

Climate Change



Sustainability Research

In collaboration with

CARBON DISCLOSURE PROJECT

The ETS Spring

In contrast with ailing international climate change talks, twelve national or regional carbon pricing schemes are set to emerge by 2015-16, including in key economic areas such as China. We analyse their designs and assess the exposure of more than 100 companies based on the unique dataset provided by the CDP. With a large proportion of their carbon emissions in Australia and South Africa, we point out that global mining companies are particularly at risk of CO₂ costs.

■ New carbon schemes about to emerge

News flow on the development of carbon capping initiatives outside Europe has intensified in months, which contrasts with the gloomy prospect for the UN-led Kyoto Protocol, confirming our view that drivers for CO₂ regulations are now bottom-up. Most of the momentum comes from the Asia Pacific region while there are only scattered initiatives emerging in the Americas. All in all, we reasonably expect 12 such schemes to start up by 2015-16.

■ Australia and South Africa: high-impact policies

We review the key design elements of the policies launched or proposed in Australia, China, South Korea, India, South Africa, California and Quebec, as well as other local schemes. Designs differ widely hence the economic carbon price signal range (from USD4 in NZ to USD24/tCO₂ in Australia). With CO₂ prices set at AUD23/t and USD14/t, respectively, we see the greatest carbon risks in Australia and South Africa. Conversely, we view the reduction targets set under the Indian Perform, Achieve & Trade (PAT) policy as relatively mild.

■ Assessing exposure to new carbon-capping countries

In collaboration with the Carbon Disclosure Project, we analyse the exposure to these regions of European companies in carbon-intensive sectors — Utilities, Metals & Mining, Building Materials, Oil & Gas, Pulp & Paper — and some of their global peers thanks to the unique CDP database of country-by-country carbon data.

■ Metals & mining companies in the viewfinder

Mining companies, which are barely exposed to the EU ETS, appear the most concerned by these initiatives, due to their high exposure to Australia and South Africa: the lion's share of Xstrata, AngloAmerican and BHP Billiton's carbon emissions are concentrated in these two regions. Based on the design of the current schemes, we estimate potential CO₂ costs for these players of USD180m, USD130m and USD210m p.a. respectively.

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With the collaboration of
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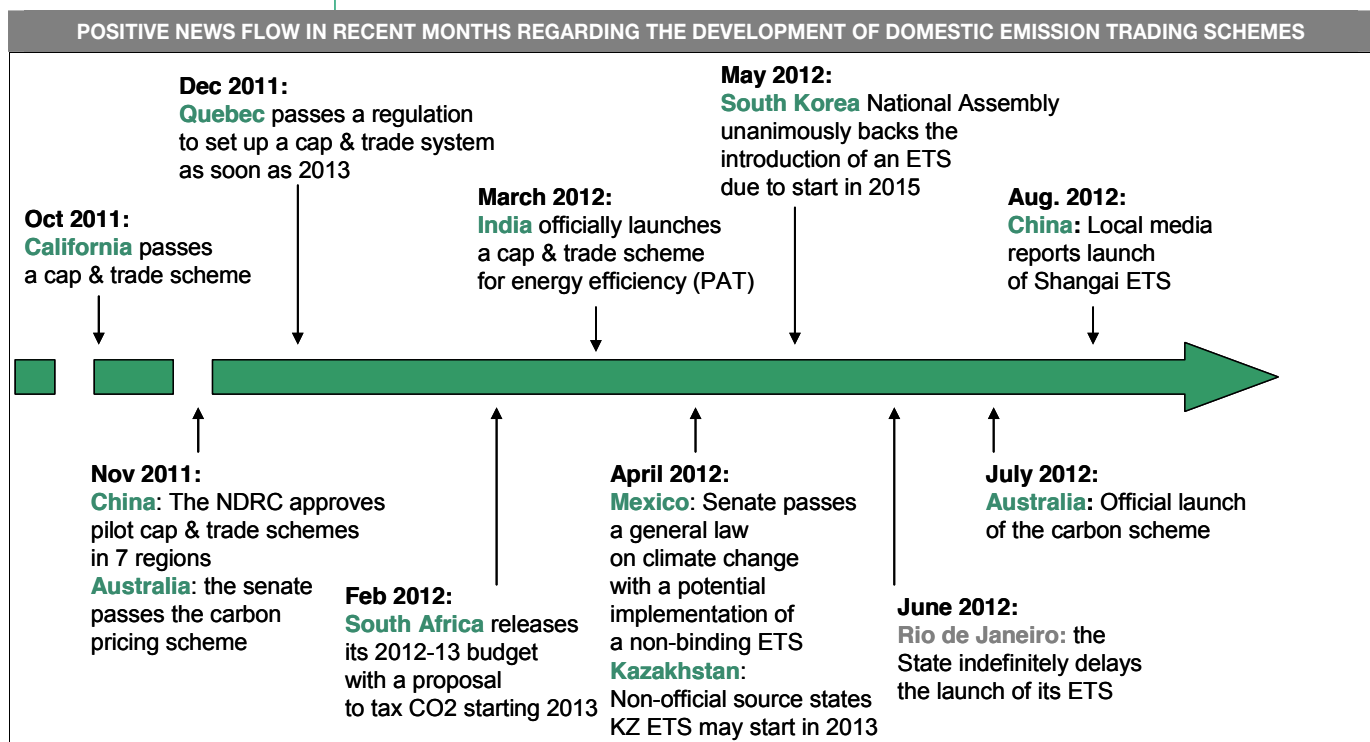
With the collaboration of **Alexandre Castelnau**

I – Introduction

News flow on the emergence of carbon-capping schemes outside Europe has intensified in months. We review the key design features of the cap & trade schemes planned or recently launched in Australia, China, India, South Korea, South Africa, California, and Quebec. The Australian carbon scheme and proposed CO₂ tax in South Africa appear to be the most high-impact carbon policies, after that in Europe. Looking at the exposure to the new carbon capping regions of European companies with global operations, we find that metals and mining companies - and to a lesser extent pulp & paper and cement groups - will have a much greater regulated proportion of their carbon emissions and will have to deal with a patchwork of carbon policies.

■ The emergence of new emission trading schemes

While Europe is striving to find ways to revive the carbon price signal emerging from its Emissions Trading Scheme, which is bogged down by structural overallocation issues, recent months have been marked by intense news flow on the development of carbon pricing schemes (in the form of emissions cap & trade or CO₂ tax regimes) outside Europe. We have summarised the key developments in the following chart.



Source: CA Cheuvreux

Most of the momentum is in the Asia Pacific

As shown in the map below, there are ongoing projects to develop ETS in at least one country of each continent, but most of the carbon capping momentum is currently in the Asia Pacific region, whilst initiatives appear to be much more scattered and uncertain in North and South America.

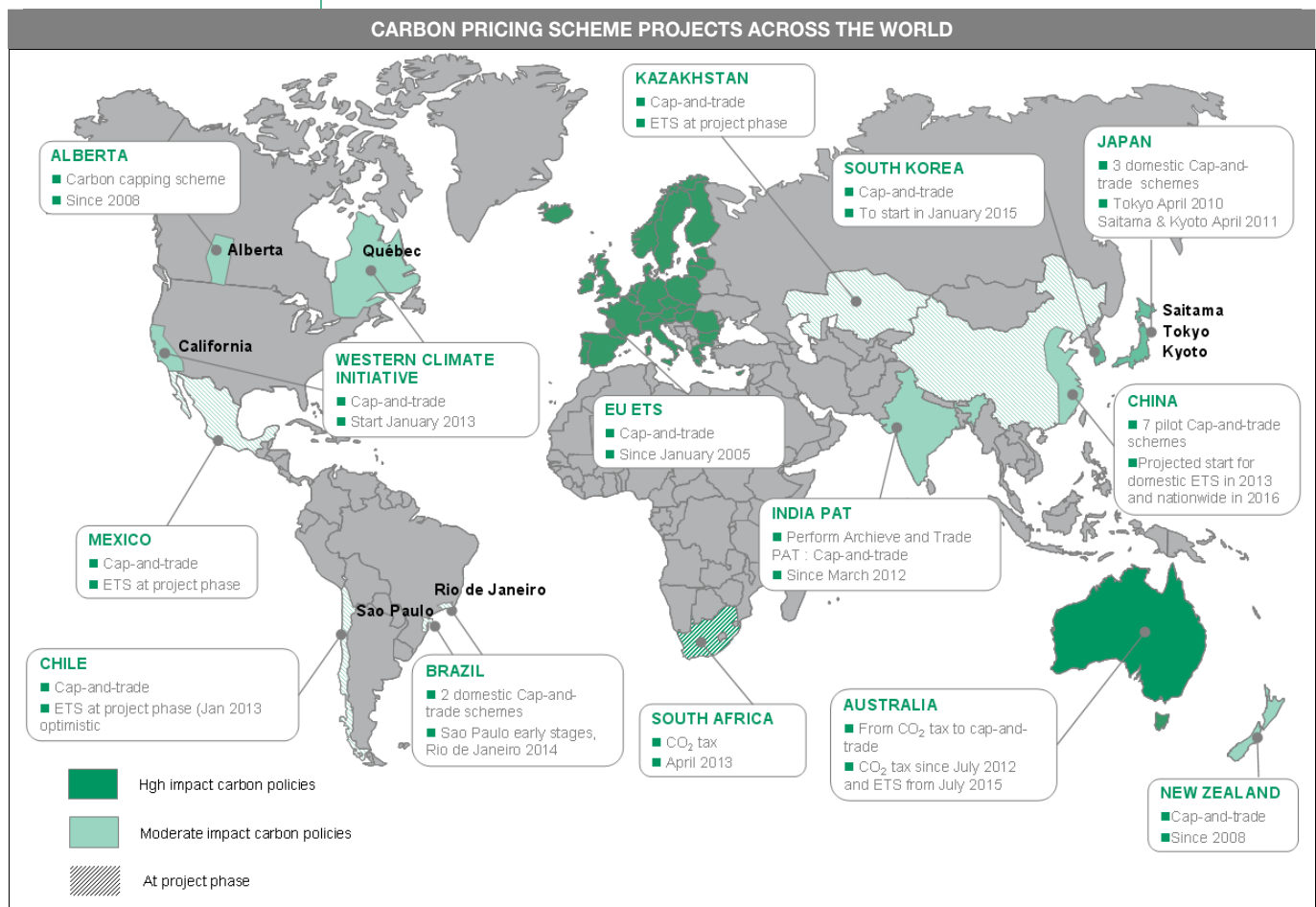
We do not expect this situation to change in the mid-term, notably given the lack of leadership that can be realistically expected from the US at the Federal level. The economic slowdown and the impact of the Climate Gate in 2009 on public opinion about the cause of climate change has seriously damaged support in the polls for politicians to

A large part of carbon emissions in the Asia Pacific region set to fall under capping schemes by 2015/2016

act on carbon mitigation strategies (see the section on North America) In Mexico, the new government that has come to power since the General Law on Climate Change was passed in April 2012 could also scale back that country's ambitions regarding the launch of a domestic ETS. In South America, the State of Rio de Janeiro has eventually decided to postpone indefinitely the launch of the planned ETS.

In contrast, a large part of Asia and Australasia may be covered by domestic cap & trade schemes by 2015/2016. According to media reports, the first (Shanghai) of the seven pilot cap & trade schemes has been launched and expansion at the national level is already projected in case of success. India, Australia, New Zealand, and three Japanese regions have already launched a cap & trade scheme. South Korea is targeting a launch in 2015 with little risk of political derailment; in our view, given the unanimous support received from political parties.

South Africa may pioneer the development of domestic ETS in Africa with a CO₂ tax proposal included in the 2012-13 budget and a draft policy paper due by the end of the year for potential implementation as soon as 2013.



Source: CA Cheuvreux

For over ten carbon schemes, we assessed...

In order to highlight countries with 'high impact' carbon policies and anticipate the wealth transfer likely to result from the introduction of these cap & trade schemes going forward, we systematically analysed the following key design features, based on the information available at this stage.

...the level of the
carbon price signal, ...

...protection for
carbon-intensive
industries (i.e. free
allocation), ...

...and the impact on
electricity prices

■ **The CO₂ price signal:** the level of the CO₂ price signal that is either fixed under a CO₂ tax scheme or dependent on the scope of the cap & trade scheme, the emission cap set and the openness of the system to international credits. The larger and the more open a scheme is, the lower the CO₂ price signal should be; as this increases the chance of the system finding cheaper carbon abatement solutions to meet the cap. For instance, in the Tokyo region, which has one of the smallest and least connected schemes, trades have been reported with prices above USD100/tCO₂. With regards to emissions caps, we note that for some schemes lessons have certainly been drawn from the EU ETS. Setting intensity-based targets, such as in India, or revising the cap based on Y-1 production levels, such as in Australia, is set to limit the risk of experiencing the same overallocation issues as in Europe due to a cap set on outdated production volumes reference levels (2005-2008).

■ **The level of free allocation or tax-free shields:** beyond the economic price signal, the materialisation of CO₂ costs for carbon-intensive industries depends on the level of protection or assistance they receive from their governments. In all schemes, industries at risk of losing competitiveness against international peers are well protected with an assistance rate (percentage of free allocation) ranging from 60% and up to 100%. Hence, despite a higher CO₂ price signal in Australia (AUD23/tCO₂), trade-exposed industries such as steel production could be more affected by the South Africa's CO₂ tax proposal which proposes a tax rate at ~USD14/tCO₂ due to the tax-free shield set at 80% of emissions compared to 94.5% in Australia.

■ **Integration of the CO₂ price signal** in the economy and notably **in electricity prices.** This requires analysis of the structure of the electricity markets, the carbon-intensity of the energy mix and price setting regimes, in order to assess the level of pass-through. We estimate that the carbon tax in Australia has added ~AUD20 per MWh to wholesale electricity prices but we expect a more limited impact should South Africa implement a CO₂ tax on the current proposed design (+USD5/MWh). It is worth highlighting that Australia also set itself apart by having planned compensation in the form of free allowances for indirect costs arising from carbon-inflated electricity prices.

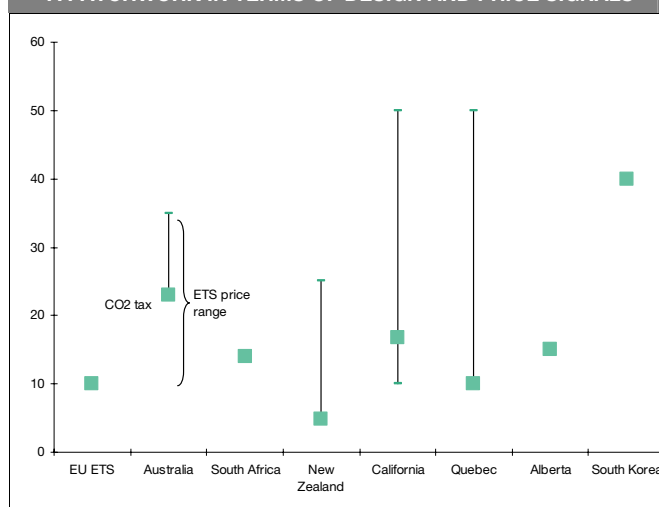
GHG EMISSIONS REDUCTION TARGETS BY GEO. ZONE

Geographical Zone	GHG emissions reduction target
EU ETS	cut GHG emissions by 20% by 2020 from 1990 levels
India	cut its GHG emissions by 20-25% by 2020 on 2005 levels
Australia	cut GHG emissions by 25% by 2020 and 80% by 2050 compared with 2000 levels
New Zealand	maintain GHG emissions at 1990 levels throughout the 2008-2012 period
South Africa	cut GHG emissions by 34% by 2020 and 42% by 2025 below BaU scenario
China	- improvement of 16% of Energy Efficiency from 2010 levels - Reduction of 17% of Carbon Intensity from 2010 levels
Japan	cut GHG emission by 25% by 2020 and 40% by 2030 compared to 1990 levels, but in revision further Fukushima's accident
South Korea	cut CO ₂ emissions by 30% by 2020 from BaU scenario
California	cut GHG emissions by 15% from 2020 BaU scenario
Quebec	cut GHG emissions 20% below 1990 levels by 2020
Mexico	cut GHG emissions by 30% by 2020 and by 50% by 2050 from BaU scenario
Brazil	maintain its GHG emissions 36% below projected levels by 2020
Chile	cut GHG emissions by 20% below 2020 BaU scenario
Kazakhstan	cut CO ₂ emissions by 15% by 2020 and 25% by 2005 from 1990 levels

Source: CA Cheuvreux

Source: CA Cheuvreux

A PATCHWORK IN TERMS OF DESIGN AND PRICE SIGNALS



Source: CA Cheuvreux

**Australian carbon scheme
and South Africa's
proposed CO₂ tax bear
highest risk of CO₂ costs
in our view**

Based on the analysis of more than ten carbon schemes, we have classified Australia and South Africa (along with Europe) as areas with 'high impact' carbon policies.

THE SCHEMES WITH POTENTIAL HIGH IMPACT ON EUROPEAN GROUPS: EU ETS, AUSTRALIA AND SA

	EU ETS	Australia	South Africa
ETS / carbon tax	Cap-and-trade	From carbon tax to cap-and-trade	CO ₂ tax
Launch date	January 2005	Carbon tax from July 2012 and ETS from July 2015	Possibly April 2013
Scope	EU 27 + Norway + Iceland + Liechtenstein. 50% of EU CO ₂ emissions	500 largest emitters in the power generation, refining, manufacturing and waste sectors.	power generation, refining, heavy manufacturing and extractive industries
Price	EUA=~EUR 8	Carbon tax: AUD23/t (USD25/t) ETS: AUD15/t < Price < ~AUD32/t	R120/tCO ₂ e (~USD14/t) +10% p.a.
% of free CO ₂ rights	100% down to 40% in phase III	Up to 94.5% (metals, refining, pulp & paper...)	Tax-free threshold starting at 60% (100% for trade exposed sectors)
Link with other schemes	Full linkage with Australia in 2018. In discussions with South Korea, China	Pending change in legislation, possibility for installations use up to 50% of their liability with EU emissions rights	n.d.
Non-compliance penalty	Yes	Yes	Yes
Use of offsets	Min 10% of allocation	From 2015 onwards, unlimited of domestic offsets, 12,5% of liability for international offsets,	Yes but undefined

Source: CA Cheuvreux

THE EMERGING SCHEMES: CHINA, JAPAN, SOUTH KOREA, WCI, INDIA AND NEW ZEALAND

	China	New Zealand	Japan	South Korea	Western Climate Initiative	Indian PAT
ETS / carbon Tax	Seven domestic Cap-and-trade schemes (Shanghai, Chongqing, Beijing, Tianjin and Shenzhen, Guangdong and Hubei)	Cap-and-trade	Three regions with cap-and-trade schemes	Cap-and-trade	Cap-and-trade (focus on California, and Quebec)	Cap-and-trade
Launch date	Local pilots by 2013-14 and national by 2016	Forestry since 2008 and large scope since July 2010	Tokyo April 2010 Saitama & Kyoto April 2011	January 2015	January 2013	March 2012
Scope	No precise scope yet be clearly defined	Forestry, electricity generation and transportation (16 mt of CO ₂ /y)	~30 million t of CO ₂ , covered Tokyo: 1,400 large local businesses Saitama: 600 corporate installations Kyoto: 280 businesses	460 firms that emit >125,000t p.a. (~60% of SK's total emissions)	California: 360 companies emitting >25,000t p.a. - 85% of emissions Quebec: carbon intensive sectors (power gen, heavy industries....) + fuels distribution & imports from 2015	installations in 8 energy-intensive industries (~42% of the total country energy consumption)
Price	N/A	NZU=NZD4.80 (government issue at NZD25/t)	Tokyo & Saitama: USD140 (JPY12,000) Kyoto: USD19.5 (JPY1,500)	est. USD40 (45,000 KWD)	USD10 (+5% p.a. over infl.) < CCA < USD50 Quebec: auctions from USD10 (+5% p.a. over infl.) and ceiling price of USD40-50 from allowance reserves	Too early to find a price on ESCert. REC=~USD36 /MWh
% of free CO ₂ rights	N/A	60 to 95%	N/A	From 100% down to 90%	California: ~90% (100% for trade exposed sectors such as Cement) Quebec: 100%	N/A
Link with other schemes	N/A	Not scheduled	N/A	EU ETS possibly from 2020	Potentially between Quebec and California	Not scheduled
Non-compliance penalty	N/A	Yes	Yes	Yes	Yes	Yes
Use of offsets	N/A	Unlimited use	Restricted	From 2021 onwards and limited	Max 8% of total compliance	N/A

Source: CA Cheuvreux

Apart from the design elements highlighted above, it is worth mentioning that the success and credibility of these schemes will also depend on the robustness of the provisions and enforcement of emissions data monitoring, reporting and verification procedures.

