proposal for the revision of the EU ETS (see above), the annual linear reduction factor to reduce the cap on the maximum permitted emissions is proposed to be changed from 1.74% to 2.2% from 2021. 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 t CO_2/year for commercial aviation; >1,000 t CO_2/year for non-commercial aviation since 2013) (see below). **PHASE THREE (2013–2020):** In addition to Phase two sectors, CCS installations, production of petrochemicals, ammonia, non-ferrous and ferrous metals, gypsum, aluminum, nitric, adipic and glyoxylic acid (various thresholds) were introduced—see Annex I of the EU ETS Directive.

INTERNATIONAL AVIATION: Emissions from international aviation have been included in the EU ETS since 2012. In April 2013, the EU temporarily suspended enforcement of the EU ETS requirements for flights operating from or to non-European countries, while continuing to apply the legislation to flights within and between countries in the European Economic Area (EEA). Exemptions for operators with low emissions have also been introduced. EU institutions will decide on how to regulate aviation emissions within the EU ETS after 2016 based on progress within the International Civil Aviation Organization (ICAO) Assembly. Measures which appropriately take international developments into account are to be proposed and should take effect from 2017.

POINT OF REGULATION Downstream

NUMBER OF 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 a-uctioning in eight EU Member States (about 3% of total allowances). **PHASE THREE (2013–2020):** In 2013, about 40% of total allowances were auctioned, with different allocation rules for the electricity, manufacturing and aviation sectors. **ELECTRICITY SECTOR:** 100% auctioning with optional derogation for 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 (2012–2020): 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. **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 until 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:** 5% 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):** On 15 July 2015, the European Commission proposed amendments to the EU ETS directive to enhance cost-effective emission reductions and low-carbon investments. A central component of the proposed amendments refers to the continuation of transitory measures to address the risk of carbon leakage and a revision of the free allocation of allowances. According to the European Commission, the limited and declining number of allowances requires that the current system of free allocation be revised in order to distribute allowances in the most effective and efficient way.

To this end, changes are proposed to: **1.** Benchmark values, which will be updated to reflect technological progress in the different sectors. **2.** Production data to better take into account production increases or decreases and to adjust the amount of free allocation accordingly. This should also make the EU ETS more flexible. **3.** Carbon leakage, so the number of sectors receiving 100% of the benchmark-based free allocation will be reduced. In addition, the European Commission proposed to transfer 250 million unused allowances from 2013–2020 to establish a reserve for new and growing installations.

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) and Joint Implementation (JI) credits. **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 the land use, land-use change and forestry (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):** Currently no international offsets are envisaged.

PRICE MANAGEMENT PROVISIONS The EU ETS Directive provides for measures in the event of excessive price fluctuations. In July 2015, the European Council and the European Parliament agreed to adopt an instrument to stabilize the market in line with the Commission's proposal for a Market Stability Reserve at the beginning of 2019. This would address imbalances in supply and demand on the European carbon market by adjusting volumes for auctions, rather than directly managing prices. The MSR would operate on pre-defined rules with no discretion for Member State or European Commission intervention.

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 'Excess emissions penalty' of EUR 100/tCO_2 emitted for which no allowance has been surrendered in due time. The name of the non-compliant operator is to be published. Different penalties exist at the national level for other non-compliances.

OTHER INFORMATION

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

LINKAGE WITH OTHER SYSTEMS The European Commission has concluded negotiations with Switzerland on linking the EU ETS with the Swiss ETS. However, the link will only become operational once the agreement will have been signed and enters into force.

Swiss Emissions Trading System (Swiss ETS)

in force

EMISSIONS COVERAGE ($MtCO_2e$, 2015)	LIABLE ENTITIES
5.4	55

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

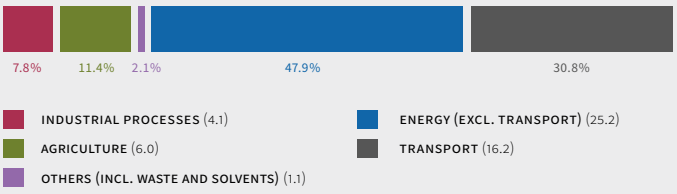
The Swiss ETS started in 2008 with a five-year voluntary phase as an alternative option to the CO_2 levy on fossil fuels. Revised regulations entered into force on 1 January 2013. The scheme subsequently became mandatory for large, energy-intensive entities, while medium-sized entities may join voluntarily. 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.

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF) 52.6 $MtCO_2e$ (2013)

OVERALL GHG EMISSIONS BY SECTOR $MtCO_2e$

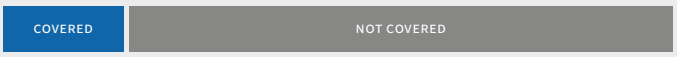


GHG REDUCTION TARGETS **BY 2020:** At least 20% reduction from 1990 GHG levels (unconditional, domestic target). **BY 2025:** 35% reduction from 1990 GHG levels (INDC Submission). **BY 2030:** 50% reduction from 1990 GHG levels (INDC Submission).

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 generally have a total rated thermal input of >20MW. **POSSIBLE VOLUNTARY OPT-IN:** Industries **1.** listed under Annex 7 of the revised CO_2 Ordinance (20 sub-sectors) and **2.** 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.

POINT OF REGULATION Downstream

NUMBER OF LIABLE ENTITIES 55 (2015)

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. 5% of the allowances are set aside in the New Entrants Reserve (NER).

COMPLIANCE PERIOD One year from (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 may 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 will be 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 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 acquire 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 125 CHF/tCO_2 (103.89 EUR/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. The timetable for this is open.

Kazakhstan Emissions Trading System (KAZ ETS)

in force

EMISSIONS COVERAGE ($MtCO_2e$, 2015)	LIABLE ENTITIES
153.0	166

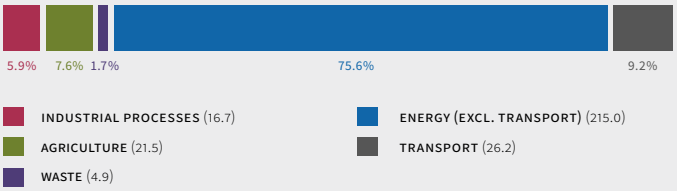
GAS COVERAGE	ALLOCATION	OFFSETS & CREDITS
CO_2 ONLY	FREE ALLOCATION	DOMESTIC OFFSETS

Kazakhstan launched an ETS in January 2013. In January 2015, it entered the third phase of operation (2016–2020). The groundwork for the development of an ETS was laid out in 2011 through amendments and additions to Kazakhstan's environmental legislation. Kazakhstan is currently working on improving these underlying laws.

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF): 284.3 $MtCO_2e$ (2012)

OVERALL GHG EMISSIONS BY SECTOR $MtCO_2e$



GHG REDUCTION TARGETS BY 2020: 15% reduction from 1990 GHG levels. **BY 2030:** 15–25% reduction from 1990 GHG levels (INDC Submission).

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: 155.4 $MtCO_2$; 2015: 153.0 $MtCO_2$. 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 (2016–2020):** 746.5 $MtCO_2$ (plus a reserve of 21.9 $MtCO_2$).

EMISSIONS COVERAGE

GHG COVERED CO_2

SECTORS & THRESHOLDS Energy sector (including oil and gas), mining and chemical industry (>20,000tCO_2/year). **INCLUSION THRESHOLDS:** For Phase one (2013) and Phase two (2014–2015), thresholds are based on 2010 and 2012 emission levels. For Phase three, 2014 emission levels are used.

POINT OF REGULATION Downstream

NUMBER OF LIABLE ENTITIES PHASE THREE (2016–2020): 140 companies

PHASES AND ALLOCATION

TRADING PERIODS PHASE ONE (PILOT PHASE): 2013 **PHASE TWO:** 2014–2015 **PHASE THREE:** 2016–2020

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 (2016–2020):** Free allocation based on grandfathering.

COMPLIANCE PERIOD One year

FLEXIBILITY

BANKING AND BORROWING Banking and borrowing are not provided by current legislation. **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.

OTHER INFORMATION

INSTITUTIONS INVOLVED Ministry of Energy, JSC Zhasyl Damu

Russian Federation

under consideration

Russia is currently exploring policy options to meet its GHG emissions reduction target of at least 25% below 1990 levels by 2020 and 25–30% below 1990 levels by 2030.

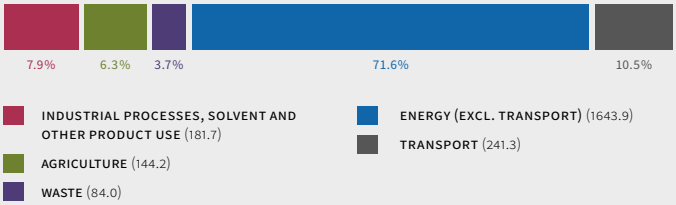
In 2014, the Russian government adopted a plan for the development and implementation of emissions reductions activities. The plan includes the development and introduction of an MRV system at the company level, assessment of emissions reduction potentials, and the development of a concept and action plan to reach the emissions reduction targets by 2020 and 2030, which could potentially include emissions trading.

Building on this, Russia has started to build up the legal basis to enable GHG monitoring at the company level. In 2015, the Government adopted the Concept on MRV. The methodological guidelines for GHG emissions assessment on a corporate and regional level were also adopted by the Ministry of Natural Resources and Ecology. The draft amendment of the Law on Environmental Protection was also published and made available for public comment. The revised Law will be submitted to the Parliament for their consideration. The draft would create a legal basis for the government to list the types of GHG that will be regulated in the future and set rules for the MRV of GHG emissions on a company level.

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF): 2,295 $MtCO_2e$ (2012)

OVERALL GHG EMISSIONS BY SECTOR $MtCO_2e$



GHG REDUCTION TARGET BY 2020: At least 25% reduction from 1990 GHG levels.
BY 2030: 70–75% reduction from 1990 GHG levels (INDC Submission).

Turkey

under consideration

In April 2012, Turkey adopted a new regulatory framework for a comprehensive, mandatory MRV system. Monitoring started in 2015 and reporting began (of 2015 emissions) in 2016.

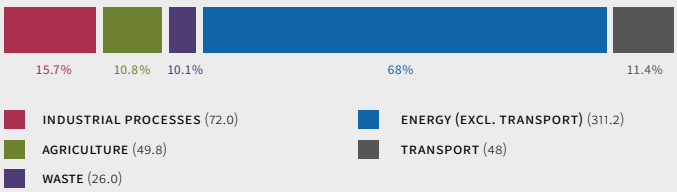
As an implementing country under the PMR, Turkey received funding in May 2013 to help implement the MRV regulation by introducing a pilot MRV system in the energy, cement and refinery sectors, and to explore options for market-based instruments. This includes a series of analytical reports on using emissions trading and other market-based instruments for the MRV sectors.

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): 459.1 $MtCO_2e$ (2013)

OVERALL GHG EMISSIONS BY SECTOR $MtCO_2e$



GHG REDUCTION TARGETS Turkey is not listed in Annex B of the Kyoto Protocol and has no mandatory GHG reduction target under the UNFCCC. **BY 2030:** Up to 21% reduction from the BAU scenario (INDC Submission).

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 will submit verified emissions reports by 30 April 2016 to the Ministry of Environment and Urbanization. Verifiers will be accredited by the Turkish Accreditation Organization after 2017. During 2016–2017, 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

under consideration

Ukraine has plans to establish a national ETS that will be compatible for linking with the EU ETS. A draft concept for ETS implementation has been developed that provides a vision of the key objectives, decisions to be taken and expected outcomes. Emissions trading would be the main national policy instrument to harness the low-carbon potential of Ukraine's energy-intensive sectors by 2030. The ETS will also help Ukraine fulfill its international obligations with regards to emissions reductions, as well as channel carbon finance and investments into low-carbon and energy-efficient technologies.

