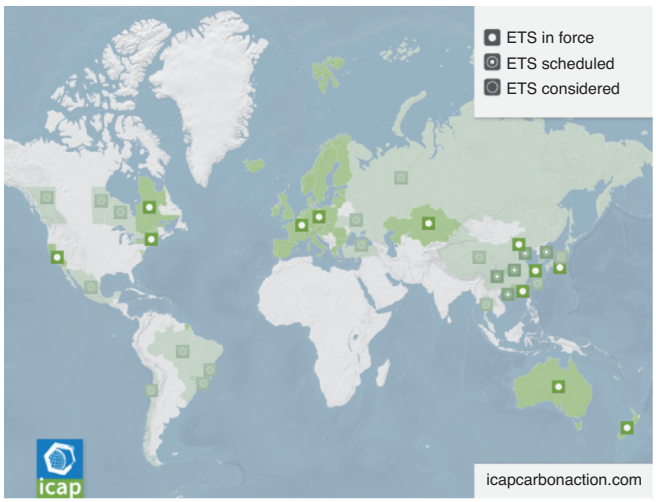
Overview of new carbon markets at international level

Although carbon prices on the European Emissions Trading Scheme (ETS) are at their lowest since 2008 and international negotiations in relation to the United Nations Framework Convention on Climate Change have been stagnating since the 2009 Copenhagen Agreement, nearly seventeen emissions trading markets have been identified at international level. Without counting the European ETS which has existed since 2005, eleven new markets have emerged since 2008 and a further five are set to commence trading in 2014. Of these eleven active markets, five are in Asia, three are in North America, one is in Oceania, one is in Central Asia and one is in Europe. It should be pointed out that to date, no markets are scheduled to begin trading in Africa. Although four markets have announced their intention to work together between now and 2020, the creation of an international emissions trading scheme is not on the immediate horizon.

Since 2008, there have been a number of international CO_2 emissions trading initiatives (Fig. 1). These markets are all different, depending on whether one looks at the rate of coverage for greenhouse gas emissions, the number of sites covered by the market, the reduction targets or the means used to allocate quotas.

Fig. 1 – Active and scheduled carbon emissions trading markets



Source: icapcarbonaction.com

Five active emissions trading markets in Asia

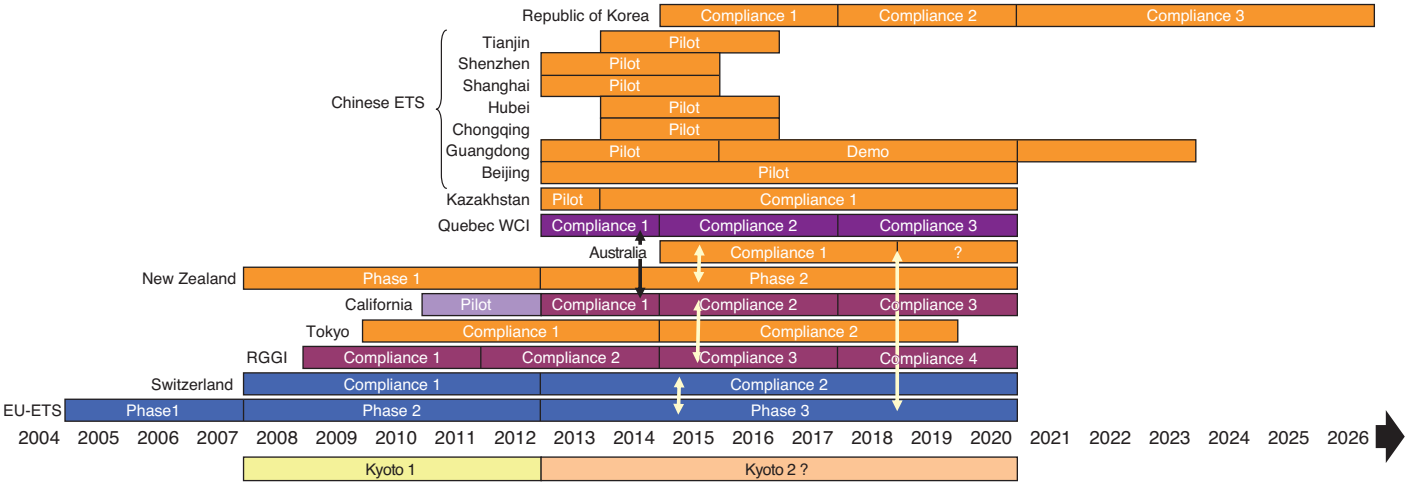
China currently produces more greenhouse gas emissions than any other country in the world. Its ambitious target is to reduce its CO_2 emissions by 45% per GDP unit between now and 2020, compared with its 2005 levels. Of the seven pilot ETS markets that have been announced in China (the provinces of Guangdong and Hubei and the towns of Beijing, Shanghai, Shenzhen, Tianjin and Chongqing), only four have been active since the end of 2013. The other pilot markets in China will commence trading in 2014 at the earliest. As of the end of 2013, very little is known about these Chinese markets in terms of their actual reduction capacity. After 2015, and on the basis of whatever experience it manages to glean from these seven pilot markets, the central Chinese government will make a decision as to whether or not a trading scheme should be introduced at national level.