The integrity of the schemes, which relies on strict monitoring, reporting and verification of the emissions data reported, could prove an issue in countries where the administrations in charge of scheme implementation lack enforcement powers. Third-party verification of emissions may require capacity building, but we note that global verification and testing companies such as DNV and Bureau Veritas have been operating in emerging countries for the measurement and verification of carbon data for projects registered under the Clean Development Mechanisms.

Screening of exposure to carbon-capping countries based on unique carbon data contained in the CDP database

A big change for global mining companies

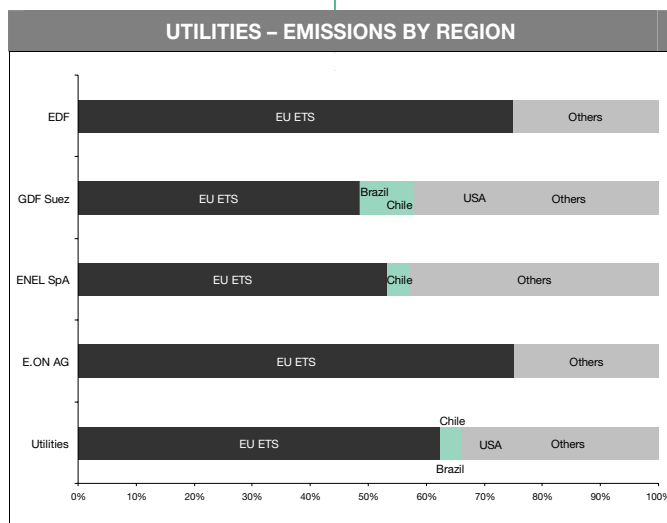
■ Assessing companies' exposure to new carbon-capping initiatives

Assessing the exposure of companies with global operations to countries with emerging carbon schemes requires access to a precise country-by-country breakdown of carbon emissions. Working in collaboration with the Carbon Disclosure Project, we use a unique set of emissions data included in the CDP database.

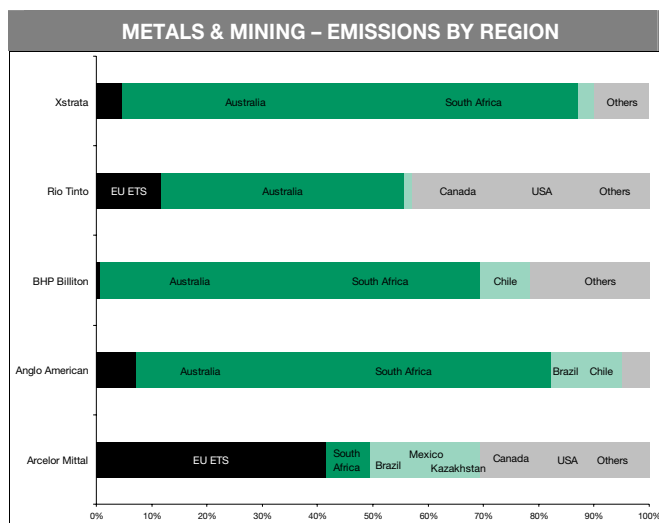
We note that the degree of precision in terms of geographical split is very disparate and sometimes hampers the analysis. For instance, we highlight below the geographical split used by building materials/cement companies. While Italcementi reports on emissions country by country, Heidelbergcement uses only two categories linked to the Kyoto Protocol country classification (Annex B/Non-Annex B)

Apart from utilities and pure European players, European companies with a global footprint in carbon-intensive sectors had only a minority of their carbon emissions regulated under cap-and-trade schemes. With the emergence of other carbon schemes outside Europe, we highlight that companies such as Xstrata, Anglo American and BHP Billiton in the metals and mining sector are facing the biggest leap in terms of scope of regulated emissions, notably due to the exposure to Australia and South Africa.

The charts below clearly highlight this:



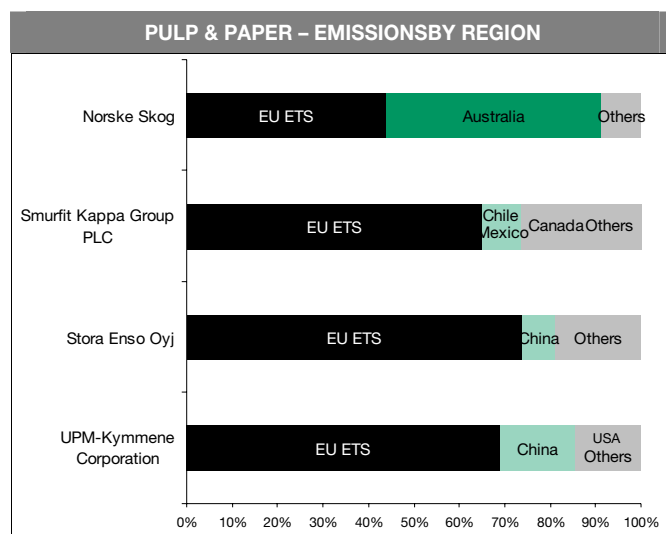
Source: Carbon Disclosure Project, CA Cheuvreux



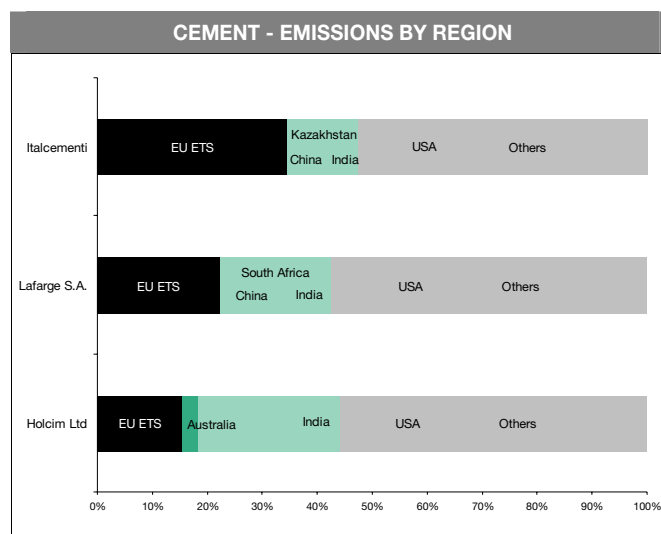
Source: Carbon Disclosure Project, CA Cheuvreux

The expansion is also visible for pulp and paper companies, notably due to their exposure to China and to Australia in the specific case of Norske Skog. In China, fine tuning is still needed to determine whether the plants operated by European pulp and paper companies are located in regions with implemented pilot cap-and-trade schemes, otherwise the constraint may not materialise before 2015-16 and the potential launch of a national cap-and-trade scheme in China.

The expansion is also visible for global cement companies, albeit with less than 50% of their carbon emissions at risk, given their exposure to the US in particular, where, in our view, there is little risk in the mid-term of seeing tough carbon constraints at the federal level.

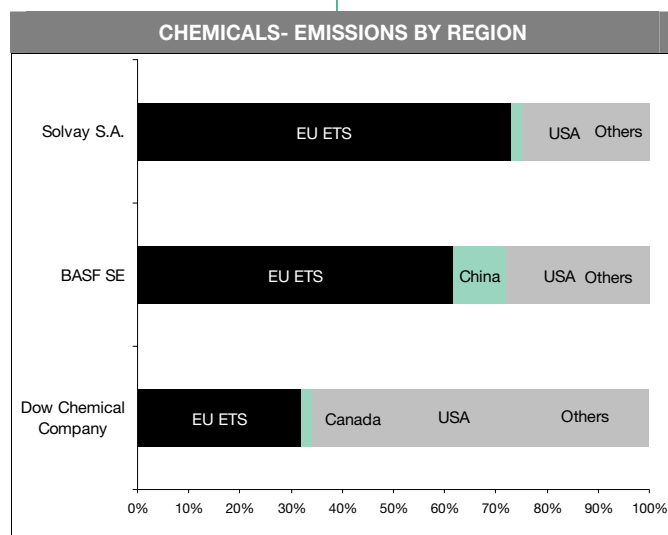


Source: Carbon Disclosure Project, CA Cheuvreux

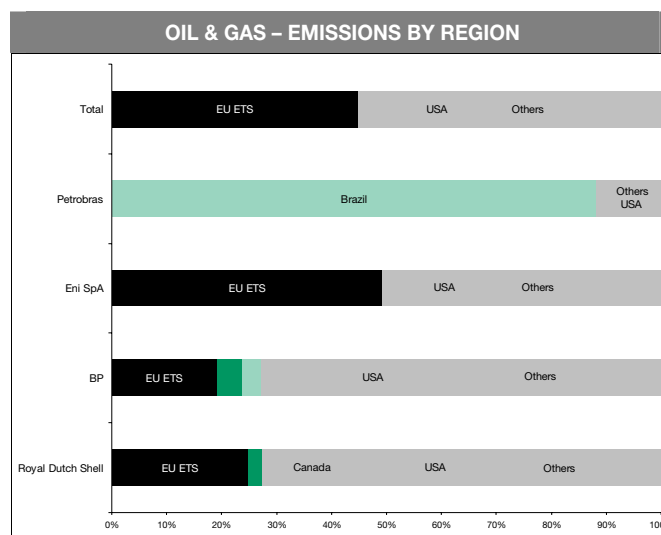


Source: Carbon Disclosure Project, CA Cheuvreux

Lastly, the impact is much less visible for chemicals and oil & gas companies, again due to their exposure to North America.



Source: Carbon Disclosure Project, CA Cheuvreux



Source: Carbon Disclosure Project, CA Cheuvreux

A still uncertain future given the likelihood of a change in the ruling majority

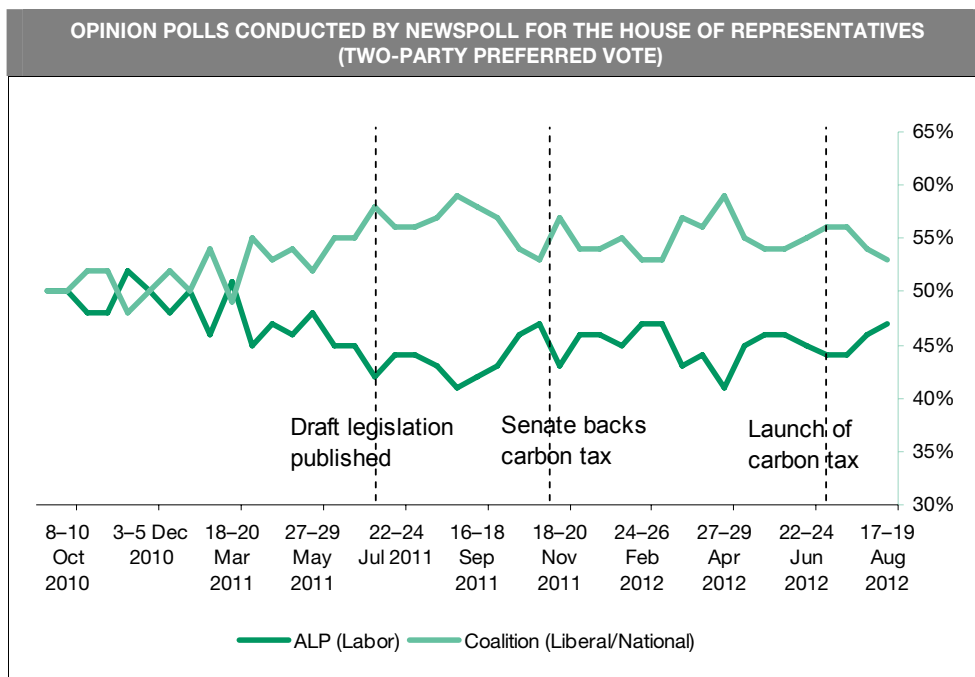
II – Australia and New Zealand ETS

■ Australia: the second-largest ETS, here to stay?

In July 2012, Australia launched the second-largest regional emissions cap-and-trade scheme. While the system starts with a fixed price for carbon, it is designed to become fully market-driven as of 2018. However, the viability of the scheme in the mid-term remains a question, given the pledge made by the leader of the opposition party to scrap the scheme if elected at the next federal elections, due in November 2013.

Australia has pledged to cut the country's GHG emissions by at least 5% (unconditional) and up to 25% (conditional on actions in other countries) by 2020 compared to 2000 levels under the Copenhagen Accord.

Since 2011, the currently ruling party (Labour) drafted, passed and launched a carbon pricing scheme that has now been live since July 2012. The future of the scheme remains uncertain though, as the next federal elections are due no later than November 2013 and the opposition party, which pledged to scrap the scheme, has been keeping a comfortable advance in the election polls. Carbon tax is an important part of the elections campaign. The Coalition party raises competitiveness risks for the national industry and price hikes for households, while the Labour party estimates that the compensation measures included in the legislation will effectively smooth the adverse economic effects on energy consumers.



A three-year fixed price period followed by a planned link-up with the EU ETS

The scheme regulates more than half of the country's GHG emissions and concern the 500 largest emitters in the power generation, natural gas distribution, refining, manufacturing and waste sectors. Agriculture and light vehicles are excluded from the scheme. Domestic aviation, shipping and rail sectors are subject to the carbon tax but in the form of increased fuel excise or fuel tax credit reductions.

High CO₂ price set at ~USD24/t until 2015

The scheme started on July 2012 with a three-year transition period, characterised by a fixed carbon tax set at AUD23/tCO₂e (USD24/t). This is one of the highest economic price signal to reduce emissions, almost 2.5x higher than current EU carbon price and more than 6x the price of international carbon offsets.

No more floor price but EU or Kyoto carbon credit prices

However, from July 2015 the carbon price will be set by the market. The Australian government announced in August 2012 its intention to amend the legislation to link up the scheme with the EU ETS as soon as 2015. In practice, this means that Australian installations can buy European carbon permits for their compliance from 2015 onwards with a limit set at 50% of their total liability. This still requires the passage of amendments by the Congress to scrap the price floor, initially planned over 2015-2018, use EU permits instead of Kyoto credits as a reference to calculate the ceiling price until 2018, and introduce a lower limit on the use of international offsets.

The emissions cap in the system is yet to be announced (deadline May 2014), which hampers price forecasting for the Australian scheme, but we realistically expect the price to significantly drop from the AUD23/t level down to the level of EU permits when the flexible price period starts in mid-2015, given the possibility for Australian emitters to widely rely on offsets and meet up to 50% of their liability with cheaper UN or EU carbon credits.

CARBON PRICE SETTLEMENT UNDER THE PROPOSED CARBON PRICING SCHEME

AUD/tCO ₂	Tax system			Emissions Trading Scheme			
	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-20xx
Fixed price	23	23.6	24.2	Market-driven price Originally set at AUD15/t, but now due to be removed to allow fungibility with EU carbon permits			Fully market-driven price
Price floor							
Price ceiling				32	33.6	35.3	

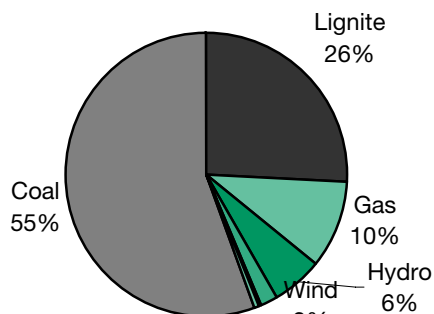
Source: CA Cheuvreux, Australian Government

A sharp hike in electricity prices...

A shake-up for the power generation sector

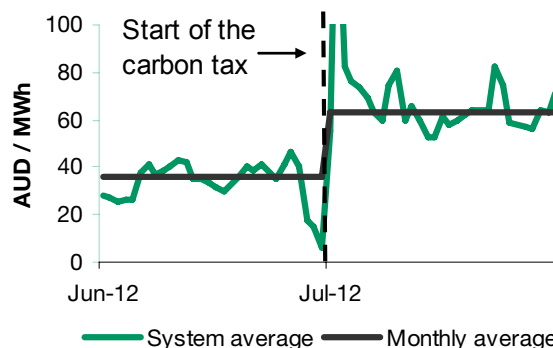
Given the high carbon-intensity of the Australian power generation system and the market-based pricing mechanism for electricity prices, one of the main economic impacts of the introduction of a carbon price has been the hike in electricity prices. As shown in the chart below (right-hand side), wholesale electricity prices increased by AUD27.75/MWh over one month in July 2012 following the launch of the carbon tax. Other factors may have contributed to the rise in power prices. In our note published in July 2011 we had anticipated AUD20.7/MWh, a figure in line with the modelling performed by TRUenergy anticipating an average price increase of USD19.7/MWh due to the introduction of the carbon tax.

AN ENERGY MIX HEAVILY RELIANT ON COAL FOR POWER GENERATION (2010)



Source: AER

TREND IN WHOLESALE ELECTRICITY PRICES FOLLOWING THE INTRODUCTION OF THE CARBON TAX



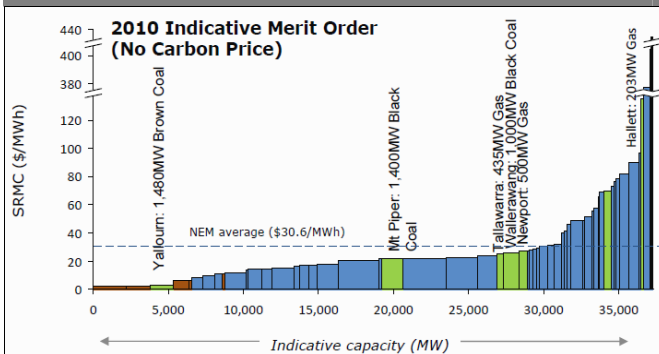
Source: AEMO, CA Cheuvreux

... benefiting cleaner plants

Indeed, a AUD23/t CO₂ tax applying to every tonne of CO₂ emitted by coal-fired power plants increases their variable costs by ca. AUD20.7/MWh (i.e. 0.9x the tax rate, where 0.9x reflects the typical CO₂ intensity of a black coal-fired power plant). As price setters in the market, this additional burden in the cost structure of coal plants is passed through in wholesale electricity prices (and further on in retail prices).

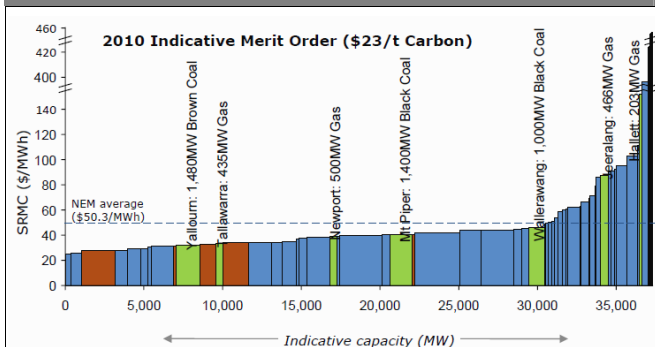
The inclusion of the tax in the cost structure of power generation plants is set to lead to a margin squeeze for lignite-based producers (before any compensation), due to their higher carbon intensity (1.3tCO₂/MWh for lignite versus 0.9 for price-setting coal plants). We estimate that lignite-fired power plants could see margin compression of ca. AUD9.2/MWh in the mid-term (i.e. once assistance measures end; see next paragraph). Looking at the modelling made by TRUenergy (see charts below), the introduction of the carbon price is likely to have made the most carbon-intensive power plants slip in the merit order to the benefit of more efficient hard coal plants and more occasionally to gas-fired power plants.