The draft concept suggests starting with a four-year pilot phase. In the first year of the pilot phase, it will only cover large installations (>50MW) in the power and heat generation, as well as the industrial processes sectors. In the next phase, the system will expand to include small- and medium-sized installations (20–50 MW). The concept proposes allocating 90% of allowances for free and auctioning the remaining 10% in the pilot phase. A new entrants reserve will also be established. The national allocation plan will be further developed based on EU ETS methodologies and practices; however, these will be adjusted to suit national circumstances.

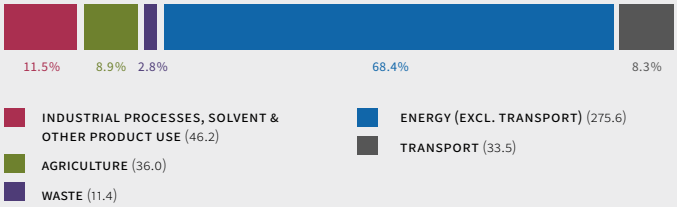
As a first step, separate legislation would be passed to regulate GHG emissions, enforce the ETS and transpose the relevant EU Directives.

Ukraine is working on its ETS plans with the assistance of the PMR, the European Bank for Reconstruction and Development (EBRD), the United States Agency for International Development (USAID), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and other institutions.

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF): 402.7 $MtCO_2e$ (2014)

OVERALL GHG EMISSIONS BY SECTOR $MtCO_2e$



GHG REDUCTION TARGETS **BY 2020:** Voluntary target of 20% reduction from 1990 GHG levels. **BY 2030:** GHG emissions will not exceed 60% of 1990 GHG levels (INDC Submission). **BY 2050:** Voluntary target of 50% reduction from 1990 GHG levels.

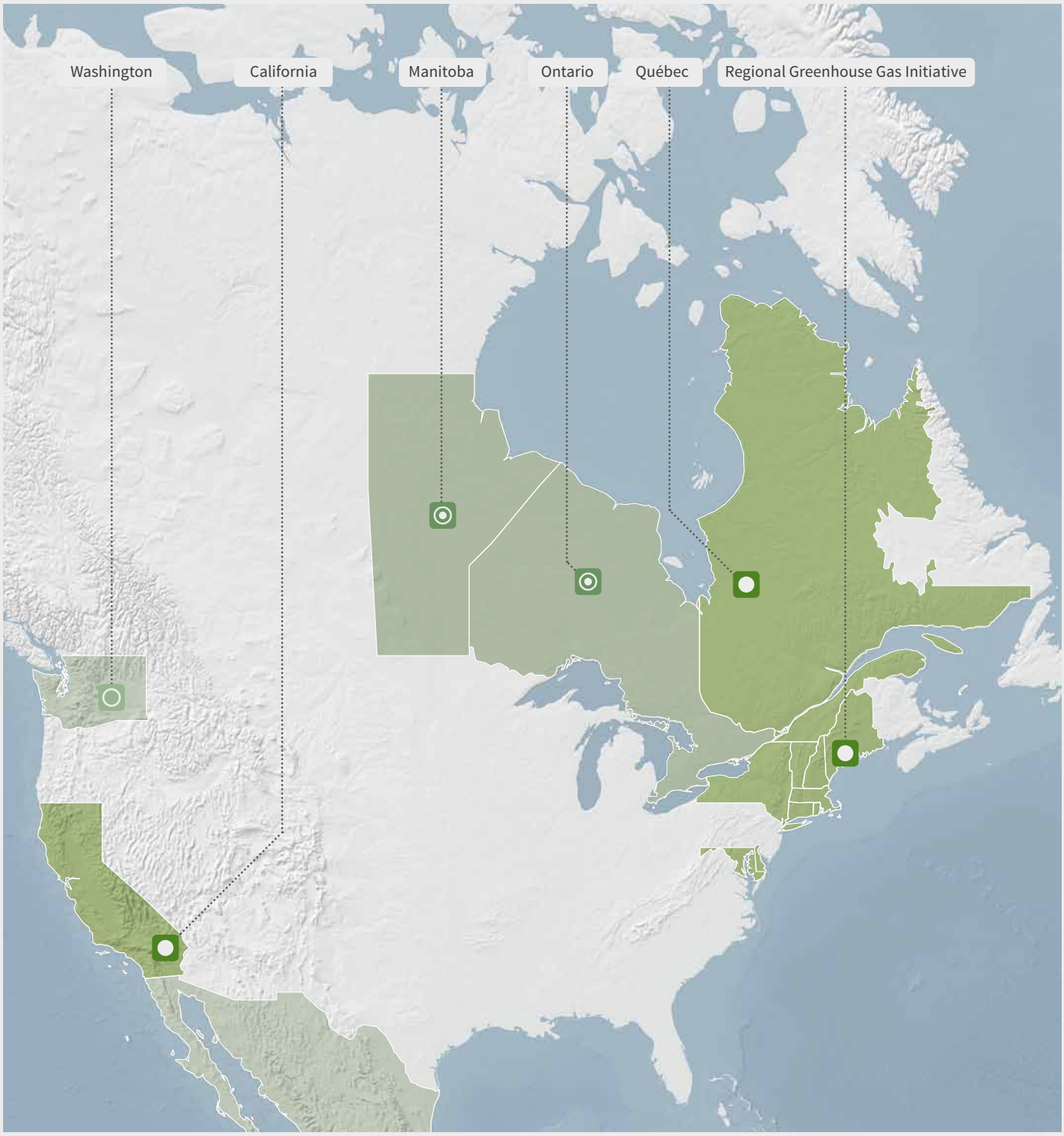
OTHER INFORMATION

INSTITUTIONS INVOLVED Ministry of Ecology and Natural Resources

North America

Following the announcement of an ETS in Ontario, Manitoba, and the Clean Power Plan (CPP) in the U.S., there is fresh momentum for carbon markets in North America. California and Québec's joint carbon market is expected to grow even further when they link up with the new systems in Canada. In the U.S., states are also looking at cap-and-trade programs like in California and RGGI as possible CPP compliance options.

ETS in force
ETS scheduled
ETS considered



Regional Greenhouse Gas Initiative (RGGI)

in force

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

EMISSIONS COVERAGE ($MtCO_2e$, 2015)	LIABLE ENTITIES
89.1	168

GAS COVERAGE	ALLOCATION	OFFSETS & CREDITS
CO_2 ONLY	AUCTIONING	DOMESTIC OFFSETS

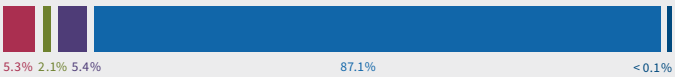
RGGI is the first mandatory GHG ETS in the United States. The program's first compliance period was from 1 January 2009 to 31 December 2011. It is now in its third compliance period (1 January 2015 to 31 December 2017). As foreseen by the original Memorandum of Understanding between the participating 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.

A second program review is underway, with several stakeholder meetings in 2016.

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF): 446.0 $MtCO_2e$ (2012)

OVERALL GHG EMISSIONS BY SECTOR $MtCO_2e$



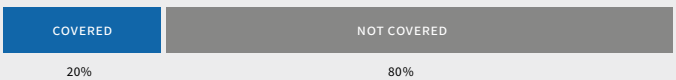
- INDUSTRIAL PROCESSES (23.8)
- AGRICULTURE (9.4)
- WASTE (24.2)
- ENERGY (388.5)
- BUNKER FUELS (0.1)

GHG REDUCTION TARGETS BY 2020: RGGI states have committed to one regional target of a more than 50% reduction from 2005 GHG levels.

ETS SIZE

CAP The original cap was stabilized at 149.7 $MtCO_2$ (165 million short tons) (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 M short tons in 2014 as part of the 2012 program review. The revised regulations extend the 2.5% annual reduction factor through 2020, with a 2020 cap of approximately 78 M short tons.

EMISSIONS COVERAGE



GHG COVERED CO_2

SECTORS & THRESHOLDS Fossil Fuel Electric Generating Units. **INCLUSION THRESHOLDS:** equal to or greater than 25MW.

POINT OF REGULATION Downstream (at installation level)

NUMBER OF LIABLE ENTITIES 163 entities (2016)

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*

FLEXIBILITY

BANKING AND BORROWING Banking is allowed without restrictions.
An annual reduction in the number of allowances offered by states at auction accounts for the large surplus of banked allowances currently in the market. Borrowing is not allowed.

OFFSETS AND CREDITS QUANTITATIVE LIMIT: 3.3% of an entity's liability may be covered with offsets. As part of the 2012 program review, RGGI participating states decided to abolish the price triggers for offsets and some states chose to adopt a new forestry offset protocol based on the California Air Resources Board protocol for U.S. forestry projects. **QUALITATIVE LIMIT:** Offset allowances from five offset types located in RGGI states are allowed: **1.** Landfill methane capture and destruction; **2.** Reduction in SF_6 emissions; **3.** Sequestration of carbon due to reforestation, improved forest management, or avoided conversion; **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.** Avoided methane emissions from agricultural manure management operations.

* 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.

REGIONAL GREENHOUSE GAS INITIATIVE (RGGI)

COMPLIANCE

PRICE MANAGEMENT PROVISIONS Minimum auction price: USD 2.10 (EUR 1.93) in 2016, increasing by 2.5% per year (to reflect inflation).
As of 2014, RGGI states created a Cost Containment Reserve (CCR). Trigger Prices: USD 6 in 2015 (EUR 5.48), USD 8 (EUR 7.31) in 2016, and USD 10 (EUR 9.14) in 2017. After 2017, the CCR trigger price will increase annually by 2.5%.
MRV FRAMEWORK: Emissions data for emitters are recorded in the United States Environmental Protection Agency's (U.S. EPA) Clean Air Markets Division database in accordance with state CO_2 Budget Trading Program regulations and U.S. EPA regulations. Provisions are based on the U.S. 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.

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 cooperation.

Washington

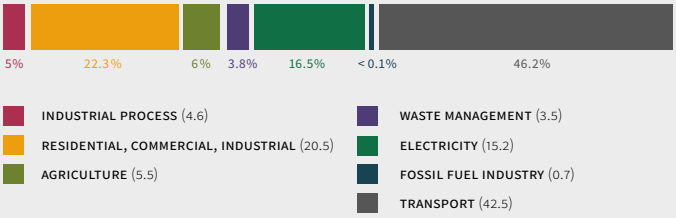
under consideration

In 2008, the State of Washington adopted GHG reduction targets for 2020, 2035 and 2050. In the Fall of 2015, the Washington Department of Ecology began writing a rule to establish emissions standards for industrial sources, petroleum fuel producers and importers, as well as natural gas distributors responsible for more than 100,000 metric tons of GHG per year. Under the proposed rule, regulated businesses would be able to comply by reducing their own emissions, buying or trading credits with other regulated parties, funding projects that reduce emissions or acquiring emissions reductions from external carbon markets.

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF) 92 $MtCO_2e$ (2012)
(million metric tons)

OVERALL GHG EMISSIONS BY SECTOR $MtCO_2e$ (2012)



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.

Western Climate Initiative (WCI)

CALFORNIA, QUÉBEC, MANITOBA, ONTARIO

The WCI is an initiative of American state and Canadian provincial governments that aims to develop a joint strategy to reduce greenhouse gas 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. In 2015, Ontario and Manitoba then announced plans to develop an ETS. British Columbia is the only member not yet officially considering an ETS.

California Cap-and-Trade Program

in force

EMISSIONS COVERAGE ($MtCO_2e$, 2015)	LIABLE ENTITIES
394.5	350

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

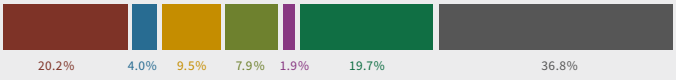
Initiated in 2012, the California Cap-and-Trade Program began its compliance obligation on 1 January 2013. California has been part of the Western Climate Initiative (WCI) since 2007 and formally linked its system with Québec's on 1 January 2014.