The Shenzhen ETS market

Shenzhen started its carbon emissions pilot market in June 2013 (Fig .2). Altogether, 635 facilities in the energy

Overview of new carbon markets at international level

Fig. 2 – Carbon market trends at international level



Source: IFPEN

and industry sectors are annually capped at 32 $MtCO_2$, this being calculated based on a carbon intensity reduction target. Data for the sites will not be made public before June 2014, which is when the sites are to be brought into compliance. This means that it is not currently possible to gauge whether or not the market is under duress. After five months of trading, the Shenzhen carbon exchange traded more than 113,000 quotas. As of the end of November 2013, a unit of carbon credit was trading at 72.8 Yuan (€8.7) on the Shenzhen carbon exchange.

The Shanghai ETS market

After Shenzhen, Shanghai created a CO_2 emissions trading market at the end of November 2013. More than 191 facilities in the energy, industry and aviation sectors, as well as business buildings, are covered by the market. For 2013, CO_2 emission permits were capped at 160 Mt. Businesses received free permits based on their past emissions (2009-2011). At the end of 2013, nearly 9,500 allowances deliverable in 2013, 2014 and 2015 were traded at an average price of 27 Yuan (€3.2).

The Beijing ETS market

As of November 2013, Beijing is the third Chinese town — two days after Shanghai — to introduce a CO_2 emissions trading scheme. China's Beijing Environment Exchange has announced two bilateral transactions for a total of 40,000 permits, each worth 50 Yuan (approximately €6). The permits have all been purchased by Sinopec Corp (China's national oil and gas company) and by the investment bank CITIC Securities. The Beijing market is aiming to reduce emissions at 490 sites (energy, industry and large buildings). The government has not made public the number of permits issued to participants in the scheme, but it has announced that 42% of the town's total CO_2 emissions will be covered. Coal power plants will receive free permits in 2013 based on 99.9% of their average emissions for the period 2009-2012. Industrials will receive numbers of permits based on 98% of their past emissions in 2013. This percentage of free permits will be reduced in 2015. Those participants who generate more than the number of permits they hold will have to buy extra permits or compensation credits issued by the central government.

The Guangdong ETS market

Guangdong, China's most populous province with more than 100 million inhabitants, launched its emissions allowance trading scheme in December 2013. Guangdong covers the largest economic area of the seven pilot projects and its ETS market is ten times the size of Shenzhen's. During the pilot phase, four sectors (food, cement, steel-making and petrochemicals) will be covered. The Guangdong market will cover 202 facilities. Nearly 97% of the allowances should be given to companies for free. It will be up to them to purchase additional quotas if necessary. The local government also put up 29 million permits for auction for 2013. The carbon market's target for 2013 is to cap CO_2 emissions at 350 Mt. The auction starting price for the permits will be 60 Yuan (€7.2). Later on, the market should include the ceramics, textiles and non-ferrous metals sectors, as well as companies involved in plastics and paper.