2010 INDICATIVE MERIT ORDER (NO CARBON PRICE) MODELLED BY TRUENERGY



Source: TRUenergy

2010 INDICATIVE MERIT ORDER ADJUSTED FOR CARBON PRICE MODELLED BY TRUENERGY



Source: TRUenergy

Compensations planned to limit the hit for the most carbon-intensive emitters

The legislation includes strong compensation measures both for carbon-intensive power plants and trade-exposed energy-intensive industries. In our view, only the coal extraction operations of mining companies are exposed to significant CO₂ costs.

Assistance measures for the dirtiest power plants will end in 2017

From 66% to 94.5% of free allocation granted to a list of trade-exposed industries

... including for indirect emissions (scope 2)

Assistance measures set to reduce the carbon bill for the most carbon-intensive power plants

To ensure a smooth transition, the government plans to help power generators with CO₂ intensities above 1tCO₂/MWh to cope with the sudden CO₂ burden. Assistance will come in the form of administrative allocations of free carbon credits for power plants with CO₂-intensities above 1tCO₂ / MWh and 2 GW of lignite-fired generation capacities (with CO₂-intensities above 1.2 tCO₂/MWh) will be elected for receiving financial compensations in exchange of depreciation charges passed for early closure.

International Power's Hazelwood plant is eligible for the two regimes and IP seeks an agreement with the government for early closure of the plant.

We estimate that the administrative allocation regime more than offsets the negative financial impact for highly CO₂-intensive coal plants until 2016-17 (cash positive effect). Indeed, we calculate that the 41.7 million of annual free carbon credits would cover 60% of the emissions of these plants. This "administrative hedge" would temporarily confer an artificially low CO₂ intensity of ~0.5 tCO₂/MWh to an average lignite-fired plant (instead of 1.3 tCO₂/MWh). However, shortened life of assets is likely to lead to depreciation charges after 2017.

Effective competitiveness hedges for energy-intensive industries

The scheme calls for ~AUD3bn p.a. to be redistributed in the form of free carbon permits to emission-intensive trade-exposed (EITE) industries, in order to limit the hike in operational costs and to preserve competitiveness vs. international rivals. The specificity of the Australian scheme comes from the fact that it protects trade-exposed industries both from direct and indirect carbon costs arising from higher electricity prices.

31 industries have been deemed exposed to a risk of carbon leakage and hence eligible to receive this assistance from the administration. Among these industries, the rate of assistance differs based on their carbon intensity.

■ Industries considered highly emission-intensive (tCO₂-e/AUDm revenue > 2,000 or tCO₂-e/AUDm value added > 6,000), such as aluminium production, are eligible to receive a 94.5% assistance rate (see table below). This means that the administration will provide free carbon permits equivalent to 94.5% of the industry's average historical carbon-intensity benchmark value. The benchmark used includes indirect emissions due to electricity consumption, so that companies will also be compensated for higher electricity prices due to the introduction of a carbon price signal. This is particularly key for aluminium smelters, which consume ca. 14MWh/tonne of aluminium, and for which the predicted electricity price hike of AUD21/MWh would have resulted in a ca. 16% increase in aluminium production costs: enough to seriously alter their competitiveness. Thanks to the compensation measure, they will be compensated with one carbon permit (1mtCO₂-e) for each MWh consumed (unless the plant has signed a special supply contract with an electricity supplier).

■ For moderately emission-intensive industries (tCO₂-e/AUDm revenue > 1,000 or tCO₂-e/AUDm value added > 3,000), the initial assistance rate is limited to 66%. This includes industries such as polyethylene, high purity ethanol, tissue paper, urea, integrated lead and zinc production. This means that on average companies in these sectors will have to pay for 34% of their total emissions.

ELIGIBILITY OF TRADE-EXPOSED INDUSTRIES TO ASSISTANCE BASED ON CARBON-INTENSITY CONDITIONS

	tCO ₂ -e/\$m revenue	tCO ₂ -e/\$m value added	Corresponding assistance rate	CO ₂ cost as % of revenues (including assistance) in 2012-13E
Aluminium				
Alumina	2 399		94.50%	0.3%
Aluminium	5 799		94.50%	0.7%
Steel & Mining				
Iron & steel	3 299		94.50%	0.4%
Integrated lead & zinc		4 699	66%	
Manganese	4 599		94.50%	0.6%
Copper		11 499	94.50%	
Zinc		8 099	94.50%	
Other				
Cement (clinker)	15 699		94.50%	2.0%
Petroleum refining		14 299	94.50%	
Pulp & paper	3 799		94.50%	0.5%

Source: Australian Government, CA Cheuvreux

We estimate that this assistance measure will effectively protect exposed players such as BHP Billiton, Rio Tinto, Xstrata, Alcoa, and BP from significant CO₂ costs (including indirect costs through higher electricity prices) in the mid-term. Still, the economic signal will be there to incentivise emission reduction projects: the worse the CO₂-intensity performance against the benchmark, the higher the costs; and the decline in the assistance rate will force companies to cut their carbon intensity at a trend of 1.3% p.a. to avoid carbon costs in the long run.

Coal operations of mining companies bear the highest risk of carbon costs

Coal production has not been identified by the administration as a sector eligible for the assistance programme. According to the paper released by the government, most Australian coal mines have low carbon intensity (below 0.1tCO₂/t coal), which points to a tCO₂e/AUDm revenue indicator probably below the threshold of 1,000 set by the administration for eligibility for the assistance programme.

AngloAmerican, BHP Billiton and Xstrata operate coal mines in Australia and may therefore face full carbon costs for the part of their emissions due to coal operations. An average mine faces CO₂ costs of AUD1.4/t coal (slightly more than 1% of the FOB coal price), which is unlikely to significantly alter the competitiveness of Australian coal production, in our view.

However, the impact on mines with large amounts of methane (eq. 25x CO₂e) fugitive emissions could be much higher (up to AUD25 per tonne of hard coking coal). For these specific mines with carbon intensities above 0.1 tCO₂e/t coal, the government has proposed awarding free carbon permits for emissions above the 0.1 threshold, but the proposal is not backed by the Multi-Party Committee.

Companies exposed

Among the main electricity utilities in Australia, the companies with public listings are Origin Energy (ORG AU), AGL (AGK AU), TRUenergy (owned by CLP Group) and International Power (IPR LN), fully consolidated by GDF Suez (GSZ FP). Most of the other major power generators (Macquarie Generation, Snowy Hydro, Stanwell, Delta West, Tarong) are state-owned.

Typical coal mines face limited CO₂ costs of AUD1.4/t coal...

... but the impact is much higher for mines with high fugitive emissions

We find that nine global mining, aluminium and oil & gas companies are responsible for 13% of total Australian emissions and are therefore exposed to the carbon pricing scheme, both directly through direct emissions from alumina refineries, coal mines, oil refineries, etc., and indirectly through electricity consumption.

CARBON DISCLOSURE PROJECT REPORTING – CARBON EMISSIONS IN AUSTRALIA

Company	Country	GICS Industry	GICS Sub-Industry	Scope 1	Scope 2	Total of Emissions (Scope 1 & 2)	% of emissions
Norske Skog	Norway	Paper & Forest Products	Paper Products	278 100	917 000	1 195 100	47.4%
Xstrata	Switzerland	Metals & Mining	Diversified Metals & Mining	9 167 226	1 759 650	10 926 877	44.2%
Rio Tinto	UK	Metals & Mining	Diversified Metals & Mining	10 250 000	9 250 000	19 500 000	43.7%
CLP Holdings	Hong Kong	Electric Utilities	Electric Utilities	16 005 000	241 000	16 246 000	38.8%
Alcoa Inc.	US	Metals & Mining	Aluminium	8 054 478	7 718 245	15 772 723	35.4%
BHP Billiton	Australia	Metals & Mining	Diversified Metals & Mining	11 631 175	3 235 218	14 866 393	32.5%
Anglo American	UK	Metals & Mining	Diversified Metals & Mining	3 770 058	604 000	4 374 058	21.9%
Suez Environnement	France	Multi-Utilities	Multi-Utilities	337 845	176 134	513 979	7.6%
BG Group	UK	Oil, Gas & Consumable Fuels	Integrated Oil & Gas	502 410	381	502 791	6.3%
VALE	Brazil	Metals & Mining	Diversified Metals & Mining	925 043	109 823	1 034 866	5.2%
BP	UK	Oil, Gas & Consumable Fuels	Integrated Oil & Gas	2 640 000	270 000	2 910 000	3.9%
Holcim Ltd	Switzerland	Construction Materials	Construction Materials	2 848 000	266 301	3 114 301	2.9%
Royal Dutch Shell	Netherlands	Oil, Gas & Consumable Fuels	Integrated Oil & Gas	1 648 000	482 000	2 130 000	2.5%
Veolia Environnement	France	Multi-Utilities	Multi-Utilities	527 530	119 760	647 290	1.4%

Source: Carbon Disclosure Project, CA Cheuvreux

**More than USD110m
at stake for Xstrata**

NB: We removed The aluminium company Hydro from the list below following the closure of the aluminium smelter in 2012.

As explained above, precise cost estimates require distinguishing between carbon emissions from coal mining operations and other types of operations of global mining companies. The table presents a recap of the conclusions of this analysis as published in our climate change report of July 2011 '*Carbon Scheme from Down Under*'. The scenario with no assistance for coal operations needs to be retained given the lack of consensus on this assistance package within the Multi-Party Committee. Since then Xstrata has guided on carbon costs of AUD150m-250m p.a. during the fixed price period of the scheme.

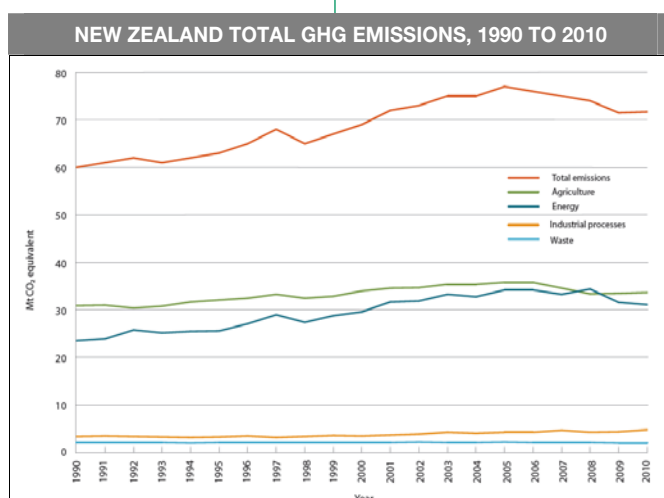
ESTIMATES FOR COMPANIES' EXPOSURE TO AUSTRALIA'S CARBON TAX SCHEME

	Direct carbon emissions (mtCO ₂ -e)	Indirect CO ₂ emissions	Total carbon emissions	Type of operations in Australia	Tax impact at 94.5% assistance rate, in m USD (at AUD23/tCO ₂)	As % of group EBITDA 2010	Tax impact if no assistance for coal operations, in m USD (AUD23/t)*	As % of group EBITDA 2010
Mining and diversified operations								
Rio Tinto	9.74	8.99	18.73	Three aluminium smelters, alumina plants, iron ore, coal, copper	25	0.2%	106	1.1%
BHP Billiton	12.99	3.58	16.57	Aluminium, coal, iron ore and manganese, petroleum	22	0.1%	95	0.5%
Xstrata	8.95	2.24	11.19	Coal, zinc, copper, nickel	15	0.2%	110	1.8%
Anglo American	3.38	0.57	3.95	Coal	5	0.1%	50	1.3%

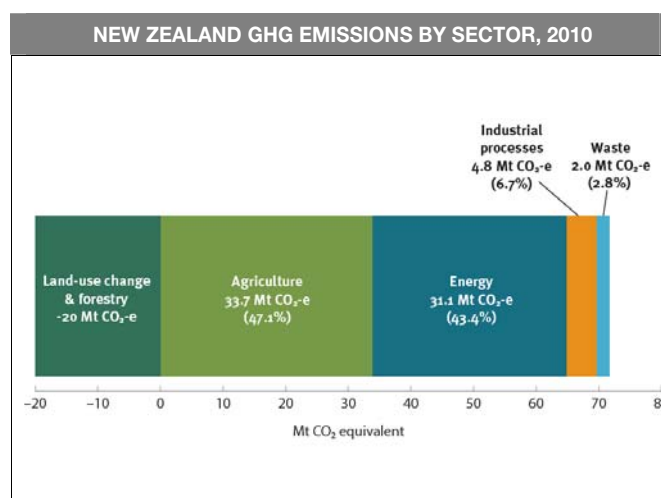
* Our cost estimates in the case of non-assistance for coal mining operations are based on reported data or own estimates of carbon emissions specifically due to companies' coal mining operations in Australia. We have applied a 0% assistance rate for coal operations and maintained the 94.5% for the remaining carbon emissions. Source: CA Cheuvreux, companies, CDP

■ New Zealand

New Zealand pledged to maintain its GHG emissions at 1990 levels throughout the 2008-2012 period.



Source: New Zealand's Ministry for the Environment



Source: New Zealand's Ministry for the Environment

The New Zealand scheme covers energy-intensive sectors since 2010

Initially launched in early 2008, the New Zealand ETS covered the **forestry sector**. Moving forward, **it was expanded in July 2010 to the manufacturing, electricity generation and transport sectors**. The scheme covers **all six GHG of the Kyoto Protocol** (CO₂, CH₄, N₂O, HFCs, PFCs and SF₆), and is aimed at **regulating 16 million tonnes of CO₂ annually**. CO₂ accounts for roughly 45% of the country's emissions (vs. ca. 75% for Australia for instance).

Up until now, **firms were entitled to deliver NZUs (New Zealand Units) up to 50% of their total emission levels**. This rule is known as the **"1-for-2 obligation"**. Theoretically, the threshold is **to be raised up to 100%** of emissions from 2013 onwards, yet government already announced that full compliance will be required only **by 2015 at the earliest**. All in all, less than 25% of NZ's emissions are covered, as agriculture, which accounts for 50% of the country's emissions, is also exempt from compliance to the ETS.

60-95% of free permits allocated to trade-exposed companies...

... and CO₂ rights trade at record lows (NZD4.80/t)

Energy-intensive firms facing international competition have been receiving **60-95% of permits for free, with regard to production and efficiency standards among industry peers**. The amount of free permits is to be reduced by 1.3 percentage points annually from 2013 onwards. Firms face **financial penalties of NZD30/t of emissions in case of non compliance**. The price on the primary market (directly issued by the government) is **NZD25/t of CO₂ (USD20.27), acting effectively as a price cap** on NZU valuations. Banking and borrowing is allowed under the NZ ETS and the use of UN-backed offsets is unlimited; as a result, NZU do not trade at a price premium to Kyoto carbon offsets but are rather priced in line with CER prices. **Currently**, and for the past 15 months, this cap is mostly irrelevant, as **NZUS are trading at record lows, around NZD4.80/t of CO₂**. Note that in 2011 New Zealand's major emitters met over 70% of their compliance obligations using international offsets, which raises concerns of capital flight instead of financing domestic permits. The regulator is thus looking into implementation of auctions to deliver the permits.

At this stage, certain differences in the design of carbon trading system between the NZ scheme and other countries' cap-and-trade systems, including Australia, make it quite challenging to envisage any linkage with foreign ETS in the short run. Yet the government is currently assessing various options to move in that direction, such as bilateral agreements with other countries to enable trading of units between several schemes.

For the time being, **no cap on total emissions has yet been fixed** by the government, and the regulator will issue as many NZU as needed, provided firms pay for them.

The New Zealand government finally brought a bill before Parliament on 21 August 2012. This bill may be seen as a threat and a way to somehow weaken the ETS, as it aims to ensure "that the ETS more effectively supports the government's economic growth priorities". Indeed, the bill plans to keep the 1-for-2 obligation in place, removing the scale-up in 2015 to 100% of emissions, and removes any references to the inclusion in the ETS of the agriculture sector, which accounts for 50% of New Zealand's emissions. This bill is likely to take up to four months to go through Parliament, and, if passed into law, it would come into effect by January 2013.

Companies exposed

CARBON DISCLOSURE PROJECT REPORTING – EMISSIONS IN NEW ZEALAND (TCO₂ – EQ.)

Company	Country	GLCS Industry	GLCS Sub-Industry	Scope 1	Scope 2	Total emissions (Scope 1 & 2)	% of emissions
Rio Tinto	UK	Metals & Mining	Diversified Metals & Mining	690 000	0	690 000	1.5%
BP	UK	Oil, Gas & Consumable Fuels	Integrated Oil & Gas	280 000	20 000	300 000	0.4%
Suez Environnement	France	Multi-Utilities	Multi-Utilities	1 973	8 592	10 565	0.2%
Imerys	France	Construction Materials	Construction Materials	1 484	904	2 388	0.1%

Source: Carbon Disclosure Project, CA Cheuvreux

China's National Development and Reform Commission pushes for the launch of seven pilot ETS schemes...

III – The carbon-capping momentum is in Asia

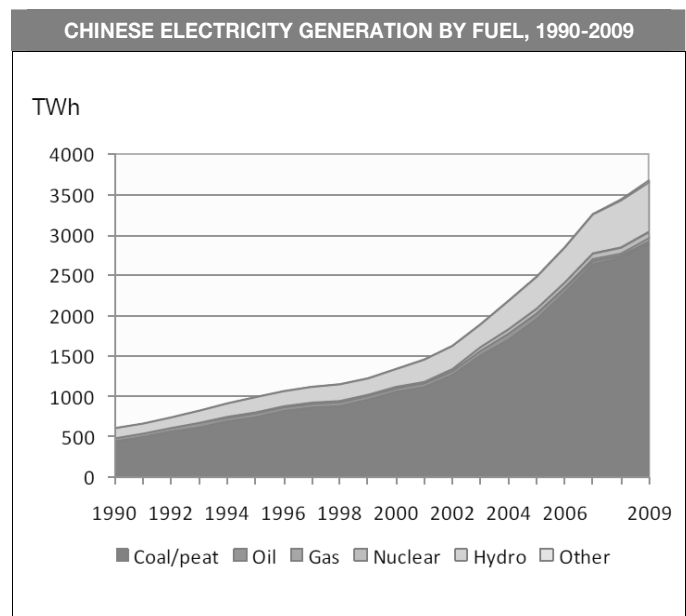
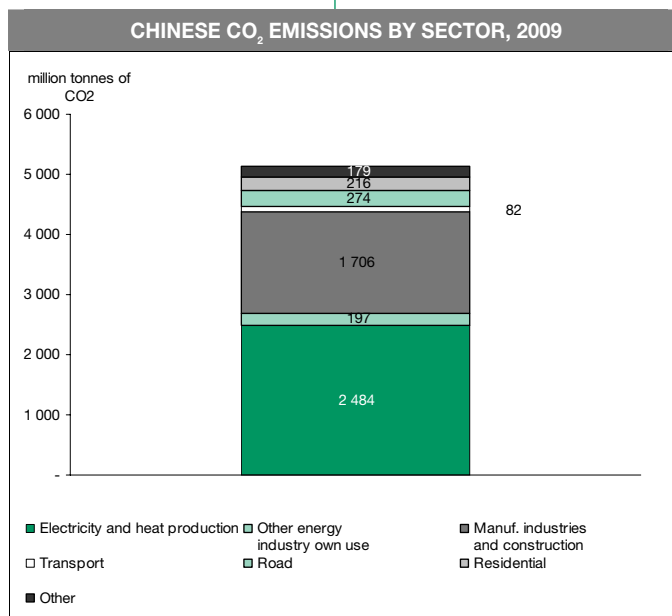
■ China's seven pilot schemes, with potential national scale-up in 2016

When the NDRC (National Development and Reform Commission) issued China's first National Climate Change Program in 2007, emission trading systems were not on the agenda. However, the 12th Five-Year Plan, ratified by the National People's Congress (NPC) in March 2011 and covering the 2011 to 2015 period, marks the start of China's interest in market-based tools to reduce energy intensity and the carbon footprint of its economy at a low cost.