The Cap-and-Trade program covers sources responsible for approximately 85% of California's GHG emissions. A key policy in California's climate law, the program will help to meet its mandate of reducing GHG emissions to 1990 levels by 2020, a 40% reduction from 1990 levels by 2030, and an 80% reduction from 1990 levels by 2050.

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF): 459.28 $MtCO_2e$ (2013)

OVERALL GHG EMISSIONS BY SECTOR $MtCO_2e$



- INDUSTRIAL (92.68)
- HIGH GWP (18.50)
- COMMERCIAL AND RESIDENTIAL (43.54)
- AGRICULTURE (36.21)
- RECYCLING AND WASTE (8.87)
- ELECTRIC POWER (90.45)
- TRANSPORT (169.02)

GHG REDUCTION TARGETS **BY 2020:** return to 1990 GHG levels. **BY 2040:** 40% reduction from 1990 GHG levels. **BY 2050:** 80% reduction from 1990 GHG levels.

ETS SIZE

CAP The cap is listed 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.

EMISSIONS COVERAGE

GHG COVERED CO_2, CH_4, 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 production, glass production, hydrogen production, iron and steel production, lead production, lime manufacturing, nitric acid production, 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. **INCLUSION THRESHOLDS:** facilities ≥25,000 tCO_2e (metric) per 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 for sale at each auction and may be traded but not used for compliance until the compliance date for the vintage year.

ALLOCATION Allowances are allocated by benchmarks in each sector. Provisions for new entrants follow established methodologies for vulnerability to leakage. The vast 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. **PUBLICLY-OWNED AND REGULATED INVESTOR-OWNED ELECTRIC UTILITIES:** Receive allowances on behalf of their ratepayers. Investor-owned utilities must consign the allowances they receive to state-run auctions. Allowances are also provided to natural gas utilities on behalf of their ratepayers. All natural gas and electrical utilities must use the allowance value for ratepayer benefit and for emissions reductions. **INDUSTRIAL FACILITIES:** Receive free allowances for transition assistance and to prevent leakage. Leakage risk is determined by emissions intensity and trade exposure. Transition assistance declines with each compliance period. 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. This will be about 10% of allowances in the first compliance period, and will increase in subsequent compliance periods.

COMPLIANCE PERIOD Three calendar years (after first compliance period of two 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.

NB: California's trading period is referred to as 'compliance period' though a portion 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

FLEXIBILITY

BANKING AND BORROWING Banking is allowed but the emitter is subject to a general holding limit. Borrowing across compliance periods is not allowed.

OFFSETS AND CREDITS **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

PRICE MANAGEMENT PROVISIONS **AUCTION RESERVE FLOOR PRICE:** USD 12.73 in 2016 (EUR 11.60) per allowance. The auction reserve price increases annually by 5% plus inflation, as measured by the Consumer Price Index. **ALLOWANCE PRICE CONTAINMENT RESERVE:** Will be allocated allowances from various budgets (1% from budget years 2013–2014; 4% from budget years 2015–2017; and 7% from budget years 2018–2020).

In 2016, the reserve sale administrator can sell accumulated allowances on a regular basis in three equal price tiers at USD 47.54, 53.49, and 59.43 (EUR 43.36, 48.79 and 52.20). 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.

COMPLIANCE

MRV **REPORTING FREQUENCY:** One year **VERIFICATION:** Emission data reports and their underlying data require independent third-party verification annually for all reporters that equal or exceed 25,000 tCO_2e (metric). **OTHER:** Reporting is required for most operators at or above 10,000 tCO_2e (metric). 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.

Under the Cap-and-Trade Regulation, if an entity fails to surrender a sufficient number of compliance instruments to meet its compliance obligation, there is a separate violation of this article for each required compliance instrument that has not been surrendered, or otherwise obtained by the Executive Officer. A separate violation accrues every 45 days after the end of the Untimely Surrender Period for each required compliance instrument that has not been surrendered.

Adjustment to Compliance Obligation: Outside of enforcement, there is also an automatic adjustment to the compliance obligation due equal to the number of allowances short for that compliance surrender deadline multiplied by four. A quarter of that amount is retired and the remaining amount is auctioned by the state.

OTHER INFORMATION

INSTITUTIONS INVOLVED California Air Resources Board (CARB)

LINKS WITH OTHER SYSTEMS California linked with Québec's ETS on 1 January 2014.

Québec Cap-and-Trade System

in force

EMISSIONS COVERAGE ($MtCO_2e$, 2015)	LIABLE ENTITIES
65.3	80

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 with a transition year in which emitters could prepare and familiarize themselves with the program without mandatory compliance. The program's enforceable compliance obligation began on 1 January 2013.

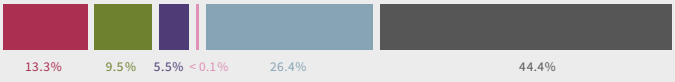
The first compliance period ended 31 December 2014. On 2 November 2015, all covered entities in the first compliance period had to surrender sufficient allowances to cover their 2013 and 2014 GHG emissions. All of Québec's covered entities complied with this requirement. The second compliance period began on 1 January 2015 and will end on 31 December 2017. Future compliance periods will be three years long.

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

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF) 78.3 $MtCO_2e$ (2012)

OVERALL GHG EMISSIONS BY SECTOR $MtCO_2e$



- INDUSTRIAL PROCESSES (10.4)
- AGRICULTURE (7.4)
- WASTE (4.3)
- SOLVENT & OTHER PRODUCT USE (0.1)
- STATIONARY COMBUSTION (20.7)
- TRANSPORT (34.8)

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

EMISSIONS COVERAGE

GHG COVERED CO_2, CH_4, N_2O, SF_6, HFC, PFC, NO_3 and other fluorinated GHGs

SECTORS & THRESHOLDS **FIRST COMPLIANCE PERIOD (2013–2014):** Electricity, Industry (>25,000 CO_2e/year). **SECOND COMPLIANCE PERIOD (2015–2017) AND THIRD COMPLIANCE PERIOD (2018–2020):** Sectors of first compliance period alongside the distribution and importation of fuels used for consumption in the transport and building sectors, as well as in small and medium-sized businesses. **INCLUSION THRESHOLDS:** >25,000 CO_2e/year. Fuel distributors will be subject to a lower threshold as of 2016.

POINT OF REGULATION Mixed

NUMBER OF LIABLE ENTITIES 93 (2016)

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 November 2015, Québec had held a total of nine auctions, five jointly with California. These nine auctions generated revenues of approximately CAD 967 million (EUR 682.51 million). All auction revenues go to the Québec Green Fund and are 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:** 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):** Free allocation based on historical levels, production level and intensity target of GHG emissions attributable to the activity, with 100% allocation for process emissions, 80% for combustion emissions and 100% for emissions from other sources. **SECOND COMPLIANCE PERIOD (2015–17):** Free allocation diminishes by approximately 1–2% on a yearly basis. 75% of free allowances issued on 14 January of each year (year X) (except in 2013 when they were issued on 1 May). The remaining 25% are to be issued in September of the following year (year X+1) after the Minister's verification of emission reports (for year X). Free allocation is based on real output. No free allocation for fuel distributors starting in 2015.

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), although rules pertaining to the free allocation of allowances are only set by regulation until 2020. 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 units originating from projects carried out according to four "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 mine methane. Additional offset types may be approved by the authority. Offsets issued by jurisdictions linked with Québec are recognized for compliance. The Minister may require the promoter 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 3% of issued offset credits as a contingency reserve to fill that account.

PRICE MANAGEMENT PROVISIONS Minimum auction (reserve) price for joint auction with California in 2015: the higher of CAD 12.08 or USD 12.10 (EUR 11.38); increasing annually by 5% and inflation until 2020. Reserve emission units held in the Allowance Price Containment Reserve account may be sold at CAD 63.58, 71.53, 79.48/t CO_2e (EUR 44.85, 50.47, 56.10) in 2015. 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% and inflation.

COMPLIANCE

MRV **REPORTING FREQUENCY:** One year. Report to be submitted by 1 June of each year. **VERIFICATION:** GHG reporting for emitters participating in ETS (higher threshold than regulatory reporting requirement) must send a verification report carried out by an organization accredited to ISO 14065. **FRAMEWORK:** Regulation respecting mandatory reporting of certain emissions of contaminants into the atmosphere of the Environment Quality Act.

ENFORCEMENT For non-compliance, entities can be fined CAD 3,000–500,000 (EUR 2,116–352,666) and spend up to 18 months in jail in the case of a natural person, and CAD 10,000–3,000,000 (EUR 7,053–2,115,998) 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, will have to remit three allowances for each allowance it failed to remit to the Minister. The emitter responsible 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), Office of Climate Change, Carbon Market Directorate

LINKS WITH OTHER SYSTEMS On 1 January 2014, Québec linked with California.

Manitoba

under consideration

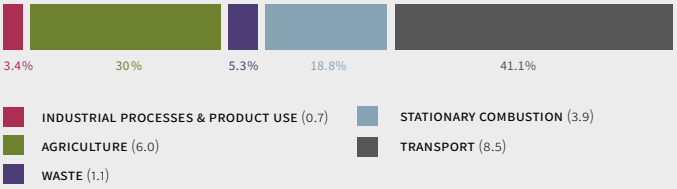
Manitoba joined the Western Climate Initiative (WCI) in June 2007. Stakeholders were invited to share their views on a Cap-and-Trade plan for Manitoba through March 2011.

In December 2015, Manitoba Premier Greg Selinger announced a new Climate Change and Green Economy Action Plan, including new 2030, 2050 and 2080 targets. To help reach these goals, Manitoba will implement a Cap-and-Trade system for large emitters designed to link to other programs in North America. Public consultations will be held to explore a unique, carbon stewardship mechanism for non-capped sectors.

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF) 20.7 $MtCO_2e$ (2012)

OVERALL GHG EMISSIONS BY SECTOR $MtCO_2e$



GHG REDUCTION TARGETS Manitoba has achieved its initial target of stabilizing emissions in 2010 at 2000 levels. Although, targeted reductions for 2012 were not achieved due to population and economic growth, a suite of new policies and programmes have been announced in the 2015 action plan. **BY 2030:** Reduce emissions by a third from 2005 GHG levels. **BY 2050:** Reduce emissions by 50% from 2050 GHG levels. **BY 2080:** Reach carbon neutrality.

Ontario

scheduled

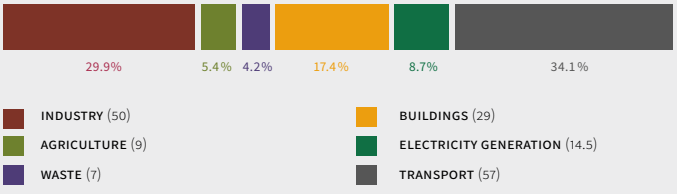
In 2015, Ontario released a climate change strategy and action plan to achieve its 2020 target of a reduction of 15% from 1990 GHG levels and lay the groundwork to achieve its 2050 target of a reduction of 80% from 1990 levels. The action plan was informed by extensive dialogue with the public, industry and municipalities.

The implementation of a Cap-and-Trade system was officially announced in April 2015. Ontario intends to join the linked Cap-and-Trade program implemented by California and Québec. The Ontario government proposes to implement the program beginning 1 January 2017 and to link with Québec and California after Ontario's first proposed compliance period (after 2020).

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF) 167 $MtCO_2e$ (2012)

OVERALL GHG EMISSIONS BY SECTOR $MtCO_2e$



GHG REDUCTION TARGETS **BY 2014:** 6% reduction from 1990 GHG levels. **BY 2020:** 15% reduction from 1990 GHG levels. **BY 2050:** 80% reduction from 1990 GHG levels.