The Tokyo ETS market

In 2010, the Tokyo agglomeration emitted a total of 62 $MtCO_2e$, 37% of which were generated by the commercial sector and 27% by the residential sector. Japan's overall target of reducing its greenhouse gas emissions

by 25% between now and 2020 relative to its 2000 levels has been compromised since the Fukushima catastrophe in March 2011. The Tokyo Metropolitan Government-ETS (TMG-ETS) which was launched in April 2010 is still obligatory. There is a cap on the market in absolute terms[1]. The TMG-ETS is a unique programme because it regulates greenhouse gas emissions of buildings that consume large amounts of energy. In fact, the TMG has deemed it more effective to limit facilities' energy consumption, rather than their CO_2 emissions. The TMG-ETS covered 1,348 entities across the greater Tokyo area in 2010 (970 entities in the commercial sector and 189 in the industrial sector) and covered 40% of total emissions in the region. The market only covers CO_2. A 1,500 m^3 oil equivalent consumption threshold has been set for each facility. Two compliance periods of five years: Phase 1 (2010-2014) and Phase 2 (2015-2019). Allowances are awarded for free on the basis of past emissions. Only surplus permits are negotiable at the end of this period (in 2014 in Phase 1). The penalties that are applicable in the event of non-compliance are extremely high — as much as ¥500,000 (€4,750)!

Five emissions trading markets scheduled for after 2014

South Korea's ETS market

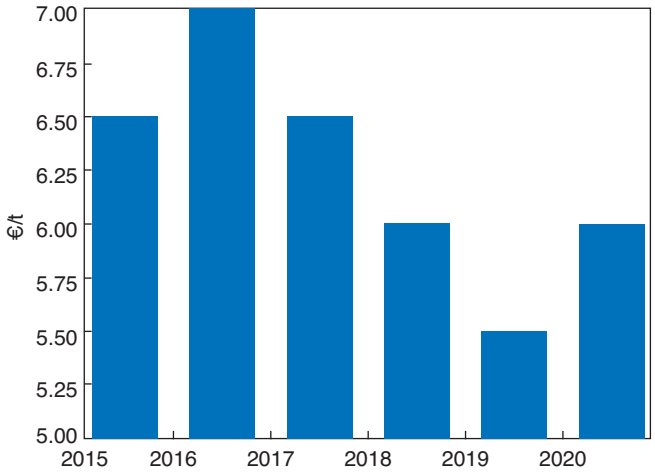
South Korea is planning to create its first emissions trading market in 2015. Major companies have had to declare their greenhouse gas emissions since 2010. In 2009, South Korea generated 608 $MtCO_2e$, 38% of which were from burning energy. Its 2020 target to reduce greenhouse gas emissions is 30% below "Business as Usual".

The Korean ETS system will be obligatory with a voluntary opt-in option, meaning that the market will allow some players to voluntarily sign up to the system. It will cover 60% of the country's greenhouse gas emissions. The market will cover the six greenhouse gases listed in the Kyoto Protocol (CO_2, CH_4, N_2O, SF_6, HFC, PFC). The sectors covered will be business (more than 125 $ktCO_2e$) and industrial facilities (more than 25 $ktCO_2e/y$). The Korean ETS system should cover nearly 460 entities altogether. Three periods of trading are scheduled for between 2015 and 2026: Phase 1 (2015-2017), Phase 2 (2018-2020) and Phase 3 (2021-2026). All quotas will be allocated to entities in Phase 1 for free, 97% will be allocated for free in Phase 2, and a maximum of 90% of emissions quotas will be allocated for free in Phase 3. Because the reduction target is relatively ambitious, the price of the Korean quota could be relatively high. However, the US$90/t non-compliance penalty will serve as a price cap in the Korean ETS scheme as it is fully discharging.

The ETS market in Australia

The Australian Carbon Pricing Scheme, which had been in operation since July 2012, set the carbon tax at A$23/$tCO_2e$ (nearly €15). In July 2013, the new government tabled a bill to do away with this carbon tax and introduce an emissions trading scheme in July 2014. This news is important for the Australian carbon market because predictions about the price of the Australian quota are far lower than the amount of the tax: an average of A$9.5/$tCO_2e$ (€6.2/tCO_2e) for the period 2015-2020 (Fig. 3).