The two main targets for 2015 of the 12th FYP are:

- A 16% improvement in energy efficiency from 2010 levels (energy consumption per unit of GDP). One has to note that 11th FYP target of a 20% reduction for 2010 from 2005 levels was only just missed (19.06%).
- A 17% reduction in carbon intensity from 2010 levels (CO₂ emissions per unit of GDP). This indicator forms part of the Chinese government's commitment, taken further at the COP16 in Copenhagen, to reduce its carbon intensity by 40-45% by 2020 compared with the 2005 baseline.

These objectives have to be linked with caps set by the National Energy Administration for 2015 of 4-4.2bn tonnes of coal equivalent for primary energy consumption and 6.4 trillion kW/h for electricity consumption.



... with start dates expected in 2013/2014

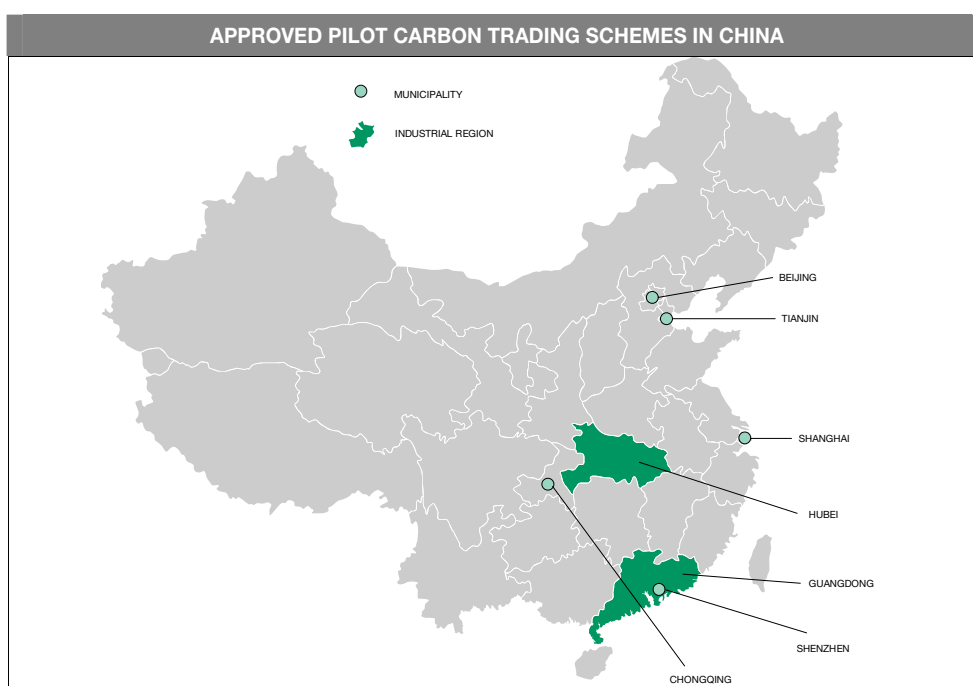
The world's largest GHG emitter launched several carbon exchanges in 2008, among which the Shanghai Environment and Energy Exchanges, the Tianjin Climate Exchange, and the China Beijing Environment Exchange. Moving forward, the Chinese government, through the NDRC, officially announced the adoption of **seven carbon-trading pilot schemes** in November 2011. The emission trading system includes five cities (**Shanghai, Chongqing, Beijing, Tianjin and Shenzhen**), and 2 provinces (**Guangdong and Hubei**). All together, the seven schemes cover a collective GDP of ca. USD2 trillion and a population of 240 million. The NDRC is pushing to start these **mandatory** carbon markets

A national system may emerge in 2015/2016 in the event of success

as fast as possible, however **the scheduled start in 2013 will most likely be delayed by a one year.**

The seven domestic markets will pave the way for a **national ETS** that was originally planned to start up in 2015. However, given the delays in the pilot schemes, this ETS will probably be **implemented nationwide in 2016**. Although the government also has to rule on whether to use an absolute emissions cap or an intensity-based one, domestic ETS are meant to evaluate the final cap level on total nation emissions. We have to remain cautious as no limit has been officially unveiled yet, but representatives have already referred to a national target of **4.1bn tonnes of coal equivalent by 2015**. Similarly, with regard to the schemes' coverage scope, once again nothing has been decided on yet, but the energy sector might not be included in the seven pilots nor in the national scheme, which would raise questions about the schemes' strengths, in our view.

By then, pilot regions already represent 30% of country's GDP



ENERGY EFFICIENCY OF EACH REGION, 2011

	GDP (USD bn)	GDP (% of China's GDP)	GDP growth rate (%)	Achieved energy intensity in 2010 (standard coal/t/10kR MB GDP)	Energy efficiency % to be increased by 2015 vs. 2005	Carbon Intensity % to be reduced by 2015 vs. 2005
Beijing	253	3.4%	8.0%	0.582	17%	18%
Guangdong	838	11.2%	10.0%	0.664	18%	19.50%
Tianjin	179	2.4%	16.5%	0.826	18%	19%
Shanghai	288	3.9%	8.0%	0.712	18%	19%
Hubei	285	3.8%	8.0%	1.183	16%	17%
Chongqing	145	2.0%	16.5%	1.127	16%	17%
Shenzhen	182	2.4%	10.0%	0.513	7.84%	15%
Total	2 170	29.1%				

Source: National Bureau of Statistics of China

The Shanghai ETS has been launched first and on time

Guangdong is country's largest CO₂ emitting region

Beijing may introduce ceiling and price floors

Details per region

The launch of the scheme designed by the **Shanghai** municipality was announced by local media in August. The scheme will involve **200 firms among 17 industries**, including iron and steel producers, non-ferrous metals and petrochemicals and power generation companies. The market will regulate industrial companies emitting over 20,000t of CO₂ and non-industrial firms with annual emissions of at least 10,000t. The total scope is to **cover ca. 110m tonnes of CO₂ p.a., equivalent to 50% of the city's total emissions**. Plants and factories started up after the launch date of the market would only be covered from 2015 onwards. Eventually, if the Shanghai Development and Reform Commission confirms state-owned newspaper declarations, the city could be the first of the seven schemes to constrain the airlines industry. The city plans to **allocate 100% of needed permits for free**, and all permits for the three years will be allocated in one go. Should emitters exceed their cap, they will be able to buy permits on the market. Three types of permits will be eligible: the one issued by the government, CCER offsets (issued by the central Beijing government) and a local kind of offset.

At present, the **Guangdong ETS** is the most advanced project. While the province emitted 510 mtCO₂e in 2010, which makes it the country's largest CO₂ emitting region, the government set a cap of **660 mtCO₂e for 2015** (+30% vs. the 2010 emissions level). This makes Guangdong **the first and only quantified cap out of the seven schemes**. This absolute cap is in line with the province's targets of reducing carbon intensity by 19.5% by the end of 2015, vs. 2005 (-45% by end 2020), and goes hand in hand with a cap of 350m tonnes of standard coal on energy consumption (+30% vs. 2010 levels of 270mt). Although the scope remains unclear, the trading system would mostly concentrate on 300 to 400 companies in the **power generation, steel and iron production, and building materials sectors**. Finally, a government official in Guangdong already warned that they would most likely miss the 2013 target launch date, somehow forcing a delay in the national scale-up. Pending the start of the mandatory scheme, a voluntary one could be implemented next year.

The **Beijing** municipality has released draft rules in which it recommends the inclusion of **companies emitting on average over 10k tonnes of CO₂ p.a. over the period 2009-2011**. Some draft plans suggest the inclusion of **600 companies**. In addition to firms in the **heating sector, note that power generators, thermal electricity providers, manufacturers and major public buildings** are already required to publish emissions data. The cap remains unknown, but is likely to be linked to the city's carbon intensity reduction target of 17% by 2015 vs. 2005 levels. Moreover, the municipal government has already announced it would also create floor and ceiling prices to constrain CO₂ volatility. As is the case for Guangdong, the scheme is expected to be delayed slightly, by a year. In December 2012, the government will be handing out permits for 2013, and an undefined portion of these will be given for free. Firms will be able to trade two different kinds of units, for both direct and indirect emissions, and the scheme will allow the use of offsets (CCER) albeit the share of compliance is not decided on yet.

The other projects are less developed. The **Tianjin** ETS project was launched in mid March 2012 and is due to start in December 2013. No official information has been unveiled, but coverage threshold could be consumption of at least 10,000 tonnes of standard coal p.a. (the five most carbon-intensive sectors could be covered, for ca. 60% of the city's CO₂ emissions). As far as **Hubei** is concerned, the province also warned it would be operational in 2014 at the earliest. The market would cover **more than 100 carbon-intensive firms** in Hubei. In 2010, the province consumed 113m tonnes of standard coal. A certain number of CCER offsets will be authorised. Eventually **Chongqing** has to set an emission cap in line with the national carbon intensity reduction target of 17%. The scope is however getting slightly clearer as it would concern **manufacturers of steel, iron, aluminium, calcium carbide, ferroalloys, cement, and caustic soda**. The use of forest-based offset to meet compliance targets could also be

permitted. Chongqing currently has 4,700 large-scale firms consuming 8m tonnes of standard coal per year. We highlight the fact that the seven pilot schemes meet the energy-efficiency targets set out in the 11th Five Year Plan. Not much information is available on **Shenzhen**, but 600 to 1,200 companies could be involved, for a total cap of ca. 100 million tonnes of CO₂ per annum.

Eventually, the government is considering levying a carbon tax from wholesalers and producers of fossil-fuel based energy, on top of the national emissions trading scheme. The Director of the NDRC's Energy Research Institute, Dr Jiang Kejun said he did not believe in the mutual exclusiveness of a market and a tax, and that the existence of a tax will incentivise even more firms to improve their production technology as it would raise CO₂ prices.

Companies exposed

CARBON DISCLOSURE PROJECT REPORTING – EMISSIONS IN CHINA (TCO₂ – EQ.)

Company	Country	GlCS industry	GlCS Sub-industry	Scope 1	Scope 2	Total emissions (Scope 1 & 2)	% of emiss. covered
Novozymes A/S	Denmark	Chemicals	Specialty Chemicals	702	218 305	219 007	53.0%
UPM-Kymmene Corporation	Finland	Paper & Forest Products	Paper Products	940 000	45 000	985 000	16.5%
Lafarge S.A.	France	Construction Materials	Construction Materials	13 704 051	1 517 020	15 221 071	14.5%
DSM (Konin)	Netherlands	Chemicals	Specialty Chemicals	372 939	115 558	488 497	9.3%
Imerys	France	Construction Materials	Construction Materials	79 467	166 521	245 988	8.1%
Stora Enso Oyj	Finland	Paper & Forest Products	Paper Products	155 000	256 000	411 000	7.4%
BASF SE	Germany	Chemicals	Diversified Chemicals	1 269 000	639 000	1 908 000	7.4%
Suez Environnement	France	Multi-Utilities	Multi-Utilities	319 981	62 856	382 837	5.7%
Syngenta International AG	Switzerland	Chemicals	Fertilizers & Agricultural Chemicals	16 000	26 300	42 300	4.3%
Veolia Environnement	France	Multi-Utilities	Multi-Utilities	724 750	1 254 710	1 979 460	4.2%
CLP Holdings	Hong Kong	Electric Utilities	Electric Utilities	1 693 000	7 350	1 700 350	4.1%
Italcementi	Italy	Construction Materials	Construction Materials	1 390 875	128 701	1 519 576	3.7%
Mitsubishi Chemical Holdings Corporation	Japan	Chemicals	Diversified Chemicals	282 000	127 000	409 000	3.5%
BP	United Kingdom	Oil, Gas & Consumable Fuels	Integrated Oil & Gas	1 620 000	430 000	2 050 000	2.7%

Source: Carbon Disclosure Project, CA Cheuvreux

Italcementi's operations remain outside pilot schemes

We looked at further company-specific information, see the table below, to better assess which groups have operations in Chinese regions concerned with pilot ETS schemes. Italcementi's cement production operations in China may not be regulated under an ETS until an ETS is launched at the national level.

BUILDING MATERIALS AND INDUSTRIAL GAS GROUPS' EXPOSURE TO PILOT SCHEMES

Company	Activities	Location of sites	Number of plants	Capacity volume	Concerned by pilot schemes?
Lafarge	Cement, Plaster, Concrete	Sichuan, Yunnan, Chongqing, Guizhou, Shanghai, Beijing	28	69m cu. m of plaster, 23 Mt of cement, and 3m cu. m of concrete	3 plants for total capacity of 67m cu. m (Chongqing and Shanghai), 5 cement plants of 7Mt (Chongqing), and 5 concrete mixer plant (Chongqing)
Holcim	Cement through 42% in Huaxin Cement Co. Ltd (HCC)	Hubei province	30	32 Mt	All plants in Hubei province
HeidelbergCement	Cement, ready-mixed concrete	Four plants in Guangdong and Shaanxi Seven plants in Guangzhou and Hong Kong	11	> 14 Mt	Plants in Guangdong, Guangzhou and Hong Kong (between 7 and 11 plants)
Italcementi	Cement through 6.25% in West China Cement (3rd-largest shareholder)	12 plants in Shaanxi and 2 plants in Xinjiang	14	24 Mt	No plants concerned for pilot schemes
Air Liquide	Dihydrogen	2 plants in Tianjin 1 plant in Shenyang Plants in Changshu 1 plant in Shanghai	>5	-	2 plants concerned in Tianjin and 1 plant concerned in Shanghai
Linde	Industrial gases	Firm has ca. 150 plants in the regions of Shanghai, Beijing, Tianjin, Fujian, Taiwan, Chengdu and Guangzhou. Regarding H2 we highlight 4 plants in Jiangsu province, 1 large plant in Jilin (25,000 cu. m H2/h) and 1 small plant in Beijing	>6	-	2 H2 plants in the provinces of Shanghai, Beijing, Tianjin and Guangzhou (5 out of the 6 identified)

Source: CA Cheuvreux

Trading of energy efficiency credits launched in March 2012

■ India and the Perform, Achieve and Trade scheme

The release of India's National Action Plan on Climate Change in June 2008 led to the creation of the Perform, Achieve and Trade (PAT) scheme in 2011 as a pillar of India's strategy on energy efficiency (National Mission for Enhanced Energy Efficiency - NMEEE). The Indian Government has committed to cut its GHG emissions by 20-25% by 2020 from 2005 levels.

Launched in March 2012, the PAT scheme works as a market-based mechanism that aims to save ca. 6.7 million tonnes of oil equivalent p.a. the end of the **first compliance period (2012-15)**.

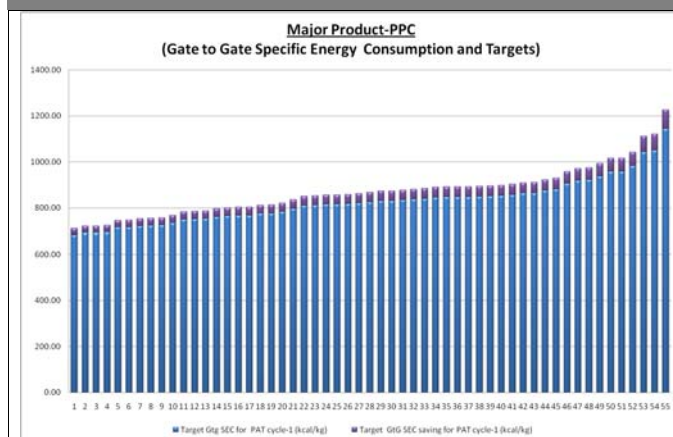
The scheme sets **mandatory** energy consumption reduction targets for installations in eight energy-intensive industries (aluminium, textile, iron & steel, cement, pulp & paper, fertiliser, chlor-alkali and thermal power generation), which represent **ca. 42% of the country's total** energy consumption.

SECTORS REGULATED UNDER THE PAT SCHEME

S.NO.	Sector	No. of Identified DCs	Annual Energy Consumption (Million toe)	Share Consumption (%)	Apportioned Energy Reduction For PAT Cycle-1 (Million toe)
1	Power (Thermal)	144	104.56	63.38%	3.211
2	Iron & Steel	67	25.32	15.35%	1.486
3	Cement	85	15.01	9.10%	0.815
4	Aluminium	10	7.71	4.67%	0.456
5	Fertilizer	29	8.20	4.97%	0.478
6	Paper & Pulp	31	2.09	1.27%	0.119
7	Textile	90	1.20	0.73%	0.066
8	Chlor- Alkali	22	0.88	0.53%	0.054
	Total	478	164.97	100.00%	6.686

Source: BEE 2012

SPECIFIC ENERGY CONSUMPTION AND TARGETS SET FOR CEMENT PLANTS



Source: BEE 2012

Large emitters have received relatively easy-to-reach intensity-based targets for 2015

... with relatively mild reduction requirements on average

The baseline is set on the basis of average production and energy consumption over three years (2007-2008 to 2009-2010). Plants receive **energy-intensity targets** (i.e. per tonne of output). At the end of the compliance period, the energy intensity of the plant will be verified and the deviation from target will be multiplied by the baseline production volume in order to estimate either the amount of ESCerts to be handed out to the operator, if it beats the target, or potential penalties if the target is missed.

For instance, if a cement plant with average production of 1m tonnes over 2007-2008 to 2010-2011 beats (misses) its assigned specific energy consumption (SEC) by 0.002 toe/t cement, it will receive (have to purchase) $0.002 \times 1,000,000$ ESCerts. In our view, this ensures that the operator meets the target thanks to energy efficiency actions and not through production volume reductions.

The best available production processes or techniques are set at sub-sector levels in order to recognize, for the different processes or technology in use, the capacity utilisation rates, the quality of the raw material or final product output (e.g. different types of cements, or paper grades).

The reduction target by industry ranges between 4.13% and 4.19%. However, reduction targets at plant level can be much wider, as the effort required from the least efficient installations is relatively higher than targets assigned for the most efficient plants. By way of example, the reduction targets for Portland Pozzolana cement plants range from 3.99% to 6.87%.

Too early to find a price as the first performance check is in 2015

Price: Trading of energy efficiency certificates (ESCCerts, expressed in tonnes of oil equivalent) was launched in March 2012. ESCerts are issued when an installation beats its target. Credits are bankable up to certain limit (25-30%) and fungible with Renewable Energy Certificates. It is too early to find a price on ESCerts but RECs are currently trading at ~USD36/MWh.

Enforcement: Penalties in case of non-compliance are relatively low, as operators that fail to comply run the risk of paying INR 1m (USD22k) as a lump sum, and INR 10k per day as long as the offence continues. However, these penalty rates are under review. More generally the administration's ability to both impose and recover the fines is also in question.

In 2011, the BEE estimated that Rs. 30,603 crores of investments would be needed to achieve a national target of 9.8mtoe of fuel savings. The target was revised down to 6.7mtoe in the latest version.

Companies exposed

CARBON DISCLOSURE PROJECT REPORTING – EMISSIONS IN INDIA (TCO₂ – EQ.)