Latin America and the Caribbean

Many jurisdictions in Latin America are considering carbon pricing. Although Chile and Mexico have a carbon tax, this could transition to an ETS in the long term. Additionally, Brazil is also exploring the possibility of a cap-and-trade program.

ETS in force
ETS scheduled
ETS considered

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 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. 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.

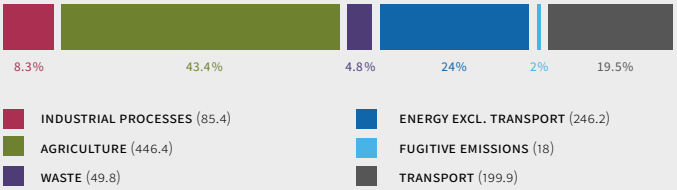
Since 2013 a group of leading companies have been participating in a voluntary ETS simulation. The initiative offers a platform to gain experience and develop proposals for a wide-ranging and robust approach towards the Cap-and-Trade market in Brazil with the purpose of promoting the reduction of national 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 is coordinated by the Centro de Estudos em Sustentabilidade da Fundação Getúlio Vargas (GVCes/FGV).

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF) 1,027.7 $MtCO_2e$ (2012)

OVERALL GHG EMISSIONS BY SECTOR $MtCO_2e$ (2012)



- INDUSTRIAL PROCESSES (85.4)
- AGRICULTURE (446.4)
- WASTE (49.8)
- ENERGY EXCL. TRANSPORT (246.2)
- FUGITIVE EMISSIONS (18)
- TRANSPORT (199.9)

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 (INDC Submission). **BY 2030:** Indicative contribution of 43% reduction from 2005 GHG levels (INDC Submission).

OTHER INFORMATION

INSTITUTIONS INVOLVED Ministry of Environment, Ministry of Finance (General Coordination of Environment and Climate Change)

Brazil — Rio de Janeiro

under consideration

The Brazilian state of Rio de Janeiro adopted subnational climate legislation in 2010. The Policy on Global Climate Change and Sustainable Development (PEMC) sets climate targets and identifies the waste, transportation, energy and industrial sectors as crucial for emissions reductions. Rio de Janeiro has also established a GHG inventory. The state is planning to implement a mandatory ETS to cover major polluting companies in the cement, ceramics, chemicals and petrochemicals industries. The scheme was announced during the Rio+20 Conference in 2012 and was expected to start in early 2013. However, it has been delayed until further notice.

The city of Rio de Janeiro is also the headquarters of the "Bolsa Verde do Rio de Janeiro" (BVRio). BVRio functions as an electronic exchange and registry for emission credits and other voluntary market products.

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF) 67 $MtCO_2e$ (2010)

OVERALL GHG EMISSIONS BY SECTOR $MtCO_2e$

- INDUSTRIAL PROCESSES (10.3)
- AGRICULTURE (5.1)
- WASTE (6.0)
- ENERGY (45.6)

GHG REDUCTION TARGETS **BY 2030:** An emissions intensity (tCO_2e/GDP) target equivalent to or below 2005 intensity levels.

OTHER INFORMATION

INSTITUTIONS INVOLVED Secretaria de Estado do Ambiente (SEA), State Environment Institute (Instituto Estadual do Ambiente)

Brazil — São Paulo

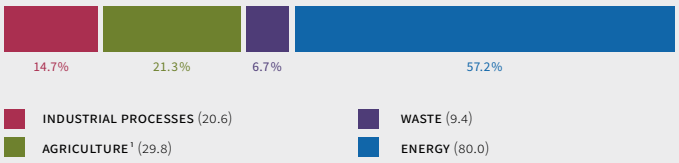
under consideration

São Paulo was the first Brazilian state to adopt subnational climate change legislation in 2009. The policy establishes an economy-wide emissions reduction target and focuses on the energy, industrial processes, solvents, agriculture, and waste sectors. São Paulo has also established a GHG inventory. In 2012, the state announced plans to establish an ETS. However, the plan was put on hold for an undetermined time in 2014.

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF) 139.8 $MtCO_2e$ (2005)

OVERALL GHG EMISSIONS BY SECTOR $MtCO_2e$



GHG REDUCTION TARGETS BY 2020: 20% reduction from 2005 GHG levels.

OTHER INFORMATION

INSTITUTIONS INVOLVED The State Fund of Pollution Prevention and Control (FECOP), Secretariat for the Environment of the State of Sao Paulo, Companhia Ambiental do Estado de São Paulo (CETESB), Brazilian Mercantile & Futures Exchange (BM&F), São Paulo Stock Exchange (Bovespa) and the Centro de Estudos em Sustentabilidade Getulio Vargas (GVCes)

1 Excluding emissions from organic soils.

Chile

under consideration

Under the PMR, Chile received funding to develop a roadmap for the design and eventual implementation of an ETS for GHG mitigation in the energy sector in March 2013. However, it subsequently shifted policy priorities towards the implementation of a carbon tax. 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.

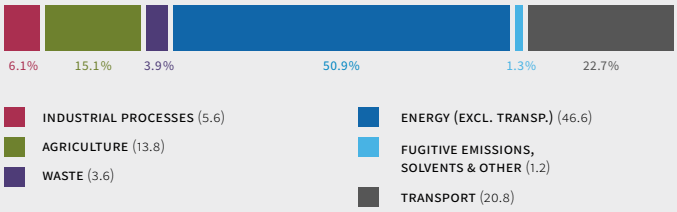
In September 2014, as part of a broader fiscal reform Chile approved the carbon tax for thermal power generators with a thermal input equal to or above 50 MW. Power plants based on biomass are exempted. From 2017 on, emitters will have to pay USD 5 (EUR 4) for related CO_2 emissions; the tax level for particulate matter, NO_x and SO_2 emissions that are also covered by the tax is yet to be determined. In the longer run, Chile is still considering the transition to an ETS.

In addition to its mandatory mitigation policies, Chile has a track record of activities in the voluntary carbon market. Established in 2009, the Santiago Climate Exchange provides a local platform for trading voluntary GHG reductions. In addition, the Chilean government established a "Platform for the Generation and Trading of Carbon Credits from the Forestry Sector in Chile" in January 2013. The platform works in cooperation with Verified Carbon Standards, a major GHG program in the global voluntary carbon market.

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF) 91.6 $MtCO_2e$ (2010)

OVERALL GHG EMISSIONS BY SECTOR $MtCO_2e$



GHG REDUCTION TARGETS BY 2020: Under the UNFCCC and conditional to external support, Chile has pledged to reduce projected BAU emissions by 20% compared to 2007 levels. **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.

OTHER INFORMATION

INSTITUTIONS INVOLVED Ministry of Energy, Ministry of the Environment, Ministry of Finance, Inter-Ministerial Committee on Climate Change

Mexico

under consideration

The General Climate Change Law 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.

In 2014, the Mexican Secretary of Energy introduced a carbon tax on fossil fuel sales and imports (natural gas exempted). The tax is set at approximately USD 3.50 per tCO_2e (EUR 3.19), though firms are allowed to use offset credits (from domestic CDM offset projects only) to fulfill their tax liability. In parallel several legislative attempts to introduce an ETS for the electricity sector have been made. At the time of writing, Mexico is considering the implementation of an ETS.

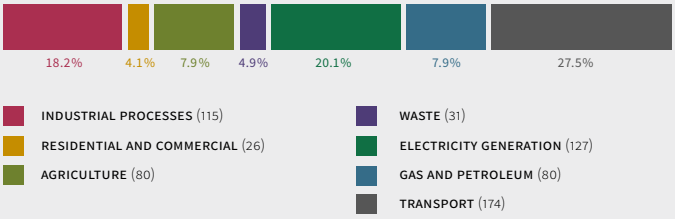
Mexico has also taken steps to liberalize the energy sector. In December 2013, the Mexican Constitution was modified, and by July 2014, a legal framework was in place, opening the energy sector to both domestic and foreign private investment. A market for Clean Energy Certificates will be developed in order to promote the use of renewables and other clean energy sources. It remains to be determined how the different policy instruments will work together.

In October 2014, a mandatory reporting system (the National Emissions Register) for both direct and indirect GHG emissions for facilities with annual emissions above 25,000 tCO_2e was established. Emitters in the energy, industrial, transport, agricultural, waste, commercial and services sectors are required to report the six GHGs identified by the UNFCCC and 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.

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF) 633 $MtCO_2e$ (2013)

OVERALL GHG EMISSIONS BY SECTOR $MtCO_2e$



GHG REDUCTION TARGETS BY 2030: 22% reduction compared to BAU scenario and 36% conditional reduction, subject to a global mitigation agreement (INDC Submission). **BY 2050:** 50% reduction from 2020 GHG levels (Climate Change Law aspirational goal).

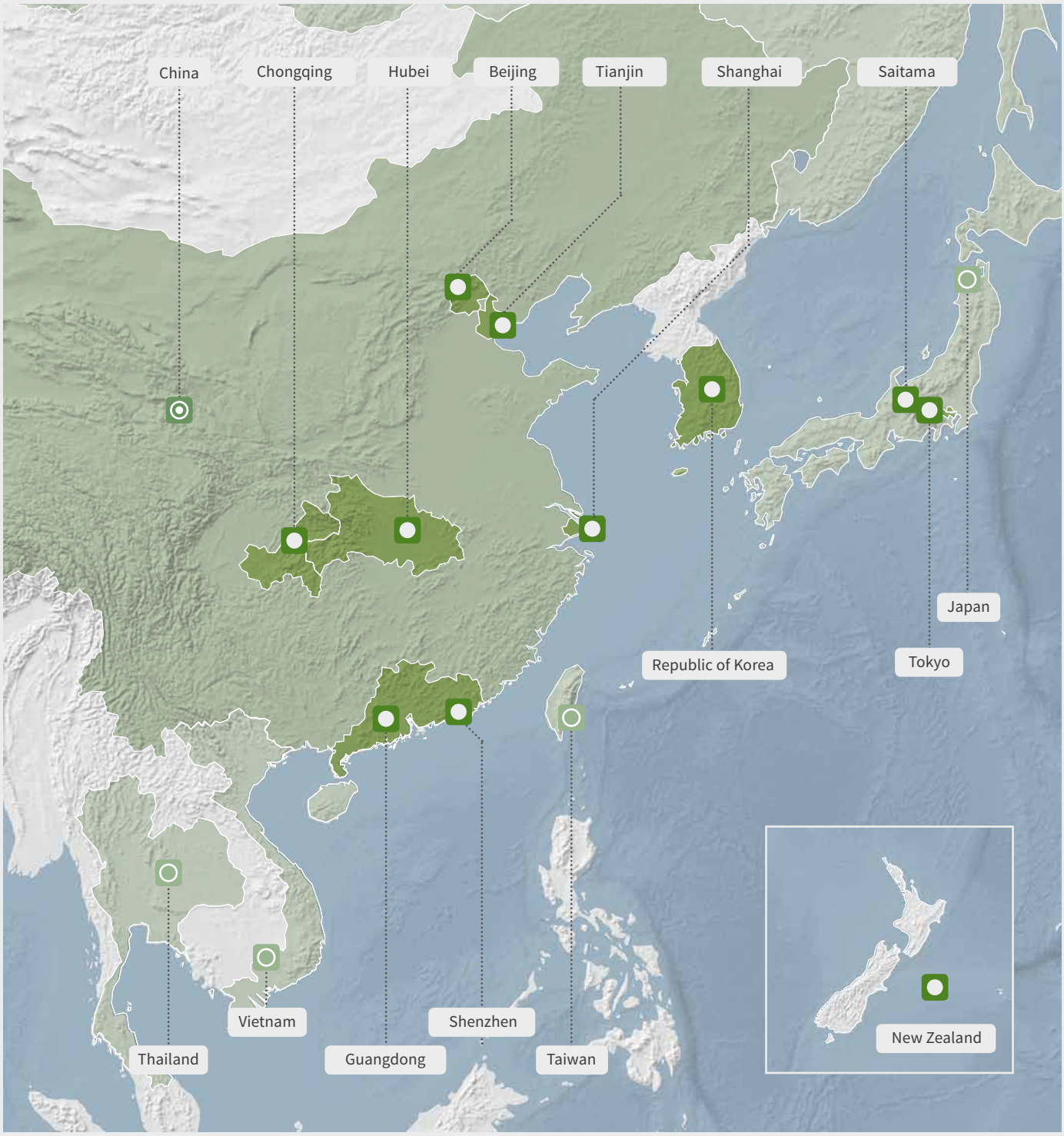
OTHER INFORMATION

INSTITUTIONS INVOLVED Ministry of Environment and Natural Resources

Asia-Pacific

Asia is rapidly establishing itself as a new ETS hub, with the newest system launched last year in the Republic of Korea. In 2017 it will also be home to the world's largest ETS when China introduces its nationwide system. In the Pacific, following the transition of the New Zealand ETS to a domestic-only system, the government will now undertake a wider review of the NZ ETS.