Fig. 3 – Australian carbon unit price forecasts to 2020



Source: Thomson Reuters Point Carbon

The Australian system should cover the energy and industrial processes sectors, together with storage site emissions and fugitive emissions. The system could be applied to the 316 facilities that emit more than 25 $ktCO_2e/y$. A bilateral connection with the European emissions trading scheme was initially considered for 2018 and is yet to be confirmed. Within this context and due to its small size (scarcely 275 Mt/y), the Australian market will not have a great deal of influence on the international carbon market.

The Hubei, Chongqing and Tianjin ETS markets

Very little information has so far been provided about the Hubei, Chongqing and Tianjin ETS markets. These pilot markets will not commence trading before the end of 2014.

(1) The number of available allowances over a compliance period is set

Overview of new carbon markets at international level

Three active emissions trading markets in North America

The ETS-Regional Greenhouse Gas Initiative (RGGI) market

The RGGI market groups together nine states in the north-east of the United States. In 2010, the RGGI's member states generated 472 $MtCO_2e$, nearly 90% of which were from the energy sector. After a period of quota over-allocation, the RGGI carried out an assessment of its member states for Phase 3 (2015-2017).

Four compliance periods of three years: Phase 1 (2009-2011), Phase 2 (2012-2014), Phase 3 (2015-2017) and Phase 4 (2018-2020). The trading system is obligatory with a cap that is fixed in absolute terms. The ETS is targeting a 15% reduction by 2020 compared with 2014 levels. Only CO_2 is covered by the market which itself only covers 25% of its member states' CO_2 emissions. Nearly 200 thermal power plants will be affected by the RGGI (threshold of over 25 MW) in the second compliance period. Nearly 90% of allowances will be auctioned at a minimum price of US$1.93 (approx. €1.5). Since January 2013, organizations have been expecting a scarcity in the RGA (regional Gas Allowance) quota in Phase 2, resulting in an increase in the price of permits (Fig. 4) — although they remain very modest.

The ETS market in Quebec

Quebec has been a member of the Western Climate Initiative (WCI) since 2008 and is seeking to bring its Cap & Trade programme in line with California's WCI market. In 2012, Quebec introduced a greenhouse gas emissions trading system the compliance obligation of which began in January 2013. Quebec generated 81.8 $MtCO_2e$ emissions in 2009. Its overall target is to reduce greenhouse emissions by 20% between now and 2020 compared with its 1990 emissions levels.

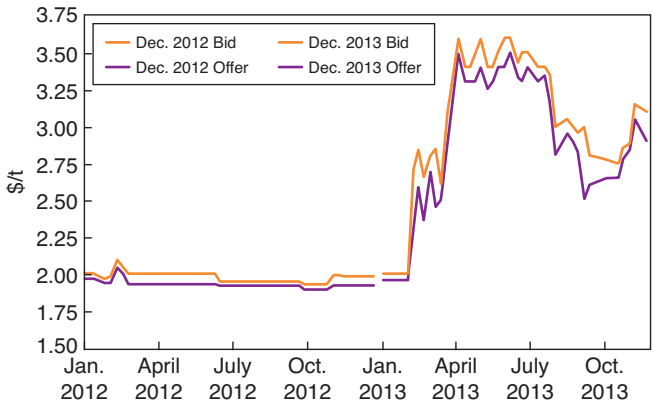
The market operates with an absolute cap. The annual cap for emissions is 23.2 $MtCO_2e$ for Phase 1. From 2015, the cap will be reduced by 2.5 $MtCO_2e$/y. In 2015, nearly 81% of Quebec's greenhouse gas emissions will be affected by the market — which is still seven times less than in California.