Company	Country	GICS industry	GICS Sub-industry	Scope 1	Scope 2	Total emissions (Scope 1 & 2)	% of emissions
CLP Holdings	Hong Kong	Electric Utilities	Electric Utilities	5 904 000		5 904 000	14.1%
Italcementi	Italy	Construction Materials	Construction Materials	2 702 486	319 937	3 022 423	7.4%
BG Group	UK	Oil, Gas & Consumable Fuels	Integrated Oil & Gas	443 753	2 501	446 254	5.6%
Syngenta International AG	Switzerland	Chemicals	Fertilizers & Agricultural Chemicals	28 500	26 500	55 000	5.6%
Imerys	France	Construction Materials	Construction Materials	37 908	30 538	68 446	2.3%
Suez Environnement	France	Multi-Utilities	Multi-Utilities	69	80 057	80 126	1.2%
BASF SE	Germany	Chemicals	Diversified Chemicals	29 000	37 000	66 000	0.3%

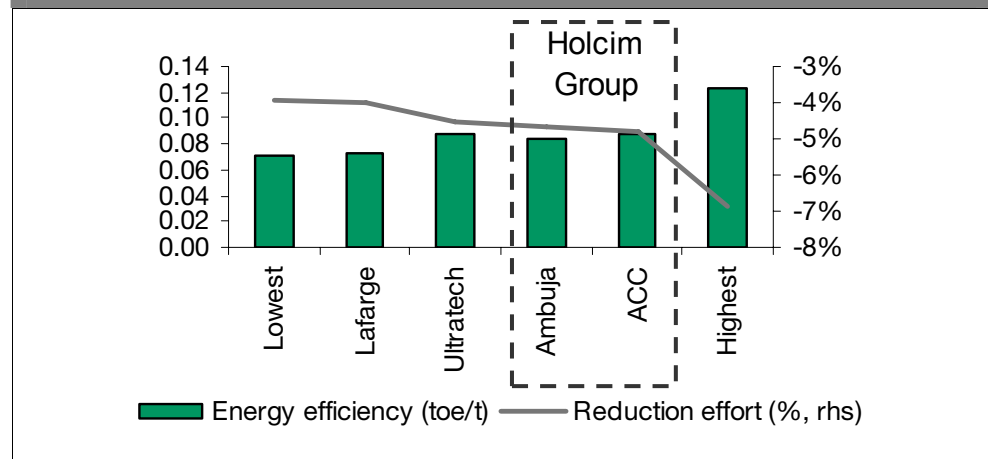
Source: Carbon Disclosure Project, CA Cheuvreux

Holcim's assets in India have lower energy efficiency than Lafarge

Other companies exposed are electricity utilities CLP Holdings (5.9mtCO₂, 14% of group emissions) and AES Corporation (1.4mtCO₂, 1.8%).

We also compared the targets assigned to some of the main cement producers in India, based on a installation-by-installation list provided by the Indian administration. We find that Holcim's Indian subsidiaries have received relatively higher energy efficiency improvement targets. Given the current energy efficiency plan set by Holcim at the group level, we would expect the company to easily meet these targets though.

ENERGY EFFICIENCY AND PAT REDUCTION TARGETS OF MAIN CEMENT COMPANIES IN INDIA



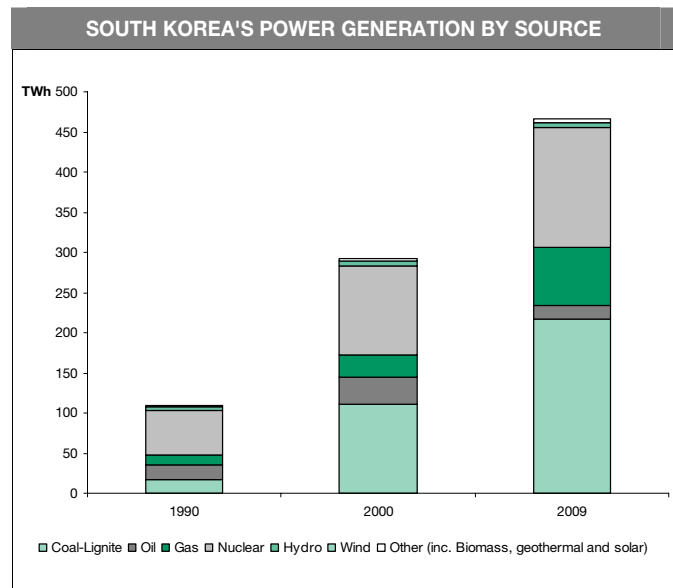
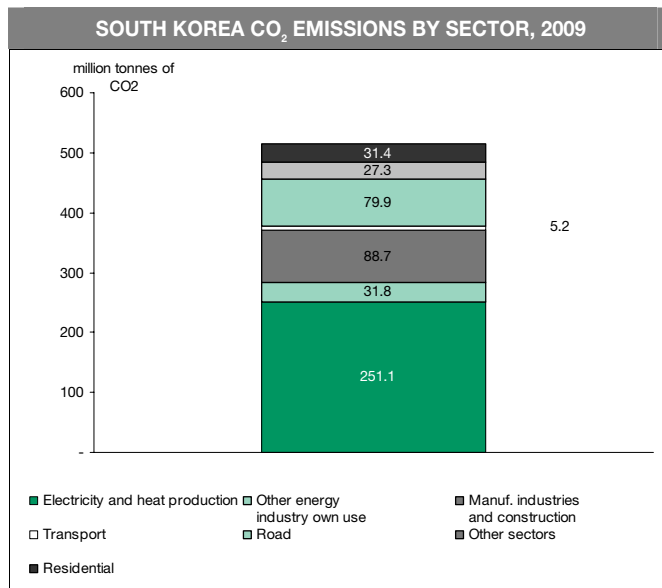
Source: CA Cheuvreux

Cap & trade project is part of a wider National Green Growth Strategy and widely backed by bipartisan support

■ South Korea: ETS deployment backed by political consensus

In May 2012, the South Korean National Assembly unanimously backed the introduction of a new **cap-and-trade system which will take effect on 1 January 2015** (Act on the Allocation and Trade of Greenhouse Gas Emissions Rights (Alternative)).

South Korea pledged at a UN summit in Copenhagen to **cut CO₂ emissions by 30% from 2020 compared to a business-as-usual scenario**. The world's 13th largest economy widely relies on heavy industries such as petrochemicals and steelmaking and heavily depends on fossil fuel imports, which makes it the 9th largest CO₂ emitter on the planet. Furthermore, in 2011, the country generated 39.2% of its USD1.574 trillion GDP from industry. Bloomberg noted in a report in February that South Korea is the **fastest-growing source of emissions amongst 34 member states of the OECD** (640 million metric tonnes in 2011 vs. 350 million tonnes in 1990, a 183% increase from 1990 to 2011). According to the report, the country would emit 742 million tonnes by 2020 without any efficient scheme to reduce emissions. Therefore President Lee Myung-bak has unveiled a Framework Act for "Low Carbon Green Growth", passed in the National Assembly at the end of 2009. This framework is part of the National Green Growth Strategy (2009-2050) as well as the Five-Year Plan for Green Growth covering the 2009-2013 period.



100% free allocation planned for the first phase 2015-2017

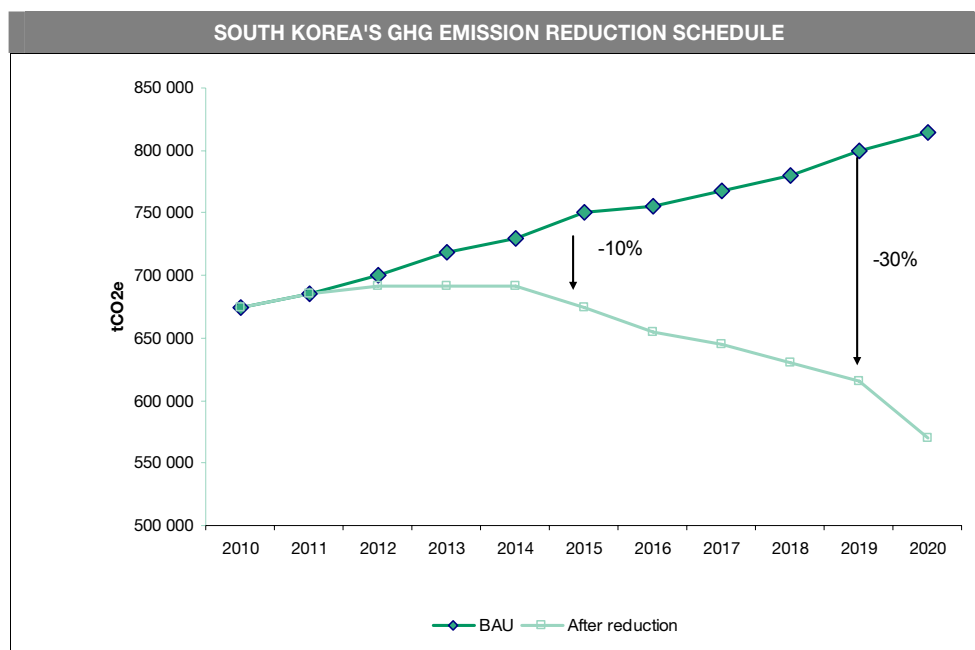
The scheme will concern **460 firms in all sectors that emit at least 125,000 tonnes p.a., together with livestock farms, factories and buildings that produce 25,000 tpa or more, which represents ca. 60% of country's total emissions.**

The government will be **granting 100% of quotas for free for the first phase covering 2015-2017**. Moving forward to **the next period (2018-2020)**, the number of free permits will be lowered to **97%**, and will drop **below 90% for the 3rd period of five years from 2021 onwards**. In case of non-compliance, the penalty is set at 3 times market prices with a cap at KRW100,000 per tonne (ca. EUR72). The scheme will allow banking and borrowing between members. Unlike in Europe, firms will **only be able to use offsets from 2021 onwards and even at that time their use will be limited**. By doing so the government hopes to promote CO₂ cuts locally and to maintain high price levels on the market. Finally, carbon prices will float straight away from the scheme's commencement, which, in our view, would require good assessment of the accurate quantity of free rights to issue so as to maintain a sufficient price signal on the market.

Obviously, the government is facing opposition from the country's largest companies, which are raising competitiveness issues. South Korea's two largest business lobbies, the Korea Chamber of Commerce and Industry and the Federation of Korean Industries are already pushing for a delay in the implementation of the plan. Indeed, State-owned Korea Energy Management Corporation has valued **at KWN5.6 trillion (ca. EUR4bn) the additional cost that all carbon-intensive industries would face once the cap-and-trade system is introduced**. In addition, the Korea Economic Research Institute estimates an implied **carbon price of ca. USD40 (KWD45,000) per tonne**, leading to a decline in annual sales for the nine main industries, including oil refining and steelmaking, of USD10.6bn (KWD12 trillion).

The final decree is due to be finalized by November 2012, just before the forthcoming presidential elections. Note that there is bipartisan support on carbon topics (the South Korean National Assembly voted unanimously for ETS in May 2012), and we thus see limited risk of having the decree revoked by that date.

A pilot scheme is live since 2012



In October 2011, the government had already imposed reduction targets by sector and industry in order to facilitate the transition towards the national ETS. A total of **458 firms producing over 25,000 tonnes of CO₂ per year** within 7 sectors (such as manufacturing, transportation and building) and 26 industries (including semiconductors, steel, electronics, cement and petrochemicals) **are constrained by reduction targets for 2012 via the Target Management System**. This system regulates **68% of the GHG emissions in Korea**, and the scope threshold will further be reduced gradually to reach 15,000t p.a. in 2014. The TMS is a mandatory scheme that will charge non-compliant firms a small fine should targets not be met.

What is more, the government plans to invest 2% of GDP in green growth each year. All national energy producers and 14 power generators of over 500 MW capacity are currently constrained to source 2% of their energy output from renewables; this mandatory cap is set to be raised to 10% by 2022.

Companies exposed

We highlight that Lafarge currently accounts for ca. 13% of the Korean cement market, with one cement plant and two grinding plants in the country. Its total capacity of 9.6 million tonnes (total production in Asia of 44.7 Mt in 2011) is therefore perfectly within the sights of the new ETS.

CARBON DISCLOSURE PROJECT REPORTING – EMISSIONS IN SOUTH KOREA (TCO₂ – EQ.)

Company	Country	GICS industry	GICS Sub-industry	Scope 1	Scope 2	Total emissions (Scope 1 & 2)	% of emissions
POSCO	South Korea	Metals & Mining	Steel	68 705 000	2 974 000	71 679 000	100.0%
BASF SE	Germany	Chemicals	Diversified Chemicals	373 000	212 000	585 000	2.3%
BP	UK	Oil, Gas & Consumable Fuels	Integrated Oil & Gas	230 000	50 000	280 000	0.4%
Veolia Environnement	France	Multi-Utilities	Multi-Utilities	11 710	74 330	86 040	0.2%

Source: Carbon Disclosure Project, CA Cheuvreux

A training session for businesses was held in October 2011...

... but limited amount of detail on the design of a KZ ETS

■ Kazakhstan: a domestic ETS as soon as 2013?

Kazakhstan is one the largest CO₂ emitters per unit of GDP, even twice as bad as China.

Kazakhstan pledged to cut emissions by 15% by 2020 and 25% by 2005 vs. 1990 levels under the Copenhagen Agreement, and the Ministry of Environment Protection of the Republic of Kazakhstan is **currently working on the design of a domestic emissions trading scheme**, as part of the country's climate-change mitigation strategy.

Legislative and technical preparation work is already underway (**Parliament has already adopted legislation allowing the government to set up a domestic cap & trade scheme** and the Ministry has started gathering in historical emissions data from installations) but draft regulation has yet to be published and approved before the scheme can be implemented. Unless the process is speeded up, **2013 could prove an optimistic timeline for the launch of the market, in our view.**

There are very few clues about the design of the scheme at this stage, as details of the coverage scope and the level of the cap, along with the length of the first trading period, are still under discussion. The firms concerned would not be able to use UN-backed credits for compliance, and a certain proportion of credits would be allocated for free. The government has been assisted by European experts in the design of the market system, which is thus likely to use the same architecture as the EU ETS, in our view. We would not expect the KZ ETS to bite significantly into companies' profits, in its first phase at least.

Companies exposed

CARBON DISCLOSURE PROJECT REPORTING – EMISSIONS IN KAZAKHSTAN (TCO₂ – EQ.)

Company	Country	GICS industry	GICS Sub-industry	Scope 1	Scope 2	Total emissions (Scope 1 & 2)	% of emissions
Arcelor Mittal	Luxembourg	Metals & Mining	Steel	14 209 783		14 209 783	7.7%
Italcementi	Italy	Construction Materials	Construction Materials	677 029	47 749	724 778	1.8%
BG Group	UK	Oil, Gas & Consumable Fuels	Integrated Oil & Gas	686 502	2 886	689 388	8.6%

Source: Carbon Disclosure Project, CA Cheuvreux

MAIN CEMENT PRODUCERS' CAPACITIES IN KAZAKHSTAN

Group	Plant	Capacity
ArcelorMittal	Temirtau Steel Plant	Total annual capacity of 80,000 longitudinal welded tubes and production of 3.6 million tonnes in 2011
Italcementi	Shymkent Cement plant	1.3 Mt of cement per year
Vicat (in partnership with Homebroker)	Jambyl Cement	Capacity of over 1.1 million tonnes per year. Plant operational since 2010

Source: CA Cheuvreux

■ Japan: the economic and nuclear crises have put climate change ambitions on hold

Japan is **unlikely to be able to meet its 25% GHG emission reduction target for 2020 and 40% goal by 2030 (compared to 1990 levels)**. This is a direct consequence of the **Fukushima** accident in 2011, as the Japanese authorities have failed to find enough support from public opinion to restart nuclear plants (ca. 70 nuclear plants now offline).

Nuclear crisis put the climate change strategy under review

Furthermore, the government has also failed to plan the construction of the nine nuclear reactors projected in the Japanese climate change mitigation strategy. Nonetheless, the Japanese power generation industry has maintained a target of cutting CO₂ emissions by 20% over the period 2008-2012 compared with 1990 levels.

As the economy struggles and anti-cap & trade lobbying gains in strength, **policy action is also at a standstill**. The government is expected to revise its emission reduction target down by several percentage points by the end of the year, and **plans for launching a domestic ETS in 2013 were already postponed indefinitely in December 2010**.

In view of this context, a governmental panel has calculated that the country will only be able to cut emissions by 11% through domestic reduction efforts, hence the rest will have to be met thanks to offsets and forest carbon sinks. **The Ministry of Economy, Trade and Industry (METI)**, which has largely taken climate change off the national agenda, has also **decided to halve its 2012 purchase budget for Kyoto credits to USD104.74m** (2011: USD215m), saying it would be sufficient enough to meet their compliance targets.

National cap & trade project on hold

The regions are taking the lead

Three Japanese regions (Tokyo, Saitama and Kyoto) launched regional emissions cap-and-trade schemes in 2010-2011 as a tool to meet their own carbon emission reduction targets. These schemes remain **very limited in size, however, with only ~30 million tonnes of CO₂ regulated (i.e. 1-2% of the EU ETS)**.

Three prefectures launched local ETS in 2010 and 2011

The **Tokyo prefecture** set up a mandatory cap & trade scheme in **April 2010** — later on linked with Saitama prefecture's scheme in 2011 — that requires regulated factories to **cut carbon emissions by 6% over 2011-2014** (8% for commercial buildings), relative to a baseline set with a reference period in 2002-2007. Emission reduction targets are to be lowered for the 2nd compliance period from 2015 to 2019. The scheme regulates ca. **1,400 large local businesses** (1,100 commercial buildings and 300 factories) that **consume at least 1,500 kilolitres of oil equivalent per year** for total annual emissions of **around 13 million tonnes of CO₂**. Companies have to report emissions data on an annual basis, but only have to comply at the end of the period (i.e. no surrender of allowances to the government until end March 2015). Firms are to face **finances in case of non-compliance**. As the scheme does not allow the use of international carbon offsets, **prices tends to be pushed upwards**: Tokyo carbon credits currently trade at around **USD140 (i.e. JPY12,000) per tonne**, largely above the price of credits in the Japanese market for secondary UN credits, trading around JPY1,500 (ca. USD17.6).

Scopes remain limited

The **Saitama Prefecture** introduced a cap-and-trade programme in **April 2011**. Saitama is the 5th largest prefecture in terms of the number of inhabitants. This ETS regulates ca. **600 corporate installations consuming over 1,500 kl of oil equivalent a year** (same as for the Tokyo scheme). Factories are expected to **cut carbon emissions by 7% during the first four years of the programme**, whereas office buildings and other commercial facilities will face 8% cuts. The prefecture has earmarked JPY416m to support the ETS implementation, out of which JPY416m will be used to subsidize firms to buy new equipment to help meet their reduction targets. The Saitama and Tokyo schemes are directly linked, permitting cross-border trades of credits between regulated firms.

Operational since **April 2011**, the **Kyoto scheme** is voluntary though. It covers around **280 businesses** which have to submit **three-year emission reduction plans**. The region currently emits 12.3 million tonnes of CO₂ equivalent. Should firms struggle to meet their compliance targets, they may fund emission reduction plans in small-and-medium sized facilities or forest conservation projects to receive **Kyo-VERs credits**. However, the use of UN-issued credits is not allowed so as to maximize local emissions reduction. Kyo-VERs trade at ca. **USD19.50 (JPY1,500)**. Although there are currently no plans of link between Kyoto ETS and the other regional schemes, six neighbouring prefectures are considering scaling it up to cover a wider scope.

Companies exposed

CARBON DISCLOSURE PROJECT REPORTING – EMISSIONS IN JAPAN (TCO₂ – EQ.)