ETS in force
ETS scheduled
ETS considered



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.

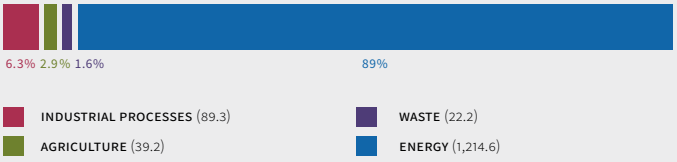
Japanese companies can also familiarize themselves with a voluntary Cap-and-Trade scheme: the Advanced Technologies Promotion Subsidy Scheme with Emission Reduction Targets (ASSET).

In parallel, Japan is implementing the Joint Crediting Mechanism (JCM) for the post-2012 era.

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF) 1,365 $MtCO_2e$ (FY2014)

OVERALL GHG EMISSIONS BY SECTOR $MtCO_2e$



GHG REDUCTION TARGETS BY FY2020: In November 2013, Japan adjusted its GHG reduction target for 2020 from 25% reduction from 1990 GHG levels to 3.8% reduction from 2005 GHG levels, taking into account the impact of the shutdown of all 52 nuclear power plants following the Great East Japan Earthquake. This amounts to a 3.1% rise from 1990 GHG levels, and is subject to change depending on future developments in Japanese energy policy. **BY FY2030:** 26% reduction from FY2013 GHG levels. The JCM will be used to achieve a total reduction of 50–100 million tCO_2 (INDC Submission). **BY FY2050:** 80% reduction from 1990 GHG levels.

Tokyo Cap-and-Trade Program

in force

EMISSIONS COVERAGE ($MtCO_2e$, 2015)	LIABLE ENTITIES
10.8	1325

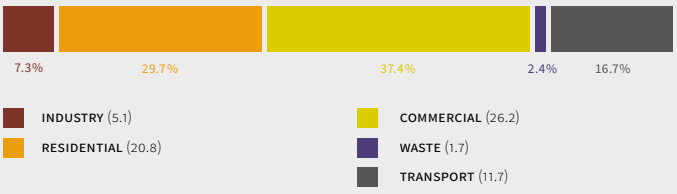
GAS COVERAGE	ALLOCATION	OFFSETS & CREDITS
CO_2 ONLY	FREE ALLOCATION	DOMESTIC

The Tokyo Metropolitan Government Cap-and-Trade Program (TMG ETS) is Japan's first mandatory ETS launched in April 2010. Under the TMG ETS, large offices and factories are required to reduce emissions by 6%–8% in the first period (FY2010–2014). Now in its second period, the target has increased to 15–17%. In FY2013, emissions were reduced by 23% compared to base-year emissions.

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF) 70.1 $MtCO_2e$ (2013)*

OVERALL CO_2 EMISSIONS BY SECTOR $MtCO_2$



* 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.

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

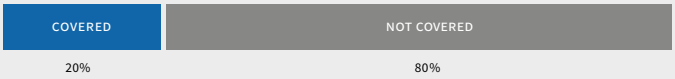
ETS SIZE

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 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



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 1,291 facilities (as of 3 December 2015)

PHASES AND ALLOCATION

TRADING PERIOD **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 FY2002–FY2007. 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:** FY2010–FY2014 **SECOND PERIOD:** FY2015–FY2019 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 TMG 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 1,500 kL 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 1,000 kW) 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 a 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 a limit.
All offsets have to be verified by verification agencies.

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 evolution.

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. **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 [EUR 3,776]) and surcharges (1.3 times the shortfall).

OTHER INFORMATION

INSTITUTIONS INVOLVED TMG Bureau of Environment

LINKS WITH OTHER SYSTEMS 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. Since excess emission reductions need to be confirmed at the end of the first compliance period, credits have only become tradable from 2015. As of December 2015, the first credits transfer took place between the two jurisdictions.

Target Setting Emissions Trading System in Saitama

in force

EMISSIONS COVERAGE ($MtCO_2e$, 2015)	LIABLE ENTITIES
11.4	581

GAS COVERAGE	ALLOCATION	OFFSETS & CREDITS
CO_2 ONLY	FREE ALLOCATION	DOMESTIC

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 FY2013, the Saitama ETS had achieved a 22% reduction in emissions below base-year emissions.

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF) 39.1 $MtCO_2e$ (FY2013) (demand side)*

OVERALL GHG EMISSIONS BY SECTOR $MtCO_2e$ (2013) (demand side)

INDUSTRY (10.9)
COMMERCIAL (5.0)
RESIDENTIAL (7.8)
TRANSPORT (9.9)

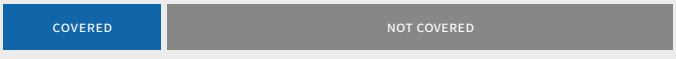
* The overall emissions figure for Saitama is higher than the total of the emissions by sector because the former includes all GHGs in Saitama, whereas the emissions by sector only measures CO_2 emissions.

GHG 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 (8%/6%) × 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



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 574 facilities (as of 31 March 2014)

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 emission reductions achieved by implementing emission 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:** Emission 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 of 8%. Issuance of credits from FY2015. Outside Saitama Credits can be used for compliance for up to one-third, in the case of offices, or 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) and hydro power (1,000kW to 10,000kW) 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 TMG 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 TMG 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

LINKS WITH OTHER SYSTEMS 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. Since excess emission reductions need to be confirmed at the end of the first compliance period, credits have only become tradable from 2015. As of December 2015, the first credits transfer took place between the two jurisdictions.

New Zealand Emissions Trading Scheme (NZ ETS) in force

EMISSIONS COVERAGE ($MtCO_2e$, 2015)	LIABLE ENTITIES
38.6	2423

GAS COVERAGE	ALLOCATION	OFFSETS & CREDITS
SEVERAL GASES	AUCTIONING & FREE ALLOCATION	INTERNATIONAL UNTIL MAY 2015 & DOMESTIC

The NZ ETS was launched in 2008, and has since continued to evolve to cover all sectors of the economy, including agriculture, which currently has reporting but not surrender obligations. The first statutory review was completed in 2011 and the NZ ETS was amended in 2012. A second review of the NZ ETS is currently underway and is expected to conclude in the second half of 2016. It is focusing on three areas: transition measures that moderate the scheme's impact, how the NZ ETS may need to evolve to assist New Zealand in meeting its 2030 target, as well as operational and technical improvements.

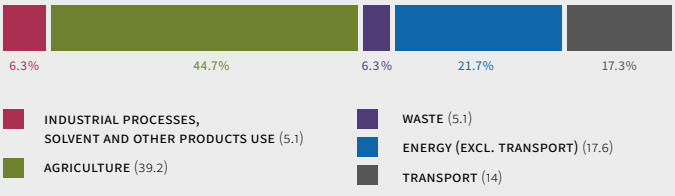
The NZ ETS was originally designed to provide unlimited access to international credits. However, the NZ ETS restricted the use of international Kyoto units (CERs, ERUs, and RMUs) as of 1 June 2015, effectively making it a domestic-only system. This may change in the future, as access to international markets is a priority indicated in New Zealand's INDC.

Also in 2015, the Government allocated funding to support work on supply management, including auctioning allowances, which could be used to respond to future supply constraints.

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF) 81 $MtCO_2e$ (2013)

OVERALL GHG EMISSIONS BY SECTOR $MtCO_2e$



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) (INDC Submission). **BY 2050:** 50% reduction from 1990 GHG levels.

ETS SIZE

CAP The NZ ETS has no fixed cap, in order to accommodate carbon sequestration from forestry activities and to enable the full use of international carbon markets. The NZ ETS legislation includes provisions to introduce auctioning of New Zealand Units (NZUs) within an overall cap on non-forestry sectors.

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 synthetic GHGs (various thresholds). Synthetic GHGs not in the NZ ETS are subject to an equivalent levy. Biological emissions from agriculture must be reported, but face no surrender obligations.

POINT OF REGULATION The point of obligation is generally placed upstream. Some large businesses that purchase 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 2,536 entities registered, of which 2,468 have surrender obligations (as of June 2015). **1.** 261 entities with mandatory reporting and surrender obligations. **2.** 2,207 entities with voluntary reporting and surrender obligations; mostly for forestry activities. **3.** 68 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 Intensity-based allocation for the industrial sector (26 eligible activities): 90% free allocation for highly emissions-intensive and trade exposed activities (1,600 tCO_2e/NZD 1 million of revenue [EUR 618,442]). 60% free allocation for moderately emissions-intensive and trade exposed activities (800 tCO_2e/NZD 1 million of revenue). In the year to June 2015, 5.1 million NZUs were allocated to industrial participants, compared to a total of 32.1 million certificates (primarily Kyoto 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. See 'offsets and credits' for information on unit entitlements for the post-1989 forestry sector. In 2012, the NZ

ETS legislation was amended to allow the introduction of auctioning of NZUs within an overall cap on non-forestry sectors. However, no decision to implement auctioning has been taken.

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 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 participants are entitled to receive one NZU per ton of removals 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 two tons of removals. In the year to June 2015, 12.8 million NZUs were transferred to participants for removal activities (mainly forestry removals). 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 a carbon price signal. These include: **1.** one-for-two surrender obligation for non-forestry sectors (one allowance may be surrendered for every two tons of emissions); and **2.** a NZD 25 fixed price option (EUR 15.47), which effectively acts as a price ceiling. These measures were extended indefinitely following the 2011 NZ ETS Review, but are being considered as part of the 2015–2016 NZ ETS Review.

COMPLIANCE

MRV Self-reporting supplemented by audits. Most sectors are required to report annually. 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. Third party verification is only required when participants apply for the use of a unique emissions factor.

ENFORCEMENT An entity that fails to surrender emission units when required to, will have to surrender units and pay a penalty of NZD 30 (EUR 18.57) for each unit. Entities can be fined up to NZD 24,000 (EUR 14,852) 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 (EUR 30,949) 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 and Ministry for Primary Industries.

Korean Emissions Trading System (KETS)

in force

EMISSIONS COVERAGE ($MtCO_2e$, 2015)	LIABLE ENTITIES
573	525

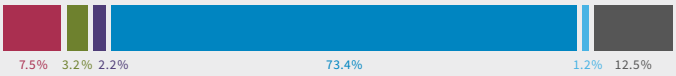
GAS COVERAGE	ALLOCATION	OFFSETS & CREDITS
SEVERAL GASES	FREE ALLOCATION	DOMESTIC OFFSETS

On 1 January 2015, the Republic of Korea launched its national ETS (KETS), the first nation-wide Cap-and-Trade program in operation in East Asia. The ETS covers approximately 525 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 INDC target of 37% below BAU emissions. In its first year of operation trade under the KETS has been limited. However, 2015 has seen a steady flow of credits from national offset projects.