The market will cover the six greenhouse gases listed in the Kyoto Protocol plus NF_3. Three periods of compliance have been scheduled: Phase 1 (2013-2014), Phase 2 (2015-2017) and Phase 3 (2018-2020). The sectors covered by the market during Phase 1 are electricity power plants and industry (more than 25 $ktCO_2e$/y). The second and third compliance periods will also include fuel distribution for the transport sector (excluding aviation and sea) and the construction sector. Nearly 75 operators will be affected by the market for the period 2013-2014. Allocation is free in Phase 1 and takes past emissions levels, production levels and carbon intensity reduction targets into account. The allocation will cover 100% of emissions from industrial processes, and 80% of emissions from combustion. The regulator may request that allocations be reimbursed if it is demonstrated that too many have been awarded. Electricity and fuel distributors have to purchase all of their allocations at auctions or go to the market. Auctions are held jointly between WCI partners (California and Quebec in 2013). The reserve price was set at C$10 (€6.8) per allocation in 2012. This price should increase by 5% per year. Bringing into compliance is required at the end of each phase (2015, 2018 and 2021). Since January 2013, the Californian and Quebec emissions trading schemes have made up a single regional carbon market (WCI) on which the compliance tools are fully fungible. The penalty applied in the event of non-compliance is three allocations for every missing allocation.

The ETS market in California

In 2009, California generated 457 $MtCO_2e$. The target for between now and 2020 is to bring greenhouse gas emissions down to their 1990 levels. The target for 2050 is to reduce greenhouse emissions by 80% compared with their 1990 levels. The Californian Cap & Trade programme commenced in January 2013 with an initial 2-year compliance period. The Californian WCI market is obligatory and operates with an absolute cap. The emissions cap is –9% in 2020 compared with 2005 levels. 88% of California's greenhouse gas emissions are covered by the system and the greenhouse gases covered are those listed in the Kyoto Protocol. Three periods of compliance

Fig. 4 – Point Carbon RGA OTC assessment



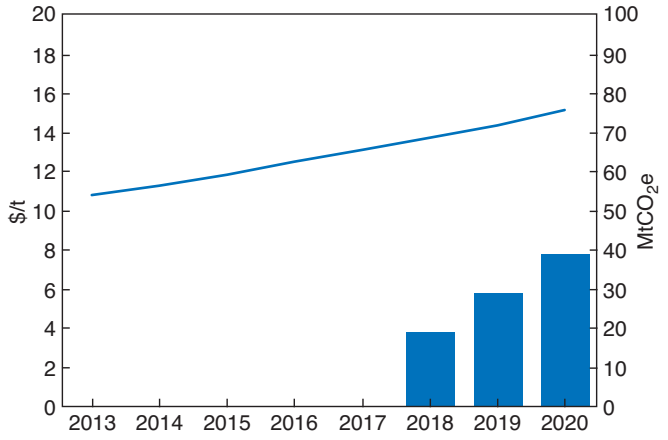
Source: Thomson Reuters Point Carbon

Overview of new carbon markets at international level

have been scheduled: Phase 1 (2013-2014), Phase 2 (2015-2017) and Phase 3 (2018-2020). The sectors covered during Phase 1 are electricity power plants and industrial facilities (more than 25 $ktCO_2e/y$). Fuel distributors for the transport and residential sectors will be included in Phase 2. Approximately 350 entities will be affected by the market.

Industrial facilities will get free quotas in Phase 1 in a bid to prevent manufacturers from transferring their activity to other countries. The first auctions were held in November 2012. A reserve price of US$10/$tCO_2$ was set until 2012. This price will increase by 5% per year. The penalty applied is equal to four allocations for every missing allocation. Since April 2013, the Californian carbon market has been linked to Quebec's, thus forming the WCI. A lack of 40 Mt of quotas is forecast on the global WCI market for 2020, resulting in a price of US$14.5/t (Fig. 5).

Fig. 5 – Price forecasts on the WCI market



Source: Thomson Reuters Point Carbon

One active emissions trading market in Oceania

The ETS market in New Zealand

In 1990, New Zealand generated 62 $MtCO_2e$ of greenhouse gas emissions, 47% of which were from the farming sector and 26% from the energy sector. New Zealand's target is to reduce greenhouse emissions by 10 to 20% between now and 2020 compared with its 1990 emissions levels.