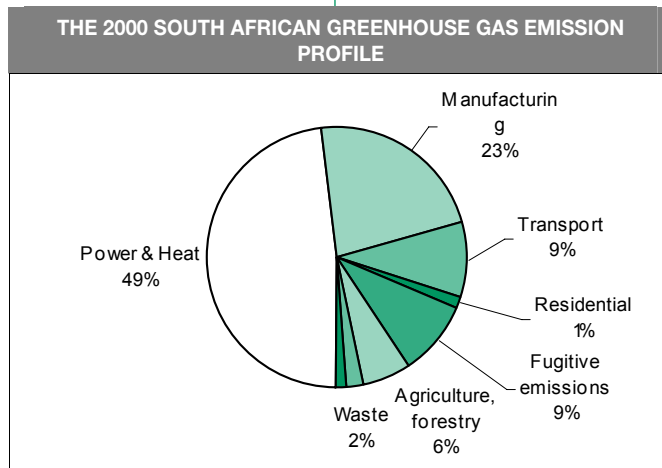
Company	Country	GICS Industry	GICS Sub-Industry	Scope 1	Scope 2	Total emissions (Scope 1 & 2)	% of emissions
Mitsubishi Chemical Holdings Corporation	Japan	Chemicals	Diversified Chemicals	7 949 000	1 665 000	9 614 000	83.0%
Imerys	France	Construction Materials	Construction Materials	54	25 165	25 219	0.8%
BASF SE	Germany	Chemicals	Diversified Chemicals	13 000	46 000	59 000	0.2%
Veolia Environnement	France	Multi-Utilities	Multi-Utilities	2 950	57 210	60 160	0.1%

Source: Carbon Disclosure Project, CA Cheuvreux

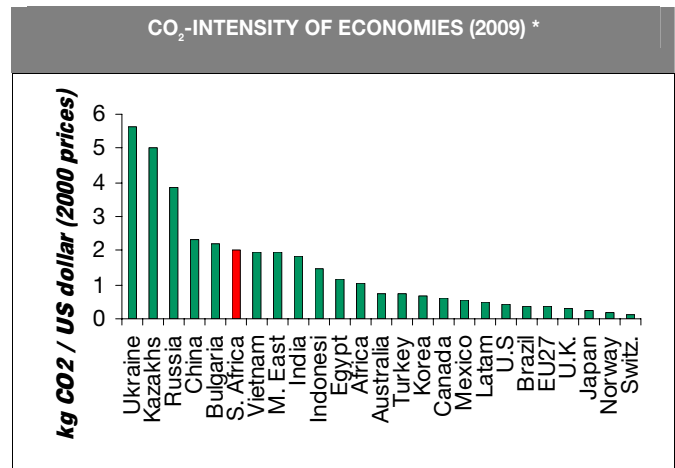
In South-East Asia, Thailand and Vietnam have also applied for funds from the World Bank to investigate the option of setting up domestic ETS.

IV – South Africa plans a step further with carbon taxes

South Africa's economy is particularly carbon-intensive as most of the power generation relies on coal, and extractive industries represent a significant share of the GDP.



Source: National Climate Change Response

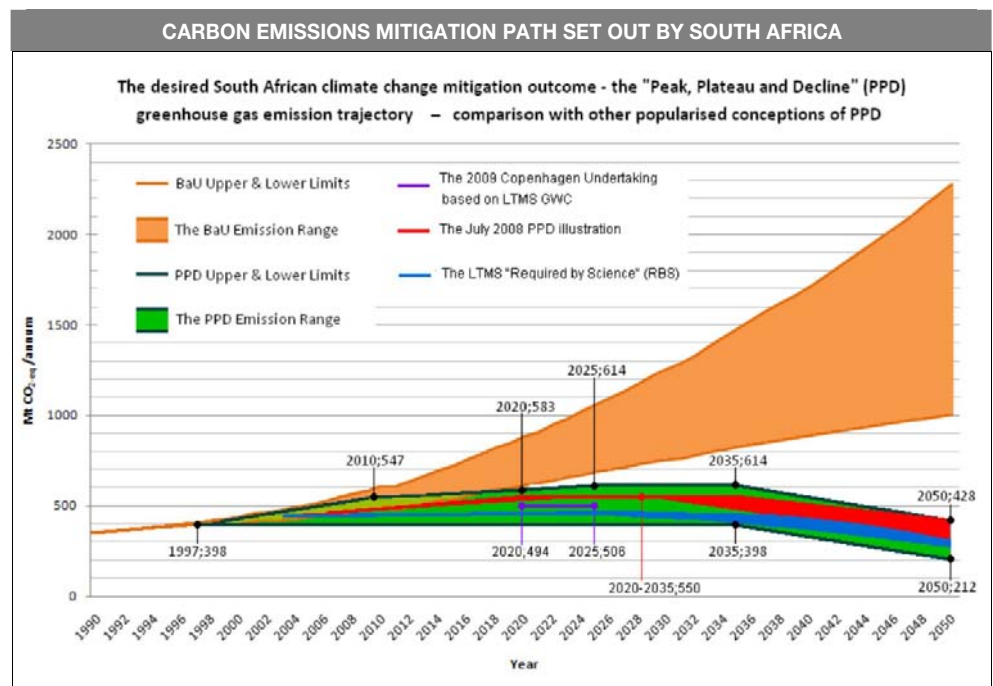


*Country list non-exhaustive Source: CO₂ Emissions from Fuel Combustion (2011 Edition), IEA, Paris.

Plan to cut GHG emissions by 34% by 2020

Under the Copenhagen Agreement, South Africa committed to cut GHG emissions by 34% by 2020 and 42% by 2025 below Business-as-Usual, but with conditions on finance, technology and capacity.

In 2010, the government published a National Climate Change Response Green Paper which sets out the strategic pillars of the country's climate change mitigation and adaptation action plan.



Source: South African Government of Environmental Affairs

A CO₂ tax on new vehicles already exists

Carbon trading is quoted as a potential tool for medium to long-term response, but the strategy explicitly includes the use of carbon tax among other economic levers in the form of regulatory and fiscal measures to promote behaviour change in the transition to a low-carbon economy.

In September 2010 the current government already launched a CO₂ tax applied to the sales of new passenger vehicles with CO₂-intensity above 120 g/km. The government recently stated that it has raised 2,384m Rands (ca. USD300m) since the implementation of the tax. We estimate that this points to an average fuel economy of 150g/km for new cars sold.

■ New proposal for a carbon emissions tax included in 2012-2013 budget

The 2012-2013 budget released in February 2012 includes a **proposal to tax carbon emissions** for a much wider scope of the economy as **emissions of the power generation, refining and heavy manufacturing and extractive industries** would be regulated.

If implemented, the tax is to start in **April 2013 (fiscal year 2013-2014)**. The government has yet to publish a draft policy paper on carbon tax (due by the end of the year) and the Minister of Finance stated in June 2012 that no decision had been made to date.

The proposed tax was designed based on the results of a public consultation process.

- The tax would be set at **R120/tCO₂-eq. (ca. USD14/t)** and the rate would be **increased by 10% p.a., hence reaching R213 (ca. USD26) in 2019-20.**

CO₂ tax for carbon-intensive industries proposed in the 2012-2013 Budget ...

PROPOSED TAX RATE

	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Tax rate (Rand / tCO ₂ -eq)	120	132	145	160	176	193	213
Annual increase		10%	10%	10%	10%	10%	10%
Tax in USD/t, at USD1=R8.29	14	16	18	19	21	23	26

Source: South African Revenue Service, CA Cheuvreux

... with a tax rate starting at USD14/t and rising aggressively (+10% p.a.)

- In order to phase-in the introduction of the carbon price signal in the economy and to smooth the materialisation of carbon costs for carbon-intensive industries, the tax would only apply to **carbon emissions above a tax-free threshold starting at 60% and with some modulations by sector. Sectors exposed to international competition** or with part of their emissions coming from chemical reactions in their production processes are eligible for **additional tax shields of 10%**. Consequently, sectors would pay the tax for 10% to 40% of their emissions.

PROPOSED EMISSIONS TAX SHIELD THRESHOLDS FOR SECTORS

	Basic tax free threshold (%) below which no carbon tax will be payable during the first phase (2013 to 2019)	Maximum Additional allowance trade exposure	Additional allowance for “process” emissions	Total	Maximum offset percentage
Electricity	60%			60%	10%
Refining	60%	10%		70%	10%
Iron & Steel	60%	10%	10%	80%	5%
Aluminium	60%	10%	10%	80%	5%
Cement	60%	10%	10%	80%	5%
Glass & ceramics	60%	10%	10%	80%	5%
Chemicals	60%	10%	10%	80%	5%
Pulp & paper	60%	10%		70%	10%
Sugar	60%	10%		70%	10%
Agriculture	60%		40%	100%	
Waste	60%		40%	100%	
Fugitive emissions: coal	60%	10%	10%	80%	5%
Other	60%	10%		70%	10%

Source: National Treasury Republic of South Africa

**Min. 60% of emissions
protected from the tax**

This system can be seen as less stringent than absolute caps, but it has the benefit, in our view, to limit the volatility of carbon costs resulting from hiccups in production volumes. Tax-free thresholds would be reduced over 2020-2025 though, and may be replaced with absolute caps in the long term.

On top of tax-free thresholds, the system would allow companies to **use offsets to reduce their carbon tax liability**, but the proposal clearly lacks specifics on this option (e.g. type of offsets, location of projects, etc.)

Potential full tax-free shield for players with 25% superior CO₂-efficiency

The proposed design also includes a **possibility for companies improving their carbon-intensity to receive additional relief**. For instance, a cement company with a carbon-intensity 10% better than the industry benchmark would receive a 10% bonus on its basic tax-free threshold (1.1*60%=66%). We estimate that setting industry benchmarks requires a lot of time and we doubt that such a bonus/malus system would be up and ready from the start. Still, if implemented, it would mean that any producer with a carbon-intensity 25% better than average and making a full use of offsets would avoid paying the tax. On the contrary, an installation 25% less efficient than the average would have to pay for at least 30% of its emissions (instead of 15%). It remains to be seen whether this system would apply in the power sector, where standard deviation to average CO₂-intensity is very high due to the wide range of available power generation technologies.

The issue of indirect CO₂ costs through higher electricity bills is still on the table

With substantial tax shields applying to direct emissions of industrials, the main risk may come from the indirect impact of carbon-inflated power prices.

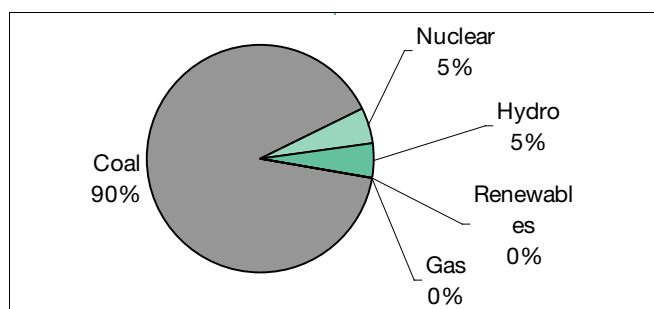
90% of electricity produced in South Africa comes from coal-fired power plants, with nuclear and hydro providing the remainder. The electricity market is dominated by the national company Eskom (95% market share) but the market has been open to Independent Power Producers (IPPs) since 2011.

With a 60% tax-free threshold and an average CO₂-intensity per megawatt-hour produced estimated at 0.9 tCO₂/MWh, this points to a **R53/MWh (or USD5/MWh) cost increase due to the implementation of the carbon tax**.

**Regulated tariffs for
electricity may rise by
+USD5/MWh**

Electricity prices are regulated by the State. Tariffs are determined for three-year periods to ensure cost-reflective pricing. The next period is set to start in April 2013 and visibility may be given for a five-year period (instead of three). Eskom has yet to present its application for tariff increase to the regulator for the next period. We estimate that a **7% tariff increase would be needed in 2013-2014 to cover carbon costs.**

POWER GENERATION ENERGY MIX



Source: Eskom

ESTIMATED ELECTRICITY TARIFF TREND

Rc	2009-10	2010-11	2011-12E	2012-13E	2013-14E
Revenue per kWh, cents per kWh	31.9*	40.3*	50.7	58.8	N/A
Tariff increase		24.8%	25.8%	16.0%	N/A
Estimated CO ₂ costs per kWh					4.32

* As reported by Eskom

Source: Eskom, CACheuvreux

Our cost estimates for ArcelorMittal, Xstrata, Anglo American, BHP, Lafarge, etc.

■ Our estimates of carbon costs faced by companies exposed to South Africa

The state-owned national electricity company Eskom is by far the most exposed with ca. 230mt of CO₂ emissions affected by the tax. With a 60% tax-free threshold and USD14/tCO₂, the tax may cost the company ca. USD2bn p.a. in 2013-2014 if implemented. In spite of the prospect of the carbon tax, Eskom still has plans to build new coal-fired power plants (including a supercritical unit) but the Integrated Resource Plan for 2030 set out by the regulator plans over 70% of carbon-free capacities by 2030. Eskom and IPPs have started developing renewable capacities (wind, solar power).

OUR ESTIMATES OF CARBON COSTS FOR COMPANIES EXPOSED TO SOUTH AFRICA

	Scope 1 emissions (mt)	Scope 2 emissions (mt)	Estimated electricity consumption (TWh)	Sector tax-free shield	Direct CO ₂ costs (USD m), @USD14/t	Indirect CO ₂ costs (USD m)	Total CO ₂ costs (USD m)	% of group EBITDA
Electricity Utilities								
Eskom	230			60%	1332		1 332	37%
Refining								
Sasol	61.2	9.7	11	70%	266	56	322	6%
BP	0.5	0.1	0.1	80%	1.4	0	2	0%
Metals & Mining								
Arcelor Mittal	10.6	3.9	4	80%	31	22	53	0.5%
Evraz	2.8	1.8	2	80%	8	10	19	0.7%
BHP Billiton	3.1	13.5	15	80%	9	78	87	0.2%
Xstrata	3.4	5.9	7	80%	10	34	44	0.4%
Anglo American	2.7	8	9	80%	7.8	46	54	0.4%
Imerys	0	0	0	80%	0.1	0	0	0%
Harmony Gold mining	1.5	3.4	4	80%	4.5	20	24	8%
Cement								
Pretoria Portland Cement	4.8	0.6	1	80%	13.8	3	17	6%
Lafarge	2.2	0.3	0	80%	10.1	2	12	0.3%
Cimpor	1.1	0.1	0	80%	4.8	1	6	0.7%
Paper								
Sappi	2.7	1.5	2	70%	11.5	9	20	3%
Mondi	1.1	0.9	1	70%	4.6	5	10	0.7%

Source: CDP, Companies, CA Cheuvreux

NB: Estimates of direct CO₂ costs in the table above have been corrected vs. the original version released on 3 Sept. 2012

CARBON DISCLOSURE PROJECT REPORTING – EMISSIONS IN SOUTH AFRICA (TCO₂ – EQ.)

Company	Country	GICS Industry	GICS Sub-Industry	Scope 1	Scope 2	Total emissions (Scope 1 & 2)	% of emissions
Anglo American	UK	Metals & Mining	Diversified Metals & Mining	2 685 102	7 963 899	10 649 001	53.2%
Xstrata	Switzerland	Metals & Mining	Diversified Metals & Mining	3 434 661	5 868 586	9 303 248	37.7%
BHP Billiton	Australia	Metals & Mining	Diversified Metals & Mining	3 126 046	13 479 882	16 605 928	36.3%
ArcelorMittal	Luxembourg	Metals & Mining	Steel	10 637 195	3 882 317	14 519 512	7.9%
Imerys	France	Construction Materials	Construction Materials	39 326	27 596	66 922	2.2%
BP	UK	Oil, Gas & Consumable Fuels	Integrated Oil & Gas	490 000	70 000	560 000	0.7%
Syngenta International AG	Switzerland	Chemicals	Fertilizers & Agricultural Chemicals	1 000	1 500	2 500	0.3%
Gas Natural SDG SA	Spain	Gas Utilities	Gas Utilities	18 008	0	18 008	0.1%
Kuehne + Nagel International AG	Switzerland	Air Freight & Logistics	Air Freight & Logistics			0	0.0%

Source: Carbon Disclosure Project, CA Cheuvreux

V – North America

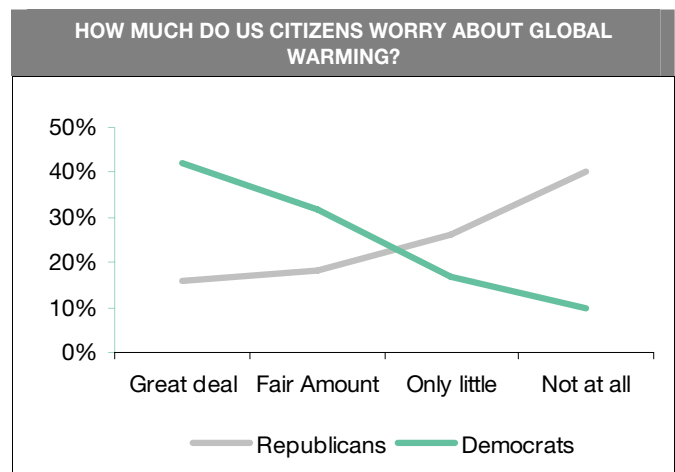
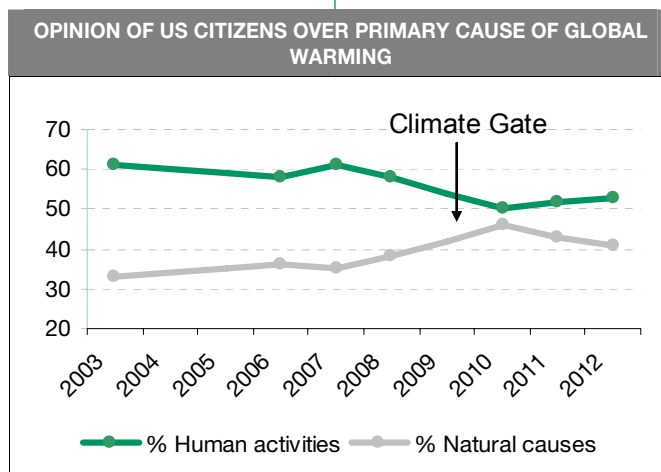
The Climate Gate and the change in majority at the Congress have cooled Obama's ambitions to pass a cap-and-trade system at the Federal level. Regional initiatives such as the Western Climate Initiative may regain some momentum with California and Quebec planning to launch cap-and-trade schemes as early as 2113. Meanwhile, Alberta has started a review of its carbon scheme, and may seek to increase carbon price to improve funding capacity for CCS projects and try to reach its 2020 reduction target.

■ The US: hostile Congress leaves the EPA little room for action

The Obama administration has pledged to cut US emissions by 17% by 2020 compared to 2005 levels. However, after having passed the House of Representatives in June 2009, the last attempt to pass a carbon emissions cap-and-trade scheme failed on the Senate floor in 2010. The Climate Gate in late 2009 in particular eroded the support from the polls in the US to act on climate change (see chart below, left-hand side) and some Members of the House are said to have lost their seats due to their support of the American Clean Energy and Security Act when Democrats lost the control of the House following the November 2010 elections.

Views on global warming generally and on cap-and-trade solutions specifically show a strong political cleavage (see chart below right-hand side). In addition, the Senate proved to be a significant hurdle for carbon capping, as democrat senators representing states with carbon-intensive economies were reluctant to support cap-and-trade proposals.

The Congress is hostile to cap-and-trade policies since Republicans took the House



EPA, the main tool of Obama's administration to rule on GHG emissions

The Environmental Protection Agency (EPA) has taken the lead in carbon emission mitigation actions, starting with the Mandatory Greenhouse Gas Reporting Rule requiring large facilities (>25 ktCO₂) to report GHG emissions data since 2010. The first annual reports were submitted to EPA in 2011.

The action of the EPA on GHG emissions is based on the official recognition that climate change is a threat to public wealth and welfare. Following the decision of the Supreme Court in 2007, the EPA determined that greenhouse gas emissions endanger the public health – a prerequisite to regulate these emissions under the Clean Air Act.

EPA strives to set CO₂-efficiency standards for new plants

This allows the EPA to pass regulations on CO₂-efficiency standards for new plants and for vehicles.

Apart from fuel economy standards for the car industry, the EPA has started working on best available control technologies for new power plants and refineries under the New Source Performance Standards (NSPS). Both are due by the end of 2012 (proposal issued in March 2012 for power plants and due in November 2012 for refineries) but draft regulations face fierce opposition and have already been postponed and/or challenged.