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF) 688.4 $MtCO_2e$ (2012)

OVERALL GHG EMISSIONS BY SECTOR $MtCO_2e$



- INDUSTRIAL PROCESSES (51.37)
- AGRICULTURE (21.99)
- WASTE (14.81)
- FUEL COMBUSTION (EX. TRANSPORT) (505.57)
- FUGITIVE EMISSIONS (8.32)
- TRANSPORT (86.36)

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):** 1,687 $MtCO_2e$, including a reserve of 89 million tCO_2e for market stabilization measures, early action and new entrants. 2015: 573 $MtCO_2e$, 2016: 562 $MtCO_2e$, 2017: 551 $MtCO_2e$
Caps for phase two and three have not yet been announced.

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 525 business entities including 5 domestic airlines.

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), not across phases.
OFFSETS AND CREDITS **PHASE ONE (2015–2017) AND PHASE TWO (2018–2020):** **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) are allowed in the scheme. Eligible activities include those eligible under the CDM and Carbon Capture and Storage (CCS). However, only activities implemented after 14 April 2010 are eligible. **QUANTITATIVE LIMIT:** Up to 10% of each entity's compliance obligation. **PHASE THREE (2021–2025):** Up to 10% of each entity's compliance obligation with a maximum of 5% coming from international offsets.
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 (EUR 7). 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 10%). **4.** An increase or decrease of the offsets limit (currently up to 10%). **5.** Temporary set-up of a price ceiling or price floor.

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 (EUR 70).

OTHER INFORMATION

INSTITUTIONS INVOLVED Ministry of Environment

China Emissions Trading System

scheduled

The year 2015 marked a significant milestone on the path towards the implementation of China's national ETS. China's schedule to launch a unified national carbon market by 2017 was confirmed at the highest political level.

In its 12th Five Year Plan (2011–2015), China committed to gradually developing a national ETS. This intention was reaffirmed in China's INDC Submission to the UNFCCC in June 2015.

The Interim Administrative Measures on Emissions Trading were published by the National Development and Reform Commission (NDRC) in December 2014, which focused on core principles and the division of responsibilities between the national and provincial authorities.

On 25 September 2015, the United States and China released a joint statement on climate change. China's President Xi Jinping announced that the country will launch its national ETS in 2017. The mandatory system will cover key sectors such as power generation, iron and steel, petrochemicals, chemicals, building materials, paper making, non-ferrous metals and aviation.

On 11 January 2016, the NDRC further published the Notice on Key Works in Preparation for the Launch of the National ETS that puts forward major tasks for 2016, supplemented by technical guidance and templates for data reporting and verification.

BACKGROUND INFORMATION

OVERALL GREENHOUSE GAS EMISSIONS 10,975.50 $MtCO_2e$ (2012)

OVERALL GHG REDUCTION TARGET BY 2015: 17% reduction in carbon intensity compared to 2010 levels. **BY 2020:** 40–45% reduction in carbon intensity compared to 2005 levels (voluntary commitment under the Copenhagen Accord of 2009). **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 and increasing the share of non-fossil fuels in primary energy consumption to around 20%.

ETS SIZE

SECTORS & THRESHOLDS The National ETS will cover: petrochemicals, chemicals, building materials, iron and steel, non-ferrous metals, paper making, power generation and aviation, that are further divided into 15 subsectors. **INCLUSION THRESHOLDS:** Entities with an annual energy consumption of 10,000 tons of standard coal (in any year during the period 2013–2015) are asked to report their historical emissions and may be enrolled into the National ETS.

FLEXIBILITY

OFFSETS AND CREDITS 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 China Certified Emission Reduction (CCER). 2015 is the first year that credits generated by CCER projects have been surrendered for compliance in the pilot schemes.

COMPLIANCE

MRV FRAMEWORK: From 2013–2015, the NDRC has released a series of MRV guidelines covering a total of 24 sectors. To support the NDRC drafting of the national allocation plan in 2016, local DRCs shall collect emissions reports from entities in their regions for 2013–2015 in accordance with the MRV sector guidelines. Companies are also required to report production and other industry-specific data that may be used for benchmark allocation. The reports have to be verified by third-party verifiers. Both the emissions and verification reports must then be checked by local DRCs and sent to the NDRC before the end of June 2016. **VERIFICATION:** The NDRC is currently drafting regulation for third-party verification for the national ETS. Before this is finalized, local DRCs are asked to select suitable institutions and personnel to carry out the verification tasks according to suggested requirements by the NDRC.

OTHER INFORMATION

INSTITUTIONS INVOLVED NDRC, provincial/autonomous regional/municipal Development and Reform Commissions (DRCs), and Civil Aviation Administration of China (CAAC)

1 This will be replaced by formal legislation issued by the State Council in 2016.

Beijing (Pilot) Emissions Trading System

in force

EMISSIONS COVERAGE ($MtCO_2e$, 2015)	LIABLE ENTITIES
50.0	551

GAS COVERAGE	ALLOCATION	OFFSETS & CREDITS
CO_2 ONLY	FREE ALLOCATION	DOMESTIC

On 28 November 2013, Beijing was the third Chinese region, after Shenzhen and Shanghai, to launch its pilot ETS. The pilot covers about 40% of the city's total emissions, including both direct and indirect emissions from electricity providers, the heating sector, cement, petrochemicals, other industrial enterprises, manufacturers and major public buildings. In June 2015, the second compliance phase ended with 100% compliance.

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF) 188.1 $MtCO_2e$ (2012)

GHG REDUCTION TARGETS BY 2015 (12th Five Year Plan): 118% reduction in carbon intensity compared to 2010 levels.

ETS SIZE

CAP 50$MtCO_2$ (Estimate, no official data published)

EMISSIONS COVERAGE

* Estimate, no official data published

GHG COVERED CO_2

SECTORS & THRESHOLDS Industrial and non-industrial companies and entities, including electricity providers, heating sector, cement, petrochemicals, other industrial enterprises, manufacturers and service sector. With the revised inclusion threshold the transport sector will be covered as well. **INCLUSION THRESHOLDS:** 10,000t CO_2/year, considering both direct and indirect emissions. Revision of the threshold in December 2015 to 5,000t CO_2/year will affect the cap, emissions coverage, and number of liable entities, however these numbers are not yet available.

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 551 (2015)

1 Initially, the seven Chinese pilot ETS were scheduled to end after three compliance years and be replaced by the national ETS in 2016. However, as the national ETS will not start before 2017, the pilots will likely be extended until then.

PHASES AND ALLOCATION

TRADING PERIODS Three years (2013–2015)[1]

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

COMPLIANCE PERIOD One year (15 June)

FLEXIBILITY

BANKING AND BORROWING Banking allowed during the pilot phase. Borrowing is not allowed.

OFFSETS AND CREDITS QUANTITATIVE LIMIT: Domestic project-based carbon offset credits—China 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, 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 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 In case of market fluctuations, the Beijing Development and Reform Commission (DRC) can buy or auction allowances in order to stabilize the market.

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 six sectors: heat production and supply, thermal power generation, cement, petrochemicals, 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 tons of standard coal equivalent have to report their emissions, verification is not required.

ENFORCEMENT Penalties for failing to submit the emissions or verification report on time vary and can result in fines up to 50,000 CNY (EUR 7,343). 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)

Chongqing (Pilot) Emissions Trading Scheme

in force

EMISSIONS COVERAGE ($MtCO_2e$, 2014)	LIABLE ENTITIES
106	237

GAS COVERAGE	ALLOCATION	OFFSETS & CREDITS
SEVERAL GASES	FREE ALLOCATION	DOMESTIC

On 19 June 2014, Chongqing was the latest Chinese region to start its pilot ETS. The system covers enterprises from seven sectors: power, electrolytic aluminum, ferroalloys, calcium carbide, cement, caustic soda, and iron and steel. The 242 covered enterprises account for around 40% of the city's total emissions.

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF) 243.1 $MtCO_2e$ (2012)

GHG REDUCTION TARGETS BY 2015: (12th Five Year Plan): 17% reduction in carbon intensity compared to 2010 levels.

ETS SIZE

CAP 106 $MtCO_2e$ (2014)

EMISSIONS COVERAGE

GHG COVERED CO_2, CH_4, N_2O, HFCs, PFCs, SF_6

SECTORS & THRESHOLDS Power, electrolytic aluminum, ferroalloys, calcium carbide, cement, caustic soda, and iron and steel. **INCLUSION THRESHOLDS:** 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 (2014)

PHASES AND ALLOCATION

TRADING PERIODS Three years (2013–2015)[1]

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. 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 was put in place for 2015 (20 June).

FLEXIBILITY

BANKING AND BORROWING Banking allowed during the pilot phase. Borrowing is not allowed.

OFFSETS AND CREDITS QUANTITATIVE LIMIT: Domestic project-based carbon offset credits—China 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.

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: combustion, industrial processes and electricity consumption.

ENFORCEMENT According to the Interim Administrative Measures for the Chongqing ETS published on May 2014, there are no financial penalties for non-compliance. The punishments may include media reporting and public exposure of the noncompliance, disqualification from the energy saving and climate subsidies, as well as associated awards for three years; records on the State Owned Enterprise (SOE) performance assessment system.

OTHER INFORMATION

INSTITUTIONS INVOLVED Chongqing DRC (Competent authority), Chongqing Carbon Emissions Exchange (Trading platform)

1 Initially, the seven Chinese pilot ETS were scheduled to end after three compliance years and be replaced by the national ETS in 2016. However, as the national ETS will not start before 2017, the pilots will likely be extended until then.

Guangdong (Pilot) Emissions Trading Scheme

in force

EMISSIONS COVERAGE ($MtCO_2e$, 2015)	LIABLE ENTITIES
408.0	217

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

On 19 December 2013, Guangdong was the fourth Chinese region, after Shenzhen, Shanghai and Beijing, to start its pilot ETS. Guangdong is the largest in size of the seven ETS pilots. The scheme covers enterprises from four sectors: power, iron and steel, cement, and petrochemicals. These sectors account for more than half of the province's emissions. The second compliance period was completed in July 2015.

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF) 610.5 $MtCO_2e$ (2012)

GHG REDUCTION TARGETS BY 2015: (12th Five Year Plan): 19.5% reduction in carbon intensity compared to 2010 levels.

ETS SIZE

CAP 408 $MtCO_2e$ (2015)

EMISSIONS COVERAGE

COVERED	NOT COVERED
55%	45%

GHG COVERED CO_2

SECTORS & THRESHOLDS SECTORS: energy, iron and steel, cement, petrochemicals. Ceramics, textiles, nonferrous metals, chemicals, pulp and paper, construction, transportation sectors may be included during the pilot phase at a later stage. **INCLUSION THRESHOLDS:** 20,000tCO_2/year or energy consumption 10,000 tons coal equivalent (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 186 existing enterprises and 31 new entrants (2015)

PHASES AND ALLOCATION

TRADING PERIODS Three years (2013–2015)[1]

ALLOCATION Mainly free allocation through grandfathering based on 2010–2012 emissions and benchmarking for electricity generators, certain cement and iron and steel industrial processes and new entrants. During the pilot phase 3% (2013) to 10% (2015) of allowances are auctioned. During the first compliance year participation in auctions was mandatory for entities to be able to receive or trade their respective portions of free allocation.

COMPLIANCE PERIOD One year (20 June)

FLEXIBILITY

BANKING AND BORROWING Banking allowed during the pilot phase. Borrowing is not allowed.