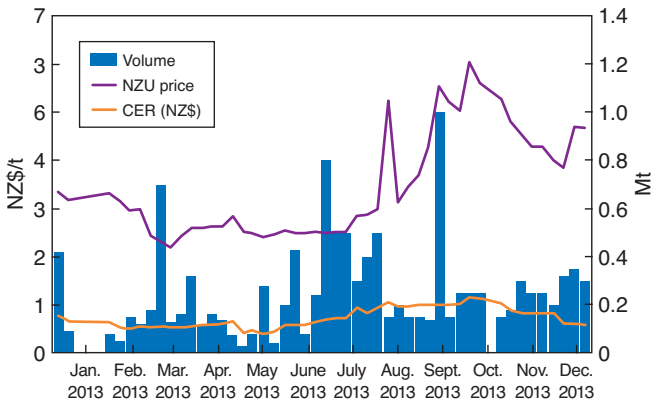
In 2008, New Zealand created a carbon allowance market (ETS-NZ), for which the first compliance period was 2008-2012. The ETS-NZ market is obligatory and covers nearly 50% of New Zealand's greenhouse gas emissions. The market allows some players to voluntarily sign up to the system (opt-in). In 2012, nearly 1,090 entities were covered by the ETS-NZ.

The ETS-NZ covers the six greenhouse gases listed in the Kyoto Protocol. The ETS-NZ covers the forestry, energy, industrial processes and waste sectors. As of 2013, the agricultural sector is required to quantify its emissions.

Permits are allocated for free based on past emissions. 3.47 million New Zealand units (NZU) were allocated and 16.34 million units were auctioned in 2011. The energy, industrial and liquid fossil fuel production sectors are special cases and are required to reimburse one allocation for every 2 t of greenhouse gas emissions.

The penalty applied is approximately NZ$30/t (about €20) for each missing allocation. This market is very small, with nearly 11 $MtCO_2$ traded in 2013 at an average price of NZ$4/t (Fig. 6) — €2.4/t. The ETS-NZ was looking into the possibility of linking to the Australian market in 2015 prior to the change of government in Australia.

Fig. 6 – Carbon prices and volumes on the ETS-NZ



Source: Thomson Reuters Point Carbon

Three active emissions trading markets in Europe and Central Asia

The ETS market in Kazakhstan

In 2010, Kazakhstan generated 263 $MtCO_2e$, 35% of which came from the energy sector. The national target is to reduce greenhouse gas emissions by 5% between now and 2020 compared with their 1990 levels. In 2011, Kazakhstan decided to implement a carbon quota

Overview of new carbon markets at international level

trading scheme. In 2013, the pilot year commenced without any compliance obligations for sites. Phase 1 will begin in 2014. How long it lasts has not been decided, but trading will continue until 2020. The number of annual quotas is 147.1 $MtCO_2$ in 2013, 57% of which are for the energy sector and 13.4% for the oil and gas sector. Nearly 178 facilities are affected starting in 2013. The ETS-K is obligatory with a voluntary opt-in option. The ETS-K is capped in absolute terms at 147 $MtCO_2$ set for 2013. In 2013, the market covered 77% of Kazakhstan's greenhouse gas emissions. Only CO_2 is covered by the ETS-K. All sites which generate more than 20 $ktCO_2$/y are included in the system. The ETS-K still has to set up a national register.

The Swiss market

In 2010, Switzerland generated 54 $MtCO_2e$ of greenhouse gas emissions, 50% of which were from burning fossil fuels. Switzerland's target is to reduce greenhouse emissions by 30% between now and 2020 compared with its 1990 emissions levels. Switzerland's ETS market was created in 2007. It only covers 5% of Switzerland's greenhouse gas emissions. Nearly 380 entities are included in the scheme which only counts CO_2. In Phase 2 (2013-2020), the ETS-Switzerland will be obligatory with a voluntary opt-in option. The cap for Phase 2 has not yet been decided. This cap will then be reduced every year by 1.74% — as is the case with the EU-ETS. Sites found not to be in compliance will be awarded a non-compensatory penalty of Swiss Fr.125/tCO_2 (€102.4). Switzerland's ETS scheme will be linked up to the EU-ETS in 2015.

