Greenhouse Gas Emissions: still trading after all these years

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Economics Section

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**Acronyms**

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAU</td>
<td>Assigned Amount Units</td>
</tr>
<tr>
<td>CCX</td>
<td>Chicago Climate Exchange</td>
</tr>
<tr>
<td>CER</td>
<td>Certified Emissions Reduction Units</td>
</tr>
<tr>
<td>CDM</td>
<td>Clean Development Mechanism (under the Kyoto Protocol to the UNFCCC). CERs are generated by CDM projects.</td>
</tr>
<tr>
<td>CO₂</td>
<td>Carbon Dioxide</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>EU ETS</td>
<td>European Union Emissions Trading Scheme</td>
</tr>
<tr>
<td>ERU</td>
<td>Emission Reduction Units</td>
</tr>
<tr>
<td>GFC</td>
<td>Global Financial Crises</td>
</tr>
<tr>
<td>GHG</td>
<td>Greenhouse Gas</td>
</tr>
<tr>
<td>JI</td>
<td>Joint Implementation Mechanism (under the Kyoto Protocol to the UNFCCC) ERUs are generated by JI projects</td>
</tr>
<tr>
<td>Kyoto Protocol</td>
<td>A protocol to the UNFCCC. Sets up the CDM and JI mechanisms and specifies emissions targets for signatory countries.</td>
</tr>
<tr>
<td>MtCO₂e</td>
<td>Million tone Carbon Dioxide Equivalent</td>
</tr>
<tr>
<td>N₂O</td>
<td>Nitrous Oxide</td>
</tr>
<tr>
<td>RGGI</td>
<td>Regional Greenhouse Gas Initiative</td>
</tr>
<tr>
<td>UN</td>
<td>United Nations</td>
</tr>
<tr>
<td>UNFCCC</td>
<td>United Nations Framework Convention on Climate Change</td>
</tr>
<tr>
<td>WCI</td>
<td>Western Climate Initiative</td>
</tr>
<tr>
<td>$USm</td>
<td>Million US dollars</td>
</tr>
</tbody>
</table>
Introduction

In Australia, support for emissions trading appears to have declined in importance as the main method of addressing the problems caused by increasing emissions of greenhouse gases (GHG).\(^1\) The former Rudd Government deferred the proposed emissions trading scheme, the Carbon Pollution Reduction Scheme to at least 2013 due to the slow progress of global emissions control efforts and the political difficulty of gaining Senate approval for this scheme.\(^2\) The current Australian government has, to date, promised no more than to work towards the introduction of a carbon price over an undefined time frame.\(^3\) Judging by Australian actions and attitudes alone emissions trading schemes no longer seem the preferred method for dealing with GHG emissions.\(^4\) This trend was reinforced internationally with a number of comments in early 2010 proclaiming the ‘death’ of emissions trading.\(^5\) In the wake of the recent US mid-term elections (with reduced numbers of Democrat members of Congress) President Obama has suggested that a cap-and-trade scheme is ‘just one way of skinning the cat; it was not the only way’ and that he is going to look for other ways of dealing with GHG emissions.\(^6\)

Against this rather gloomy background this Note surveys recent emissions trading developments and updates information presented in a previous Library Background Note from 2008.\(^7\)

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1. Generally, greenhouses gases are carbon dioxide (CO2) and the five other gases mentioned in Annex 1 to the Kyoto Protocol to the United Nations Convention on Climate Change. They are methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs, a class of gases containing carbon, hydrogen and fluorine), perfluorocarbons (PFCs, a class of gases containing carbon and fluorine), and sulphur hexafluoride (SF6).
The Global Carbon Market

Recent global carbon market statistics suggest that the practice of emissions trading is in rude health. Since 2005, the global carbon market has continued to expand, as the following table illustrates:

<table>
<thead>
<tr>
<th>Year</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume MtCO₂e</td>
<td>717</td>
<td>1745</td>
<td>2984</td>
<td>4836</td>
<td>8700</td>
</tr>
<tr>
<td>Value ($USm)</td>
<td>11 057</td>
<td>31 235</td>
<td>64 035</td>
<td>126 345</td>
<td>143 735</td>
</tr>
</tbody>
</table>

Source: Kossoy and Ambrosi

The volume of greenhouse gases permits traded has roughly doubled in each year since 2005. The value of this trade followed the same pattern until the 2009 year, when overall emissions permits prices fell dramatically due to the economic downturn. However, the overall volume of emissions permits traded continued to increase during this downturn. This suggests that emissions trading is alive and well and that any notions of the demise of such markets is premature.