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

QUALITATIVE LIMIT: Of the annual compliance obligation, half have to be from CO_2 or CH_4 reduction projects. At least 70% of CCERs need to come from Guangdong. Pre-CDM credits are not eligible as are credits from hydropower and most fossil fuel projects.

PRICE MANAGEMENT PROVISIONS Guangdong has an auction floor price. Initially, it was set at CNY 60 (EUR 8.81). After the completion of the first compliance phase, the price was lowered to CNY 25 (EUR 3.67) and increased to CNY 40 (EUR 5.87) in steps of CNY 5 (EUR 0.73) 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.

COMPLIANCE

MRV REPORTING FREQUENCY: Annual reporting of CO_2 emissions. **VERIFICATION:** Third-party verification is required. **FRAMEWORK:** The Guangdong Development and Reform Commission (DRC) released guidelines for monitoring and reporting for the four following sectors: power, cement, iron and steel, and petrochemicals.

ENFORCEMENT Penalties[2] for failing to submit emissions or verification reports on time range from CNY 10,000 (EUR 1,309) to CNY 50,000 (EUR 6,544). Furthermore, companies failing to surrender enough allowances to match their emissions will be deducted twice the amount of allowances from next year's allocation and are fined CNY 50,000 (EUR 6,544).

OTHER INFORMATION

INSTITUTIONS INVOLVED Guangdong DRC (Competent authority), China Emissions Exchange Guangzhou (Trading platform)

1 Initially, the seven Chinese pilot ETS were scheduled to end after three compliance years and be replaced by the national ETS in 2016. However, as the national ETS will not start before 2017, the pilots will likely be extended until then.

2 Penalties are currently under review.

Hubei (Pilot) Emissions Trading System

in force

EMISSIONS COVERAGE ($MtCO_2e$, 2015)	LIABLE ENTITIES
281	167

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

On 2 April 2014, Hubei was the sixth pilot ETS in China to start trading. The system covers 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.

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF) 463.1 $MtCO_2e$ (2012)
GHG REDUCTION TARGETS BY 2015: (12th Five Year Plan): 17% reduction in carbon intensity compared to 2010 levels.

ETS SIZE

ETS CAP 281 $MtCO_2e$ (2015) (not officially confirmed)
EMISSIONS COVERAGE

COVERED	NOT COVERED
35%	65%

GHG COVERED CO_2
SECTORS & THRESHOLDS Power and heat supply, iron and steel, chemicals, petrochemicals, cement, automobile manufacturing, ferrous metals, glass, pulp and paper, food and beverage. **INCLUSION THRESHOLDS:** Energy consumption more than 60,000 tons coal equivalent (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 167 (2015)

PHASES AND ALLOCATION

TRADING PERIODS Three years (2013–2015)[1]
ALLOCATION Mainly free allocation through grandfathering based on 2009–2011 historic emissions, early action and sector-specific factors were also considered. A smaller proportion of allowances were auctioned at the beginning to complement the allocation process.
60% of total allowances are initially distributed to entities, 32% go to the new entrance reserve, and 8% to the government reserve in which 30% are marked for auctioning and 70% are allocated for market control in case of price fluctuations. Ex-post allocation adjustments are possible.

COMPLIANCE PERIOD Due to the late start, compliance for 2013 and 2014 were combined in one phase. A one year compliance period was implemented for 2015 (30 May).

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—China Certified Emission Reduction (CCER)—is limited to 10% of the annual allocation. **QUALITATIVE LIMIT:** CCERs must come from the province of Hubei or from provinces and regions that have signed agreements with Hubei are allowed. Credits from large- and medium-scale hydro projects are not eligible.
PRICE MANAGEMENT PROVISIONS In case of market fluctuations, the Hubei Development and Reform Commission (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.

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 (EUR 1,309) to CNY 3,000 (EUR 3,927). Trade participants that manipulate the market face up to CNY 150,000 (EUR 19,632) 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 (EUR 19,632).

OTHER INFORMATION

INSTITUTIONS INVOLVED Hubei DRC (Competent authority), Hubei Carbon Emissions Exchange (Trading platform)

1 Initially, the seven Chinese pilot ETS were scheduled to end after three compliance years and be replaced by the national ETS in 2016. However, as the national ETS will not start before 2017, the pilots will likely be extended until then.

Shanghai (Pilot) Emissions Trading System

in force

EMISSIONS COVERAGE ($MtCO_2e$, 2015)	LIABLE ENTITIES
160	190

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

On 26 November 2013, Shanghai was the second Chinese region, after Shenzhen, to start its pilot ETS. The pilot covers around half of the city's emissions, including industrial and non-industrial sectors like transportation. Shanghai completed its second compliance period in June 2015.

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF) 297.7 $MtCO_2e$ (2012)

GHG REDUCTION TARGETS BY 2015: (12th Five Year Plan): 19% reduction in carbon intensity compared to 2010.

ETS SIZE

CAP 160 $MtCO_2$

EMISSIONS COVERAGE

COVERED	NOT COVERED
57%	43%

GHG COVERED CO_2

SECTORS & THRESHOLDS The following sectors are covered: airports, aviation, chemical fiber, chemicals, commercial, electricity, financial, hotels, iron and steel, petrochemicals, ports, non-ferrous metals, building materials, paper, railway stations, rubber, textiles, paper, rubber. **INCLUSION THRESHOLDS:** For power and industry: 20,000t CO_2/year. For non-industry: 10,000t 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 190 (2015)

PHASES AND ALLOCATION

TRADING PERIODS Three years (2013–2015) [1]

ALLOCATION One-off free allocation for 2013–2015 based on 2009–2011 emissions, considering company growth and benchmarks for certain sectors (electricity, aviation, ports and airports). Ex-post allocation adjustments, e.g., on the basis of production data, are possible. Auctioning or other forms of allocation may be introduced during the pilot phase.

COMPLIANCE PERIOD One year (30 June)

FLEXIBILITY

BANKING AND BORROWING Within the pilot phase, banking is allowed across compliance periods. Borrowing is not allowed.

OFFSETS AND CREDITS QUANTITATIVE LIMIT: Domestic project-based carbon offset credits—China Certified Emission Reduction (CCER)—are allowed. The use of CCER credits is limited to 5% of the annual allocation. **QUALITATIVE LIMIT:** Credits for reductions that were realized before January 2013 cannot be used for compliance.

PRICE MANAGEMENT PROVISIONS If prices vary more than 10% in one day, the Shanghai Environment and Energy Exchange can take price stabilization measures, 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 nine sectors: Iron and steel, electricity, building materials, non-ferrous metals, textiles, paper and pulp, aviation, large buildings (hotels, commercial and financial) and transport stations.

ENFORCEMENT Penalties for failing to submit emission report or verification report on time or providing fraudulent information range from CNY 10,000 (EUR 1,309) to CNY 50,000 (EUR 6,544).

Between CNY 50,000 (EUR 6,544)–CNY 100,000 (EUR 13,088) 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 DRC (Competent authority), Shanghai Environment and Energy Exchange (Trading platform)

1 Initially, the seven Chinese pilot ETS were scheduled to end after three compliance years and be replaced by the national ETS in 2016. However, as the national ETS will not start before 2017, the pilots will likely be extended until then.

Shenzhen (Pilot) Emissions Trading Scheme

in force

EMISSIONS COVERAGE ($MtCO_2e$, 2015)	LIABLE ENTITIES
34.78	832

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

Shenzhen was the first of the Chinese pilot ETSs to start operation on 18 June 2013. The Shenzhen ETS covers 635 medium and small emitters from 26 sectors and 197 buildings, accounting for about 40% of Shenzhen's 2010 emissions. In June 2015, Shenzhen finished its second compliance period.

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF) 153 $MtCO_2e$ (2012)
GHG REDUCTION TARGETS BY 2015 (12th Five Year Plan): 21% reduction in carbon intensity compared to 2010 levels.

ETS SIZE

CAP 34.78 $MtCO_2$ (excluding buildings)
EMISSIONS COVERAGE

GHG COVERED CO_2
SECTORS & THRESHOLDS Power, water supply, manufacturing sectors, buildings. Since June 2015, public buses and taxis are required to measure and report their emissions and may be included during the pilot phase at a later stage. **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 635 enterprises, 197 public buildings (2015)

PHASES AND ALLOCATION

TRADING PERIODS Three years (2013–2015) [1]
ALLOCATION Allowances are largely distributed for free based on sector-specific carbon intensity benchmarks for electricity, water supply and gas supply sectors. In addition, a game theoretical approach that takes into account the companies' own estimations of output and emissions is applied for manufacturing companies. Ex-post adjustments are possible. Up to 3% of allowances can be auctioned. As of January 2016, only one auction has taken place (June 2014).
COMPLIANCE PERIOD One year (June 30)

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—China 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 Development and Reform Commission (DRC) can either 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 Penalties for failing to submit an emissions or verification report on time, providing fake information or disturbing the market order can cost up to CNY 100,000 (EUR 13,088). 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)

1 Initially, the seven Chinese pilot ETS were scheduled to end after three compliance years and be replaced by the national ETS in 2016. However, as the national ETS will not start before 2017, the pilots will likely be extended until then.

Tianjin (Pilot) Emissions Trading System

in force

EMISSIONS COVERAGE ($MtCO_2e$, 2015)	LIABLE ENTITIES
160.0	112

GAS COVERAGE	ALLOCATION	OFFSETS & CREDITS
CO_2 ONLY	FREE ALLOCATION	DOMESTIC

On 26 December 2013, Tianjin was the fifth Chinese region, after Shenzhen, Shanghai, Beijing and Guangdong, to start its pilot ETS. 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 around 60% of the city's total emissions. The second compliance period ended in July 2015.

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF) 215 $MtCO_2e$ (2012)

GHG REDUCTION TARGETS BY 2015 (12th Five Year Plan): 19% reduction in carbon intensity compared to 2010 levels.

ETS SIZE

CAP 160 $MtCO_2$

EMISSIONS COVERAGE

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 112 (2014)

PHASES AND ALLOCATION

TRADING PERIODS Three years (2013–2015)[1]

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)

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—China 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 policies for three years. There are no financial penalties for non-compliance.

OTHER INFORMATION

INSTITUTIONS INVOLVED Tianjin DRC (Competent authority), Tianjin Climate Exchange (Trading platform)

1 Initially, the seven Chinese pilot ETS were scheduled to end after three compliance years and be replaced by the national ETS in 2016. However, as the national ETS will not start before 2017, the pilots will likely be extended until then.

Taiwan

under consideration

On 1 July 2015, Taiwan enacted the Greenhouse Gas Reduction and Management Act, which sets a 50% emissions reduction target for 2050 compared to 2005 GHG levels. The Act charges the Taiwanese Environmental Protection Administration (TEPA) with the development of appropriate climate change policies to reach this target.

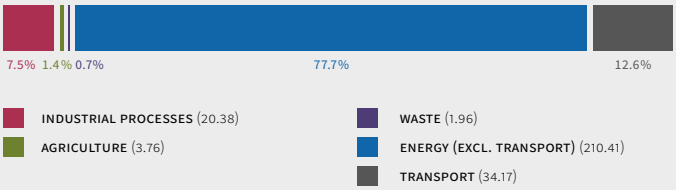
An ETS is mentioned as a key option in the law, although no precise timeline is given for its implementation. The Act also outlines options for ETS design elements including: allocation, provisions for offsets and which considerations must be taken into account when setting the cap.

Currently, preparations are focussing on mandatory reporting for entities from certain sectors with annual emissions above 25,000 tCO_2e. Reporting has been ongoing since 2013. Taiwan is also encouraging voluntary emission reduction efforts.

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF) 270.68 $MtCO_2e$ (2012)

OVERALL GHG EMISSIONS BY SECTOR $MtCO_2e$



GHG REDUCTION TARGETS BY 2050: 50% below 2005 GHG levels.