The European Union's ETS

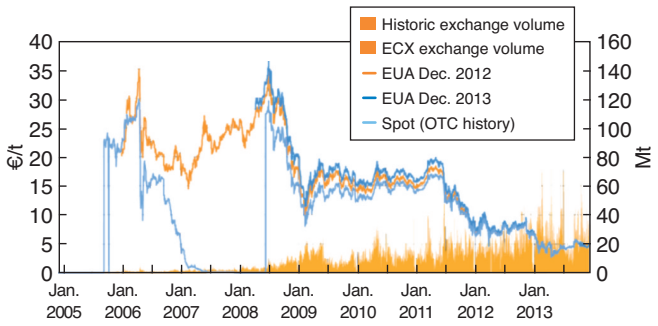
In 2009, the European Union generated 4,615 $MtCO_2e$ of emissions. The target for 2020 (which can be altered if an international agreement is reached) is to reduce greenhouse emissions by 20% compared with their 1990 levels. The EU-ETS was the first one to be set up back in 2005. With close to 2,040 $MtCO_2e$ of allocations for 2013 alone, the scheme is now the world's largest carbon credit trading market. The market's rate of coverage is 40% of European emissions and it affects nearly 12,850 facilities. In 2013, the EU-ETS entered Phase 3 (2013-2020) with a cap (excluding aviation) of 1,950 $MtCO_2e$, 1,104 $MtCO_2$ of which is auctioned off at European level. Since 2008, the market has suffered from a chronic oversupply of allowances. In 2013, European allowance prices were around €5/t (Fig. 7). The number of allowances being reduced by 1.74% per year until 2020, followed by the possibility of their being reduced by 2.5% per year until 2030, will result in their becoming scarce from 2027 onwards and in a nominal price per allowance of €66/t in 2030 (€43/t in 2013 prices) (Point Carbon Forecasts).

Comparison of new ETS markets with the European market (EU-ETS)

The new ETS markets cover a very varied volume of greenhouse gas emissions ranging from 679 $MtCO_2$/y for the RGGI market to 54 $MtCO_2$ for Switzerland (Fig. 8). The annual emissions of all of these new ETS markets total 2.1 $GtCO_2e$ — a little under half of the emissions on the EU-ETS market.

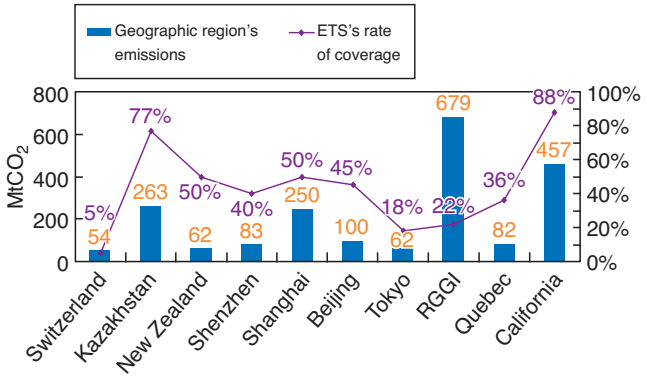
The rates of coverage provided by ETS markets are also very variable. A given market's rate of coverage provides some indication of the scope of the organizations affected. The rate of coverage taken in conjunction with a reduction target can partly be used to gauge the duress to which the market is exposed. While the EU-ETS's rate of coverage is 40% of emissions, the new markets have very variable rates which range from 5% for Switzerland to 88% for California (Fig. 8).