For power plants, the draft regulation applies only to brand new units except OCGT plants. It sets the standard at 454kgCO₂/MWh, which de facto excludes coal-fired power plants except for those designed to start Carbon Capture & Storage technology within the first ten years of operations and meet the standard in average over 30 year of operation. Biomass-fired plants also have to meet the requirements as burning biomass is not considered to be carbon-neutral by EPA, contrary to EU ETS rules. It is expected to have only little impact though, as projected capacity additions in the US by 2035 estimated by the IEA are almost exclusively gas and renewable power plants.

Presidential election: a Republican victory may further limit carbon mitigation actions

EPA's regulations of CO₂ emissions are at the heart of Obama's administration's fight against Climate Change. The new rulings limit emissions at a 35.5 miles per gallon average for the whole automobile industry by 2016. Mitt Romney calls for the halt of the EPA regulations over vehicles and trucks' GHG emissions. According to him, the Environment Protection Agency does not have the authority to regulate emissions and is just a proxy for the current president to enhance his control over the private sector.

As in the US, we would expect the Canadian Federal government to adopt a wait-and-see approach with regards to carbon-capping policies.

Upcoming presidential elections unlikely to change the deal

■ Fresh impetus from California and Quebec under the WCI

The Western Climate Initiative

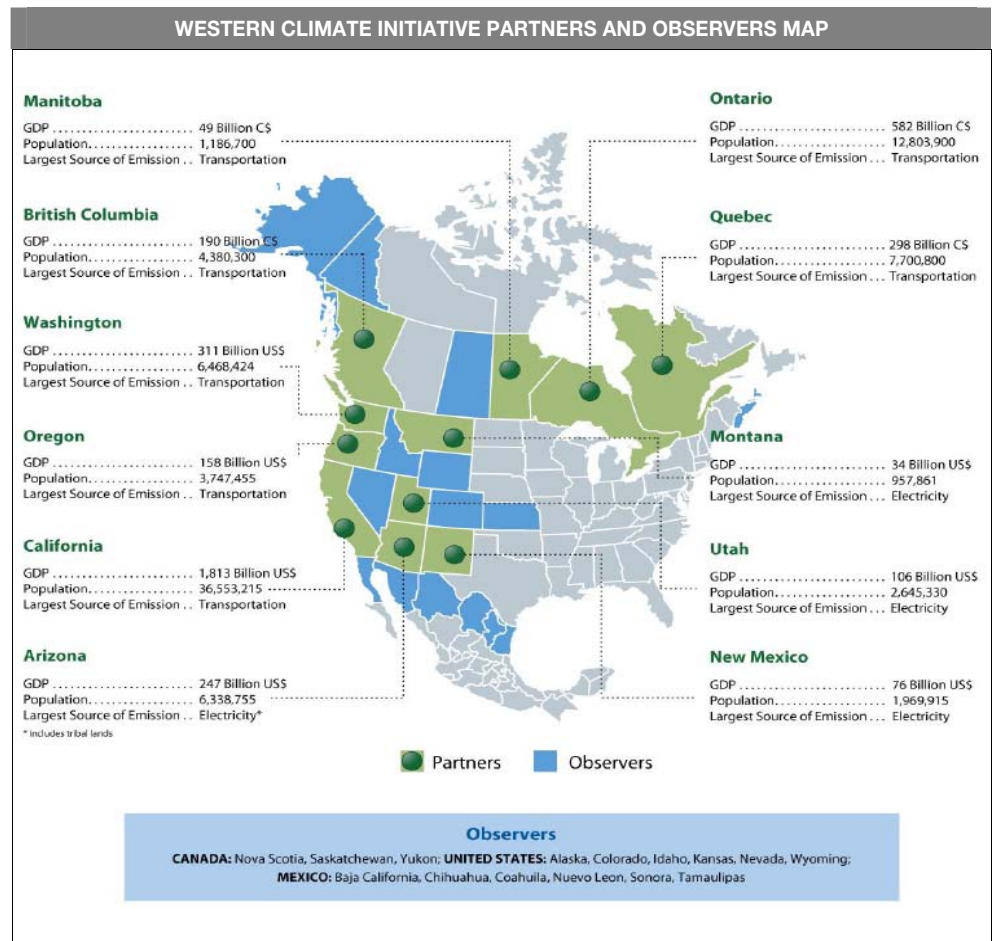
Launched in February 2007, the Western Climate Initiative (WCI) is a partnership between seven US States (Arizona, California, New Mexico, Oregon, Washington, Montana, Utah) and four Canadian provinces (British Columbia, Manitoba, Ontario and Quebec).

In order to reach its goal to cut GHG emissions 15% below 2005 levels by 2020 the organisation designed a regional cap-and-trade program, scheduled to start in 2015. This ETS would cover ca. 90% of GHG emissions and regulate firms that emit over 25,000 metric tonnes of CO₂e in the following sectors: electricity generation, industry, transportation, and residential and commercial fuel use. The scheme will cover seven GHG: CO₂, CH₄, N₂O, HFCs, PFCs, SF₆ and NF₃.

The preliminary phase begins in January 2013 and will last two years, covering electricity generation and imports. The second phase will start in 2015 and it will integrate all transportation and industrial fuels.

The regulator has provided the possibility to use offsets, auctions, banking and borrowing processes, but left the ultimate decision and clarifications of the maximum thresholds and specific regulations up to the discretion of the State or regional member. The markets will have three-year compliance periods and firms will face penalties if they emit more than the set allowances.

A cross-border initiative aiming at a regional ETS from 2015

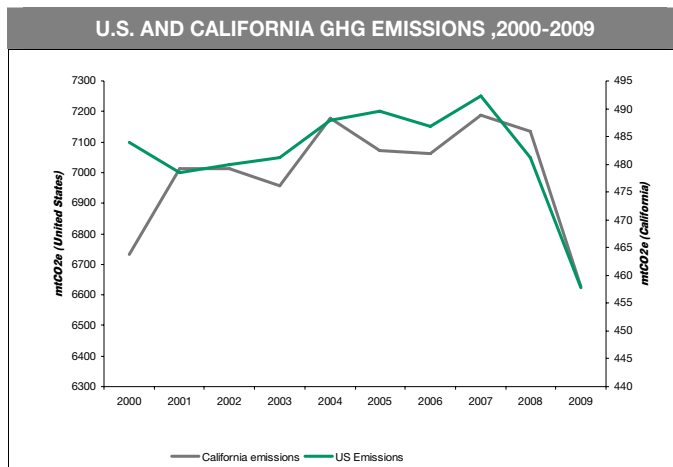


Source: Western Climate Initiative, US Census Bureau, US Bureau of Economic Analysis, Statistics Canada
 Population figures 2009 and GDP figures 2008

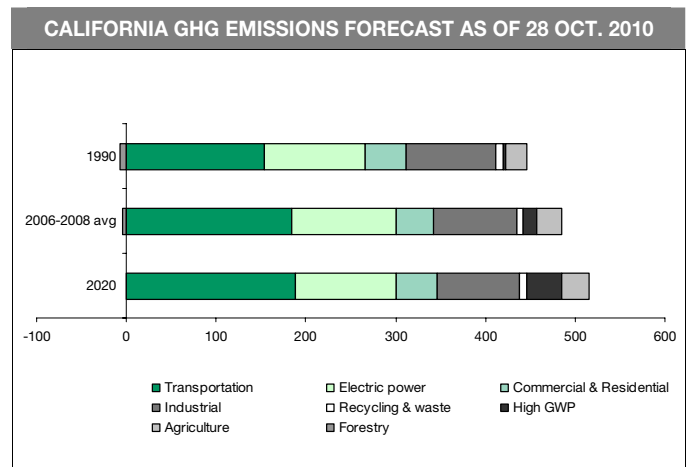
Californian ETS due to start in 2013

The Californian ETS

At the end of October 2011 the California Air Resources Board (ARB) voted the final step for the implementation of the State's **carbon trading scheme, which will start in January 2013** and will aim to deliver a total of **15% reduction in GHG emissions with regards to the 2020 BAU scenario**. The introduction of the ETS, unveiled in its 'Climate Change Scoping Plan' published in 2009, is part of the enforcement of the California's Assembly Bill (AB) 32.



Source: US Environmental Protection Agency 2011, CA Cheuvreux



Source: California Air Resources Board, CA Cheuvreux

**Expansion to
transportation fuels
and natural gas
distributors from 2017**

**2-3% annual cut in the
emissions cap**

**High level of free
allocation (90-100%)**

The cap-and-trade carbon program concerns **360 companies emitting more than 25,000 tonnes per annum (i.e. 600 Californian factories)** and covers 85% of the emissions of the world's eight largest economies.

The scheme is organized in three compliance periods: the first period from **2013 to 2015** will concern electric utilities and large industrial facilities. The two following periods, **2015 to 2017** and **2017 to 2020**, will integrate oil and gas firms, importers and distributors of natural gas and other liquid transportation fuels. The cap-and-trade program registration has already started in January 2012.

Allowances allocation

Based on each facility's production, Californian regulated companies will receive a **total of ca. 160Mt of California Carbon Allowances (CCA) for the first two years** (only covering industry and electricity) and then face an annual reduction of 2-3% from 2015 onwards, ranging from 395Mt in 2015 (with the integration of the transportation and natural gas sectors) down to 334.2Mt in 2020 (BAU forecast are of 409Mt).

Each sector will receive a free allowance of ca. 90% of the average sector emission and the rest will need to be purchased via auctions or on the market. Refiners and Oil companies such as ConocoPhillips, Chevron or even Shell already complained for not receiving allowances covering 100% of their emissions, highlighting the competitive disadvantage created by this ETS versus the out-of-state suppliers. However, this gap is partly filled thanks to the delivery of free allowances to vulnerable industries as well as allowance requirements on power importations. As the first compliance period ends, some particularly fragile industries facing out-of-the-state competition, such as cement makers, will continue to receive 100% of their allowances for free, whereas other industries will only receive 75% for the second compliance period and 50% for the third period. Firms that do not meet their compliance requirements will have to hand out four allowances per excess tonne of emissions, plus other financial fines.

Below is the split by sector. We highlight that from 2013 to 2020 the industrial sector's cap is reduced more rapidly than the electrical sector's cap (20.5% vs. 13.3%). Furthermore, note that the emission cap set for 2013 is already above projected levels of emission for 2013.

ALLOWANCE ALLOCATION BY SECTOR 2013-2020

	Year	Total cap (m CCAs)	% reduction y-o-y.	Electric sector (m CCAs)	% reduction y-o-y.	Industry and other sectors (m CCAs)	% reduction y-o-y.	Reserves (m CCAs)
1st compliance period	2013	162.8	N/A	95.8	N/A	64.6	N/A	2.4
	2014	159.7	-1.9%	94.1	-1.8%	63.2	-2.2%	2.4
2nd compliance period	2015	394.5	N/A	92.2	-2.1%	285.5	NA	16.8
	2016	382.4	-3.2%	90.4	-2.0%	275.7	-3.6%	16.3
	2017	370.4	-3.2%	88.6	-2.0%	266.1	-3.6%	15.7
3rd compliance period	2018	358.3	-3.4%	86.8	-2.1%	245.5	-8.4%	26
	2019	346.3	-3.5%	84.9	-2.2%	236.3	-3.9%	25.1
	2020	334.2	-3.6%	83.1	-2.2%	226.9	-4.1%	24.2
	TOTAL	-	-15.3%	-	-13.3%	-	-20.5%	-
	Cap for 2013	162.8		95.8		64.6		
	Projected 2013 emission levels (CARB)	167.26		93.23		74.06		

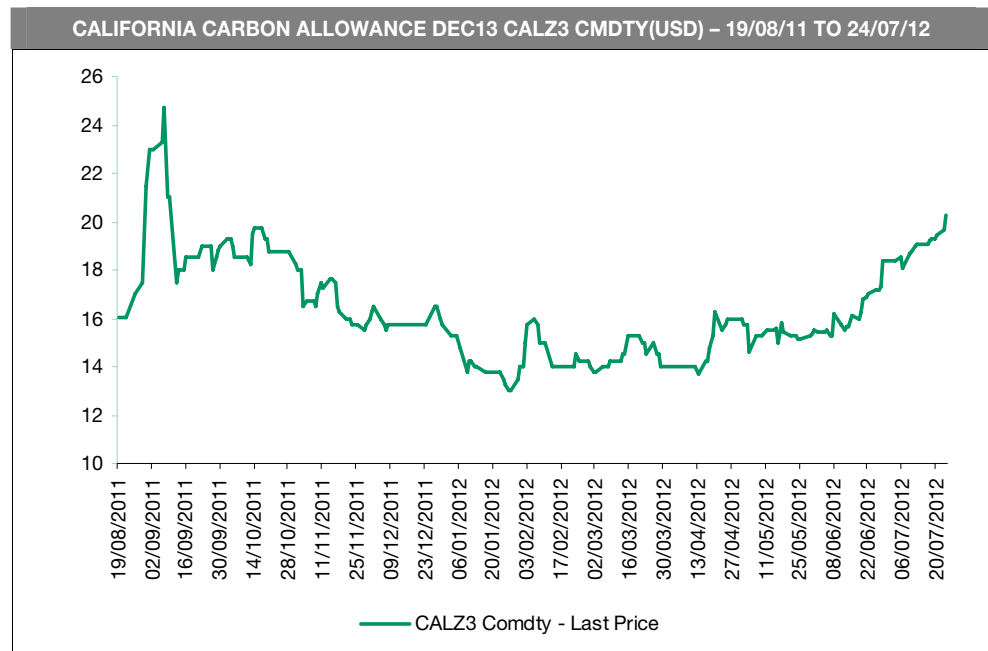
Source: CARB, CA Cheuvreux

**Recent trades at
~USD20/t and a floor
price at USD10/t**

The first allowance auctions are to be held in November 2012, and will then take place on the 12th business day of February, May, August and September. **Auctions have a price floor of USD10** per tonne, increasing over time (5% p.a. over inflation). Since the State will auction 65 million allowances the first year (through four auctions), the Government of California may expect to reap at least USD650 of revenues during that period. **The Government expects a revenue stream of over USD1bn p.a. from auctions, reaching USD7.7bn per year from 2020 onwards.** As far as the **electricity sector** is concerned, it will receive a nominal allocation of 97.7 million allowances that will be directly reduced by an adjustment factor of 98.1%, leading to a total **cap of 95.8 million allowances by 2013**; this cap will be further constrained each year, **down to 83.1 million CCA in 2020.**

Prices are expected to float between a floor of USD10/t and a ceiling of USD50/t. Industrial sectors are not treated the same way. First and foremost, to avoid price spikes, ca. 4% of allowances will be kept in reserves and will be offered in each quarter for sale from ARB at three fixed prices of USD40/t, USD45/t and USD50/t for the first period, reaching USD60/t and USD87/t by 2020 during the next two compliance periods. The first quarterly reserve sale is planned on 8 March 2013. Once the electricity sector is served and the Californian ARB has put aside sufficient reserves, industrial sectors will receive the remaining amount of allowances. Splits are then made within each sector according to baseline generation.

In our view, prices will fluctuate between a price floor of USD10/t from allowance auctions in the primary market, and a ceiling price of USD50/t from maximum reserves' fixed price during the first period (up to USD80/t in 2020). Besides, we highlight that the market is clearly over-allocated for the first compliance period, hence prices will most likely tend towards the lower range.



Source: Bloomberg

Companies may offset 8% of total compliance obligations

Moving forward, companies will be able to offset up to 8% of total compliance obligations through US-based beneficial environmental projects in uncapped sectors. The California Air Resources Board approved four kinds of projects to sell CCA: the first is avoidance of methane emissions from installation of anaerobic digesters at dairy and swine farms, the second and third are projects related to sequestration in urban and rural forestry and the fourth one concerns the destruction of ozone depleting substances. Note that a good part of these projects are already generating CO₂ credits for voluntary markets. Currently the total offset supply eligible for use in California ETS is ca.10.1 MtCO₂e.

Linking up the scheme in North America

The carbon cap scheme is designed so that it can potentially integrate the Western Climate Initiative (WCI), which currently gathers 11 states and cities in the US and in Canada (incl. California, Quebec, British Columbia, Manitoba, Ontario among others). The Californian ETS is amongst the two strongest commitments to reduce GHG emissions in Northern America, along with Quebec that plans to set up a cap-and-trade by 2013. To that effect, the two trade markets are engaged in discussions about the implementation of a unique platform, creating the second largest GHG emissions trading scheme after the EU ETS.

Exposure to the Californian ETS

We reviewed the list of facilities regulated under the Californian carbon scheme and listed below the exposure of the main international players as well as their eligibility for the allocation of free allowances.

COMPANIES REGULATED UNDER THE CALIFORNIAN CARBON SCHEME

Company	Sector	Number of entities	Eligible for free allocation
Chevron US Inc	Crude oil extraction	5	Yes
ExxonMobil	Crude oil extraction	2	Yes
PG&E	Natural gas distribution	5	No
Shell Oil Products US	Refiners	1	Yes
BP West Coast Products LLC	Refiners	2	Yes
Chevron Products Company	Refiners	2	Yes
Conoco Phillips	Refiners	5	Yes
ExxonMobil	Refiners	1	Yes
Air Liquide	Hydrogen	2	Yes

Source: CA Cheuvreux

CARBON DISCLOSURE PROJECT REPORTING – EMISSIONS IN THE US (TCO₂ – EQ.)