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 introduced voluntary GHG reporting under the Air Pollution Control Act. This became mandatory in 2013 and is continued under the Greenhouse Gas Reduction and Management Act.

INSTITUTIONS INVOLVED TEPA

Thailand

under consideration

The 11th National Economic and Development Plan (2012–2016) of Thailand calls for several measures related to 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. The importance of carbon markets has also been emphasized in Thailand's INDC. In view of this, various programs have been initiated and/or are currently under development.

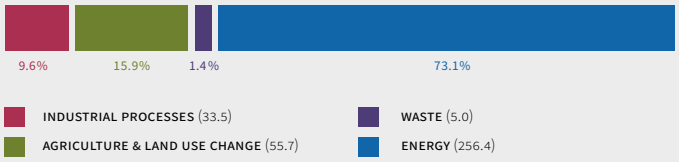
In 2013, the Thailand Greenhouse Gas Management Organization (Public Organization) (TGO) has developed an MRV system for the Thailand Voluntary Emissions Trading Scheme (Thailand V-ETS). Furthermore, the Thailand Voluntary Emission Reduction Program (T-VER), which was launched in October 2014, has 20 registered projects as of 2016, amongst which seven projects produced 339,537 credits that can be used as offsets by companies and individuals.

The TGO is also developing a Low Carbon City (LCC) Program as part of the World Bank's PMR to help Thai provinces, cities, and municipalities to build a GHG inventory along with an MRV system for citywide emissions and set reduction targets. The TGO will translate these mitigation actions into emissions reduction certificates ("Certificates") under the T-VER.

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. AFOLU) 350.7 $MtCO_2e$ (2012)

OVERALL GHG EMISSIONS BY SECTOR $MtCO_2e$ (2012)



GHG REDUCTION TARGETS Thailand has no mandatory GHG reduction targets under the Kyoto Protocol. **BY 2020:** In its Nationally Appropriate Mitigation Action (2014), Thailand committed to a voluntary 7–20% reduction compared to BAU in the energy and transport sectors. **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 (INDC Submission).

Vietnam

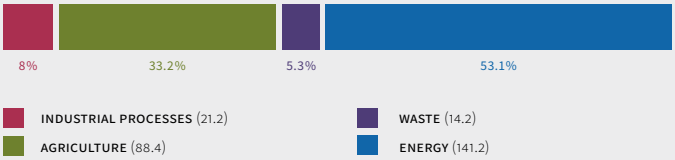
under consideration

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 their National Appropriate Mitigation Actions (NAMAs) in the waste, steel, cement, chemical fertilizer, wind power and biogas sectors. As part of its activities under the Partnership for Market Readiness (PMR) program, Vietnam is focusing on the steel and waste sectors. The planned MRV system and crediting NAMA will provide the experiences for the implementation of a sector-based Cap-and-Trade program in the steel sector, which could start in 2020.

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF) 266 $MtCO_2e$ (2010)

OVERALL GHG EMISSIONS BY SECTOR $MtCO_2e$ (2010)



INDUSTRIAL PROCESSES (21.2)
AGRICULTURE (88.4)
WASTE (14.2)
ENERGY (141.2)

GHG REDUCTION TARGETS BY 2020: 20% reduction in 2010 GHG (intensity) levels and 30% conditional on international support. **BY 2030:** 8% below BAU and 25% conditional on international support (INDC Submission).

About ICAP

Introducing the International Carbon Action Partnership

ICAP is the only multilateral forum that brings together governments on all levels that have implemented, or are planning to introduce, Emissions Trading Systems. As of 2015, we have 31 members and four observers in the Partnership.

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

14 courses since 2009

351 participants from 42 countries

188 speakers from 27 countries

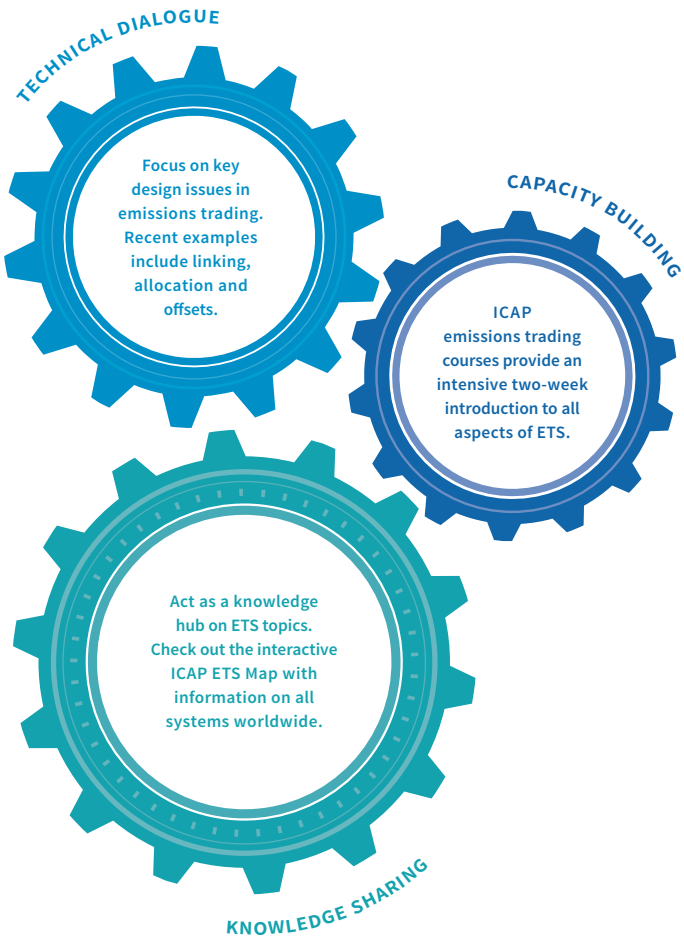
ICAP Knowledge Products

Quarterly newsletter in five languages

A range of publications on ETS

The ICAP ETS Map interactive online tool

Launch of ETS How-to-Handbook in March 2016.



Members (as of February 2016)
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

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List of Acronyms

ASSET	Advanced Technologies Promotion Subsidies Scheme with Emissions Reduction Targets
BAU	Business as Usual
BM&F	Brazilian Mercantile and Futures Exchange
Bovespa	São Paulo Stock Exchange
BVRio	Bolsa Verde do Rio
CAD	Canadian Dollar
CARB	California Air Resources Board
CCER	China Certified Emission Reductions
CCR	Cost Containment Reserve
CCS	Carbon Capture and Storage
CDM	Clean Development Mechanism
CER	Certified Emission Reductions
CETESB	Companhia de Tecnologia de Saneamento Ambiental
CH_4	Methane
CHF	Swiss Franc
CNY	Chinese Yuan Renminbi
CO_2	Carbon Dioxide
COP15	UNFCCC Conference of the Parties in Copenhagen
COP21	UNFCCC Conference of the Parties in Paris
CP1	First Compliance Period
CPP	Clean Power Plan
DRC	Development and Reform Commission
EBRD	European Bank for Reconstruction and Development
EEA	European Economic Area
EITE	Energy-Intensive and Trade-Exposed
ERU	Emission Reduction Unit
ETS	Emissions Trading System or Emissions Trading Scheme
EU	European Union
EUR	Euro
FECOP	Fundo Estadual de Prevenção e Controle de Poluição
FY	Fiscal Year
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GVCes/FGV	Centro de Estudos em Sustentabilidade de Fundação Getúlio Vargas
HFCs	Hydrofluorocarbon
HFC-23	Fluoroform
ICAO	International Civil Aviation Organization
ICAP	International Carbon Action Partnership
INDC	Intended Nationally Determined Contribution
ISO	International Organization for Standardization
ITMO	Internationally Transferred Mitigation Outcomes
JCM	Joint Crediting Mechanism
JI	Joint Implementation
JPY	Japanese Yen
KAU	Korean Allowance Units
KCU	Korean Credit Units
KETS	Korean Emissions Trading Scheme
KOC	Korean Offset Credits
KRW	South Korean Won
KRX	Korea Exchange
LAO	Legislative Affairs Office of the State Council
LCC	Low Carbon City
LDCs	Least Developed Countries
LULUCF	Land Use, Land-Use Change and Forestry
MMC	Mine Methane Capture
MRV	Monitoring, Reporting and Verification
MSR	Market Stability Reserve
M	Million
$MtCO_2e$	Million Metrics Tons of Carbon Dioxide Equivalent
MW	Megawatt
N_2O	Nitrous Oxide
NAMA	Nationally Appropriate Mitigation Actions
NAP	National Allocation Plan
NDRC	National Development Reform Commission
NEa	Dutch Emissions Authority
NER	New Entrants Reserve
NF_3	Nitrogen Trifluoride
NZ	New Zealand
NZUs	New Zealand Units
OECD	Organization for Economic Cooperation and Development
PEMC	Rio de Janeiro Policy on Global Climate Change and Sustainable Development
PNMC	Brazil National Climate Change Policy
PFCs	Perfluorocarbon
PMR	Partnership for Market Readiness
RBOB	Reformulated Blendstock for Oxygenate Blending
RGGI	Regional Greenhouse Gas Initiative
RMU	Removal Unit
SEA	Secretaria de Estado do Ambiente
SF_6	Sulfur Fluoride
SME	Small- and Medium-Sized Enterprises
SOE	State Owned Enterprise
tce	Ton of Coal Equivalent
tCO_2	Ton of Carbon Dioxide
tCO_2e	Ton of Carbon Dioxide Equivalent
TEPA	Taiwan Environmental Protection Administration
TGO	Thailand Greenhouse Gas Management Organization
TMG	Tokyo Metropolitan Government
TMS	Target Management Scheme
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 Emissions Trading Scheme
WCI	Western Climate Initiative

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Sahara desert, Algeria, November 2014 (cover) ©USGS/ESA

Fingerprints of Water on the Sand, Oman, November 2015 (page 6) ©NASA

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Notes on Sources

The report draws on a range of sources, including official ETS information from governments and public authorities, data submitted to the UNFCCC, or where available, other official reporting and information provided by ICAP members or contributing authors. Global emissions data were sourced from the World Resources Institute CAIT database—the latest available data is from 2012 and does not include LULUCF. Relative global emissions coverage was calculated by aggregating absolute caps. Where information on emissions caps was not available, cap estimates based on the relative coverage of a jurisdiction's overall GHG emissions were used. Emissions coverage under the national Chinese ETS is estimated at 3,500 $MtCO_2e$, based on recent written statements by the NDRC officials estimating the future market at 3,000–4,000 $MtCO_2e$. Economic and population data were obtained from the World Bank, official government statistics, and other financial institutions. Among the Chinese pilot schemes, official information is scarce and not always publicly available. Brazil's GHG emissions data, including subnational jurisdictions, was provided by the Federal Government of Brazil and excludes emissions from organic soils. Japan's GHG emissions data is a preliminary estimate provided by the Ministry of Environment. Information on emitting sectors is based on self-reporting by the respective jurisdictions. The designation of sectors is therefore not necessarily consistent across jurisdictions. The data for the INDC infographic was based on ICAP's analysis of INDC submissions received by January 2016. The pricing graphic uses weighted, nominal average prices where available, except for the NZ ETS and the Swiss ETS, which only indicate nominal average prices. The pricing graphic shows secondary prices, except for the Swiss ETS. For the EU ETS futures prices (rolling front December contracts) were used. Additionally, both Hubei and Chongqing only started trading part way through 2014 and very few trades have yet occurred in Chongqing.

As world leaders gathered in Paris last December to negotiate a new global agreement, momentum has also been building for carbon markets. Over a decade since the first ETS was launched, there are now 17 systems operating worldwide across four continents and many more in the pipeline. The 2016 Status Report by ICAP aims to make sense of the great diversity of ETS in operation and under consideration. It combines up-to-date factsheets on existing and planned systems with in-depth articles from policymakers and carbon market experts.

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