Fig. 7 – EUA allowance prices on the European ECX market



Source: Thomson Reuters Point Carbon

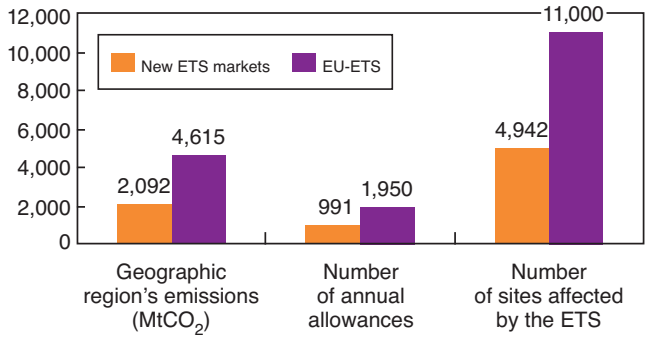
Fig. 8 – Greenhouse gas emissions and ETS markets rates of coverage



Source: IFPEN

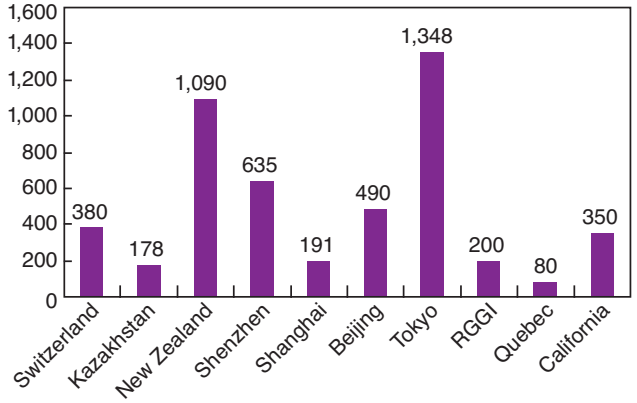
Overview of new carbon markets at international level

Fig. 9 – Comparison between EU-ETS and new active carbon markets



Source: IFPEN

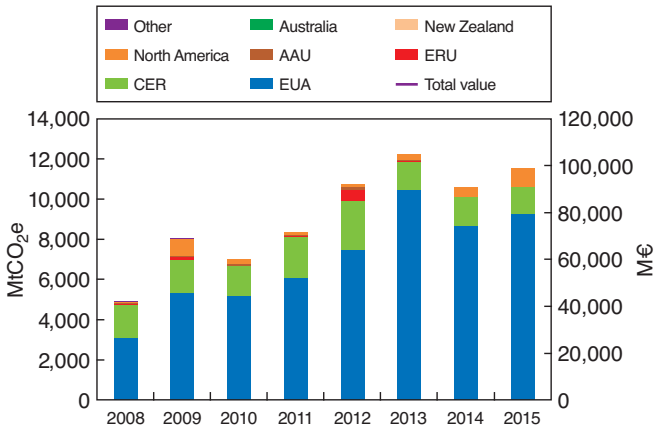
Fig. 10 – Number of sites affected by the ETS



Source: IFPEN

The number of allowances allocated also varies greatly from one market to another. In 2013, the total sum of allowances allocated on these new markets was 991 $MtCO_2e$, compared with 1,950 $MtCO_2e$ of allowances allocated within the framework of the EU-ETS. The allowances allocated outside of Europe accounted for a little over 50% of world allowances in 2013 (Fig. 9). And the number of facilities affected by an ETS also varies greatly from one market to another: 80 sites in Quebec, as opposed to 1,348 sites in Tokyo (Fig. 10). On the EU-ETS, nearly 11,000 sites are affected by the market.

Fig. 11 – Volume and value of carbon markets throughout the world



Source: Thomson Reuters Point Carbon

The carbon market that has seen the highest levels of trading in terms of volume since 2005 is without any doubt the European ETS: nearly 10 $GtCO_2e$ were traded in 2013 (Fig. 11). For the same year, the volumes traded on the world's new carbon markets were very low (17% of the total volumes traded), and will most likely remain so until 2015 given the stresses to which they are exposed and the allowances that have been decided. In 2013, the total value of carbon units traded on these markets was nearly €70 billion, lower than in 2011. The price of the European Union Allowance (EUA) also fell.

The new ETS markets are still too young for any conclusions to be drawn in terms of their impact in reducing greenhouse gas emissions. Many characteristics, such as coverage rates, reduction targets and how permits are allocated vary from one market to another. More time is needed to set up these new markets and align them properly. Other initiatives will get under way in 2014. Might these markets one day be completely or partly fungible such that there could be not just a single price for CO_2e at world level, but also real success in reducing overall greenhouse gas emissions?

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