Organisation	Country	GICS Industry	GICS Sub-Industry	Country	Scope 1	Scope 2	Total emissions (Scope 1 & 2)	% of emissions
Dominion Resources, Inc.	US	Multi-Utilities	Multi-Utilities	US	59 004 018		59 004 018	99.4%
Public Service Enterprise Group Inc.	US	Multi-Utilities	Multi-Utilities	US	22 685 699		22 685 699	94.0%
National Grid	UK	Multi-Utilities	Multi-Utilities	US	6 371 932	58 050	6 429 982	66.6%
Wolseley plc	UK	Trading Companies & Distributors	Trading Companies & Distributors	US	221 022	290 286	511 308	63.3%
Dow Chemical Company	US	Chemicals	Diversified Chemicals	US	18 663 000	3 135 000	21 798 000	57.2%
Delta Air Lines	US	Airlines	Airlines	US	16 526 985		16 526 985	54.8%
Husqvarna AB	Sweden	Household Durables	Household Appliances	US	27 774.59	58 580.32	86 355	48.9%
BP	UK	Oil, Gas & Consumable Fuels	Integrated Oil & Gas	US	29 260 000	6 360 000	35 620 000	47.5%
Imerys	France	Construction Materials	Construction Materials	US	6 900 060	500 217	1 190 277	39.4%
Electrolux	Sweden	Household Durables	Household Appliances	US	35 544	108 422	143 966	35.8%
Alcoa Inc.	US	Metals & Mining	Aluminium	US	10 808 416	3 653 882	14 462 298	32.5%
Syngenta International AG	Switzerland	Chemicals	Fertilizers & Agricultural Chemicals	US	192 500	126 500	319 000	32.4%
DSM (Konin)	Netherlands	Chemicals	Specialty Chemicals	US	1 210 488	440 835	1 651 323	31.5%
Deutsche Post AG	Germany	Air Freight & Logistics	Air Freight & Logistics	US	1 700 000	120 000	1 820 000	28.9%
Royal Dutch Shell	Netherlands	Oil, Gas & Consumable Fuels	Integrated Oil & Gas	US	16 080 000	2 382 000	18 462 000	21.7%
Novozymes A/S	Denmark	Chemicals	Specialty Chemicals	US	24 950	63 571	88 521	21.4%
BASF SE	Germany	Chemicals	Diversified Chemicals	US	3 783 000	1 444 000	5 227 000	20.3%
SSAB	Sweden	Metals & Mining	Steel	US	5 755 941	871 979	1 447 920	19.6%
BG Group	UK	Oil, Gas & Consumable Fuels	Integrated Oil & Gas	US	1 280 696	5 559	1 286 255	16.1%
Solvay S.A.	Belgium	Chemicals	Diversified Chemicals	US	1 980 159	442 951	2 423 110	15.9%
Rio Tinto	UK	Metals & Mining	Diversified Metals & Mining	US	2 520 000	3 710 000	6 230 000	14.0%
Arcelor Mittal	Luxembourg	Metals & Mining	Steel	US	23 004 248	2 783 983	25 788 231	14.0%
Ahlstrom Corporation	Finland	Paper & Forest Products	Paper Products	US	80 922	44 924	125 846	13.0%
UPM-Kymmene Corporation	Finland	Paper & Forest Products	Paper Products	US	165 000	530 000	695 000	11.6%
GDF Suez	France	Multi-Utilities	Multi-Utilities	US	12 267 413	302 365	12 569 778	11.2%
Veolia Environnement	France	Multi-Utilities	Multi-Utilities	Other: US	4 490 340	660 450	5 150 790	10.9%
Italcementi	Italy	Construction Materials	Construction Materials	US	3 334 035	279 970	3 614 005	8.9%
Tec Resources Limited	Canada	Metals & Mining	Diversified Metals & Mining	US	204 168	296	204 464	6.9%
Iberdrola	Spain	Electric Utilities	Electric Utilities	US	1 242 589	1 217 736	2 460 325	5.3%
Suez Environnement	France	Multi-Utilities	Multi-Utilities	US	15 332	266 762	282 094	4.2%
BHP Billiton	Australia	Metals & Mining	Diversified Metals & Mining	US	1 527 481	129 795	1 657 276	3.6%
Mitsubishi Chemical Holdings Corporation	Japan	Chemicals	Diversified Chemicals	US	158 000	88 000	246 000	2.1%
Petrobras	Brazil	Oil, Gas & Consumable Fuels	Integrated Oil & Gas	US	821 865.1	106 189.3	928 054	1.5%
Norsk Hydro	Norway	Metals & Mining	Aluminium	US	81 368	50 284	131 652	1.2%
Statoil ASA	Norway	Oil, Gas & Consumable Fuels	Integrated Oil & Gas	US	37 298		37 298	0.3%
EDP - Energias de Portugal S.A.	Portugal	Electric Utilities	Electric Utilities	US	2 247	642	2 889	0.0%
Xstrata	Switzerland	Metals & Mining	Diversified Metals & Mining	US	21 13.63	727.35	2 841	0.0%

Source: Carbon Disclosure Project, CA Cheuvreux

Quebec first to follow the Californian leadership

Quebec

Quebec is part of the Western Climate Initiative (WCI) and has followed California in launching an Emissions Trading Scheme. The final regulation was passed in December 2011 to start the operation of a **cap-and-trade system as early as January 2013**. The market would cover seven different greenhouse gases: CO₂, CH₄, N₂O, HFCs, PFCs, SF₆ and NF₃. This scheme will support Quebec's ambitious GHG emissions reduction target of 20% below 1990 levels by 2020, which is amongst the strongest targets in North America.

The scheme will cover carbon-intensive sectors (power generation, heavy industries, mining, etc.) along with transportation and distribution of natural gas. From 2015, the scheme also plans to include distributors of transportation fuels. The Regulator said the ETS would concern firms emitting over the threshold of 25,000 metric tonnes of CO₂e, which corresponds to ca. 75 operators in the first compliance period.

The first year's emission cap will be of 23.7Mt, increasing up to 63.6Mt in 2015 for the second compliance period that widens the scope to fuel distributors, and then will be further reduced down to 50.9 in 2020.

QUEBEC COMPLIANCE PERIODS, CAPS AND COVERAGE

Year	Compliance period	Annual allowances (Mt)	Sector covered
2013	1st compliance period	23.7	Industrial and electricity sectors (mining, power generation, natural gas distribution, manufacturing ...) emitting over 25Kt of CO ₂ e p.a.
2014		23.3	
2015	2nd compliance period	63.6	All of the above + fuel distribution & imports, emitting over 25 Kt of CO ₂ e p.a.
2016		61	
2017		58.5	
2018	3rd compliance period	56	
2019		53.4	
2020		50.9	

Source: Government of Quebec, CA Cheuvreux

Most firms will receive 100% of allowances for free, and the number of free permits will be reduced by 1 to 2% by 2015. Note that the Government will not provide free allowances for transportation emissions.

Should emissions exceed allowances, firms may meet the compliance requirements thanks to **offsets**. The system will allow the use of offsets up to 8% of emissions but more specifications are still due on the type of offsets allowed. In case of non compliance, firms are exposed to fines between CAD25,000 and CAD250,000 in addition to the handover of three permits per tonne of excess emissions. Firms may also purchase allowances directly on the market or through **auctions held at a maximum of four times per year by the Government**. Besides, the Government of Quebec will keep **allowances reserve accounts** made up of 1% of allowances available for phase 1; 4% of the ones available for phase 2; and 7% under the cap set for the final compliance period. The allowance reserves will be sold between CAD40 and CAD50 per emission unit. Note that banking between any years is allowed in the Quebec scheme. Finally, firms regulated in the first compliance period and which would have made investments leading to reductions of emissions over the 2008-2011 period (compared to the 2005-2007 reference period) may apply for early reduction credits.

The auction floor price will be set at CAD10 and will increase 5% per annum over inflation. Trading prices of allowances are to be capped by the allowance reserve price of CAD40-50.

**Alberta is reviewing
the emissions cap and
CO₂ price of its carbon
scheme**

Quebec and Californian Authorities, both part of WCI, consider a possibility to link the two trading markets in the future. This would enable firms to trade allowances between both markets creating fungible allowances and fostering liquidity on the market.

Alberta: considering recalibration of its carbon scheme following target miss

The Canadian province of Alberta is not part of the WCI, but it has a target to cut carbon emissions by 50% by 2050 below business-as-usual projection. The province has been imposing carbon emission caps to carbon-emitting plants under the Alberta Climate Change and Emissions Management Act since 2008.

The regulation requires existing installations to cut their carbon-intensity by 12% by 2021 compared to 2003-2005 average levels, and by 10% over eight years for new installations. Companies have to comply annually, and in case of deviation from the targets the operators must either surrender carbon offsets purchased from carbon-reduction projects implemented in Alberta or pay CAD15/tCO₂ to the Alberta Technology Fund.

Oil sands operations are covered by the scheme, but we estimate that CO₂ costs remain fairly limited to USD0.17/bbl for SAGD or integrated mining projects.

According to Thomson Reuters Pointcarbon quoting the director at Alberta Environment's climate change secretariat, the ministry has been testing the potential impact of raising the price, lowering reduction targets and expanding the scope of the scheme over the next months.

The Alberta government acknowledged that it likely missed its 2010 GHG emission reduction goal. The Alberta Technology Fund partly finances carbon capture and storage (CCS) pilot projects and may envisage to increase its funding capacity to support new projects. A demonstration project was dropped in July by TransAlta Corp. for lack of funding.

CARBON DISCLOSURE PROJECT REPORTING – EMISSIONS IN CANADA (TCO₂ – EQ.)

Company	Country	GICS Industry	GICS Sub-Industry	Scope 1	Scope 2	Total emissions (Scope 1 & 2)	% of emissions
Praxair, Inc.	US	Chemicals	Industrial Gases	3 970 000	5 400 000	9 370 000	62.3%
Rio Tinto	UK	Metals & Mining	Diversified Metals & Mining	7 210 000	0	7 210 000	16.2%
Royal Dutch Shell	Netherlands	Oil, Gas & Consumable Fuels	Integrated Oil & Gas	8 740 000	2 950 000	11 690 000	13.8%
Potash Corporation of Saskatchewan Inc.	Canada	Chemicals	Fertilizers & Agricultural Chemicals	362 500	300 000	662 500	6.4%
Alcoa Inc.	US	Metals & Mining	Aluminum	2 210 731	114 061	2 324 792	5.2%
Dow Chemical Company	US	Chemicals	Diversified Chemicals	1 822 000	88 000	1 910 000	5.0%
Norsk Hydro	Norway	Metals & Mining	Aluminum	222 326	309 460	531 786	4.8%
Xstrata	Switzerland	Metals & Mining	Diversified Metals & Mining	760 701	386 149	1 146 850	4.6%
Arcelor Mittal	Luxembourg	Metals & Mining	Steel	5 449 088	737 716	6 186 804	3.3%
VALE	Brazil	Metals & Mining	Diversified Metals & Mining	481 754	187 311	669 065	3.3%
Wolseley plc	UK	Trading Companies & Distributors	Trading Companies & Distributors	17 663	6 653	24 316	3.0%
Electrolux	Sweden	Household Durables	Household Appliances	6 906	3 857	10 763	2.7%
BP	UK	Oil, Gas & Consumable Fuels	Integrated Oil & Gas	1 240 000	560 000	1 800 000	2.4%

Source: Carbon Disclosure Project, CA Cheuvreux

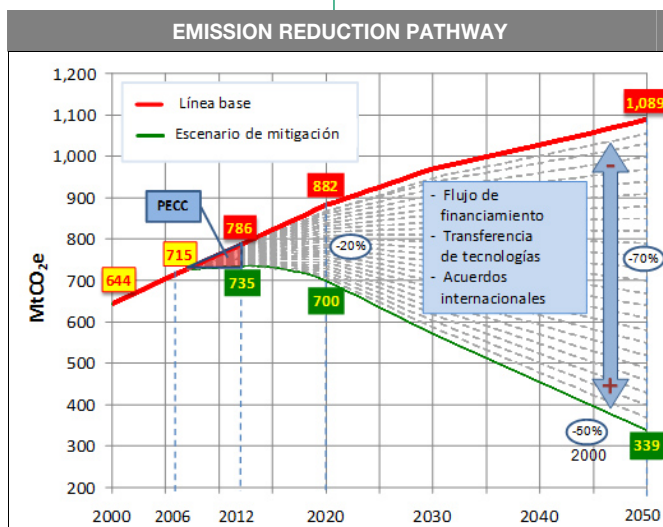
VI – Latin and South America consider ETS

■ Mexico

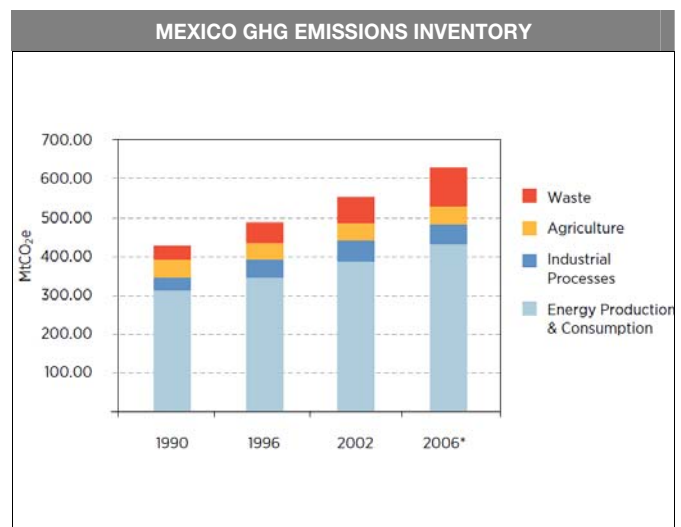
On **19 April 2012** the Senate of Mexico passed unanimously (78 for) its **General Law on Climate Change**, drawing the country's policies addressing global warming issues and paving the way for a potential implementation of a **non-bidding cap-and-trade system**. The law **targets a 35% share of renewables in the country's electricity production (and reduce fossil fuels in power generation by 50% by 2050)**.

Although the ETS would be on voluntary basis, the law requires **mandatory reporting of emissions from all major economic sectors**. Furthermore, the law creates an inter-ministerial federal climate commission (which will have the authority to set up the ETS) as well as a Green fund to financially back the scheme. The law provides for the possibility for the participants to **trade permits with foreign countries**, which would have signed bilateral agreements with Mexico. The scheme would involve the main economic sectors such as oil, steel or forestry.

The world's 13th largest GHG emitter aims to cut GHG emissions by 30% by 2020 from BaU scenario and by 50% by 2050. The current 11th biggest economy worldwide (projected to be the 5th by 2050) is still largely dependent on fossil fuels (60% of annual CO₂ emission come from the energy sector).



Source: National Ecology Institute



Source: National Greenhouse Gas Inventory
* Preliminary data from the National Ecology Institute

Political commitment in a deadlock

The law was signed by the former President Felipe Calderon in the context of a weak economic outlook (avg. GDP growth of 2.6% over the last 20 years). Mexico's new President Enrique Pena Nieto will take office in December. Even though he mentioned climate change amongst its proposals, Pena Nieto will **face incredible pressure from public opinion**. He has indeed been elected with the objective to **increase GDP growth by up to 6% per annum**. For this, the new government will **mostly focus on the oil and gas sector**, to further open it so as to attract private investments to increase production. For instance, Pemex estimates the reserves of crude equivalent at 29 billion barrels, yet they do not have sufficient expertise to tap into them. They say they would require more partnerships with other companies to gain productivity. A **great part of the legislation such as implementation planning is still to be regulated by the new President**, and will mostly depend on the new government's penchant for climate policies. With

regards to the strong support both from the Mexican Chamber of Deputies and Senate, we see promising undertaking of regulations in the forthcoming years.

Company exposure

CARBON DISCLOSURE PROJECT REPORTING – EMISSIONS IN MEXICO (TCO₂ – EQ.)

Company	Country	GICS Industry	GICS Sub-Industry	Scope 1	Scope 2	Total emissions (Scope 1 & 2)	% of emissions
Iberdrola	Spain	Electric Utilities	Electric Utilities	13 449 502	204 191	13 653 693	29.6%
Gas Natural SDG SA	Spain	Gas Utilities	Gas Utilities	4 902 070	1 066.77	4 903 137	23.9%
Smurfit Kappa Group PLC	Ireland	Paper & Forest Products	Paper Products	146 000	151 500	297 500	8.4%
Arcelor Mittal	Luxembourg	Metals & Mining	Steel	5 394 562	1 836 418	7 230 980	3.9%
Imerys	France	Construction Materials	Construction Materials	53 584	14 139	67 723	2.2%
Solvay S.A.	Belgium	Chemicals	Diversified Chemicals	84 718	25 297	110 015	0.7%

Source: Carbon Disclosure Project, CA Cheuvreux

Mild emissions targets for sectors at the Federal level

States with ETS plans account for just below one-third of Brazil's GDP

■ Brazil: states' ETS initiatives have yet to materialise

Brazil pledged to maintain its GHG emissions 36% below projected levels by 2020. However, at Federal level there is currently no plan to set up a national ETS as most of the action is focused on deforestation, which accounts for ca. 60% of country's GHG emissions (versus energy sector, which accounts for 15% of emissions).

Emission reduction targets were set in June 2012 by the government for the heavy industry, the mining and the transportation sectors, but they remain very mild in terms of burden sharing and achievability at respectively 5%, 4% and 2% below projected levels by 2020.

States' initiatives have yet to materialise

The two States of Rio de Janeiro and Sao Paulo announced plans to set up domestic cap-and-trade schemes.

Sao Paulo accounts for one-third of the country's GDP and has a target to cut its GHG emissions 20% below 2005 levels. In 2010 it emitted some 122m tCO₂est. The cap-and-trade project is at a very early stage though as Sao Paulo's intention was only revealed in June.

On the contrary, **Rio's** ETS plan is much more advanced. The design includes a three-year test phase with 90% of carbon permits handed out for free to installations, and a target for companies to cut their GHG emission intensity by 10% by 2030. The scheme would cover some of the firm's strategic sectors such as steel and oil & gas, it would be mandatory and fines would be imposed in case of non-compliance. The scheme was due to start in 2013 and the launch was due to be signed in June 2012 but the **expected start** of the ETS has been **delayed indefinitely** to leave more time for consultation with industrials.

BRAZIL NATIONAL AND REGIONAL CARBON REDUCTION POLICIES

	% of country's GDP	GHG reduction target	Latest emissions inventory	Carbon reduction policies
Brazil (Federal government)	100%	36% below BaU by 2020		No current plan for an ETS. Focus on deforestation
Rio de Janeiro	ca. 33%	N/A	72	ETS plan with advanced design but launch delayed indefinitely
Sao Paulo	ca. 15%	20% below 2005 levels by 2020	139	Intention to set up an ETS but very early stage of the design

Source: CA Cheuvreux

CARBON DISCLOSURE PROJECT REPORTING – EMISSIONS IN BRAZIL (TCO₂ – EQ.)

Company	Country	GICS Industry	GICS Sub-Industry	Scope 1	Scope 2	Total emissions (Scope 1 & 2)	% of emissions
Petrobras	Brazil	Oil, Gas & Consumable Fuels	Integrated Oil & Gas	53 204 207	756 777.9	53 960 985	88.2%
VALE	Brazil	Metals & Mining	Diversified Metals & Mining	14 205 594	840 716.1	15 046 311	75.3%
Iberdrola	Spain	Electric Utilities	Electric Utilities	13 449 502	204 191	13 653 693	29.6%
Norsk Hydro	Norway	Metals & Mining	Aluminum	1 311 335	15 390	1 326 725	11.9%
Arcelor Mittal	Luxembourg	Metals & Mining	Steel	15 348 093	142 869	15 490 962	8.4%
Imerys	France	Construction Materials	Construction Materials	150 801	59 205	210 006	6.9%
Alcoa Inc.	US	Metals & Mining	Aluminum	2 686 007	218 150	2 904 157	6.5%
Anglo American	UK	Metals & Mining	Diversified Metals & Mining	842 260	224 983	1 067 243	5.3%
Ahlstrom Corporation	Finland	Paper & Forest Products	Paper Products	8 321	41 722	50 043	5.2%
GDF Suez	France	Multi-Utilities	Multi-Utilities	5 527 527		5 527 527	4.9%

Source: Carbon Disclosure Project, CA Cheuvreux

■ Chile

The energy ministry conducted a study last year to evaluate the opportunities to launch a carbon cap-and-trade system. Chile currently emits ca. 60 million tonnes of CO₂ est. per year, and has set a voluntary target of reducing its GHG emissions 20% below BaU levels by 2020. **The study suggested to launch a pilot phase from January 2013 to the end of 2014, directly followed by a first five-year compliance period between 2015 and 2020.** The Energy ministry recommended the inclusion in the ETS of the **entire energy sector, including transport, utilities and power generators.**

However, **no steps seem to have been taken since the study to implement such a scheme.** The government launched in February 2012 its National Energy Strategy for 2012 to 2030, which highlights the key role to be played in the coming years by fossil fuels (including coal) in the country's electricity generation, instead of mentioning any clear Climate Change strategy.

CARBON DISCLOSURE PROJECT REPORTING – EMISSIONS IN CHILE (TCO₂ – EQ.)

Company	Country	GICS Industry	GICS Sub-Industry	Scope 1	Scope 2	Total emissions (Scope 1 & 2)	% of emissions
Antofagasta	UK	Metals & Mining	Diversified Metals & Mining	529 560	764 811	1 294 371	100.0%
Teck Resources Limited	Canada	Metals & Mining	Diversified Metals & Mining	1 150 301	189 481	1 339 782	45.4%
Endesa	Spain	Electric Utilities	Electric Utilities	4 194 371	4 298	4 198 669	10.7%
BHP Billiton	Australia	Metals & Mining	Diversified Metals & Mining	820 536	3 254 185	4 074 721	8.9%
Anglo American	UK	Metals & Mining	Diversified Metals & Mining	904 065	591 539	1 495 604	7.5%
GDF Suez	France	Multi-Utilities	Multi-Utilities	4 536 658	75 787	4 612 445	4.1%
ENEL SpA	Italy	Electric Utilities	Electric Utilities	4 131 269		4 131 269	3.5%
Xstrata	Switzerland	Metals & Mining	Diversified Metals & Mining	181 105	514 145	695 250	2.8%
Suez Environnement	France	Multi-Utilities	Multi-Utilities	4 801	103 415	108 216	1.6%

Source: Carbon Disclosure Project, CA Cheuvreux:

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