Compliance and voluntary markets

Such markets can be divided into two broad types: compliance markets where participants are required by law to participate, and voluntary markets, where there is no government backed compulsion to participate. The following table shows the recent differences in these two market types.

<table>
<thead>
<tr>
<th>Year</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compliance Volume MtCO₂e</td>
<td>327</td>
<td>1124</td>
<td>2085</td>
<td>3186</td>
<td>7165</td>
</tr>
<tr>
<td>Compliance Value ($USm)</td>
<td>7967</td>
<td>24 661</td>
<td>49 289</td>
<td>100 907</td>
<td>120 770</td>
</tr>
<tr>
<td>Voluntary Volume MtCO₂e</td>
<td>373</td>
<td>596</td>
<td>659</td>
<td>578</td>
<td>479</td>
</tr>
<tr>
<td>Voluntary Value ($USm)</td>
<td>2675</td>
<td>6129</td>
<td>8267</td>
<td>7882</td>
<td>5423</td>
</tr>
</tbody>
</table>

Sources: Kossoy and Ambrosi

In the above table the term ‘compliance markets’ refers to emissions trading markets where a specific government sanction applies to specified firms who do not meet the scheme’s

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8. The term CO₂e stands for carbon dioxide equivalent; which is the amount of carbon dioxide (CO₂) and/or non-CO₂ greenhouse gases that equal the global warming potential of an equivalent amount of carbon dioxide over a 100 year timeframe.


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requirements. In this table such schemes are the European Union’s Emissions Trading Scheme, the New South Wales Greenhouse Gas Abatement Scheme and from 2008, the Regional Greenhouse Gas Initiative (RGGI) based on ten north-eastern states in the United States of America.

The ‘voluntary markets’ are not without sanctions on their participants, but they are not subject to specific government enforced sanctions. In this table such markets include the Chicago Climate Exchange (CCX), the trade in Assigned Amount Units (AAU) (from 2008), and the trade in units issued under the flexibility mechanisms set up under the Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC) such as Certified Emissions Reduction Units (CER) and Emission Reduction Units (ERU), as well as various other voluntary schemes. Of course, these greenhouse gas emissions trading schemes were not the only ones operating during this time, just the major ones.

A major point to be drawn from Table 2 is the decline of the voluntary markets from 2007. This decline was especially evident in the case of the CCX and other purely voluntary markets. While the recent global financial crises (GFC) may have accelerated this trend; the CCX’s decline is linked to both the lack of meaningful action by the US at a federal level to introduce emissions trading scheme and problems with the acceptance of the CCX’s main trading unit – the Carbon Financial Instrument in emerging trading schemes in the US. In contrast, the compliance markets continued to increase in terms of both volume and value traded. Part of this was the commencement of the RGGI in 2008, but the major cause was the growth in the EU ETS activity. Overall, compliance markets appear to be gaining importance while the voluntary sector declines.

13. Some of these voluntary schemes include Japan’s Keidanren Voluntary Action Plan on the Environment, the US EPA Climate Leaders Program (closing in the near future), the Canadian GHG Clean Start Registry program, and the Australia’s Greenhouse Challenge Plus (now closed)
14. A notable omission from the above table is the Acid Rain Program in the United States. However, it is not, strictly speaking, a greenhouse gas emissions trading scheme. Other emissions reduction schemes omitted from the above table are those run by the Canadian provinces of Alberta and Nova Scotia, as they are offset schemes with no trading of emissions credits purchased or generated and surrendered by participants. Similar schemes run by the US states of Oregon and Washington are also omitted.
15. The pure voluntary market is operated on an ‘over the counter’ basis. Various organisations create emissions credits, via various emissions abatement projects (such as forestry, waste management or renewable energy) that meet one or more standards (the most popular are the Voluntary Carbon Standard (VCS), the Climate Action Reserve (CAR), the ‘Gold Standard’ or the standard required by the CCX). Corporates and individuals are the main buyers of these emissions credits. They may be traded on the above mentioned voluntary trading schemes. For further information see K Hamilton, M Sjardin, M Peters-Stanley, T Marcello, Building bridges: state of the voluntary carbon markets 2010, Ecosystems Marketplace and Bloomberg New Energy Finance, 14 June 2010, viewed 5 November 2010, http://www.forest-trends.org/publication_details.php?publicationID=2433
Developments since 2008

New Zealand

Since 2008, New Zealand has had an operating emissions trading scheme initially covering the forestry sector. With the passing of the *Climate Change Response (Moderated Emissions Trading) Amendment Act 2009* (NZ) on 25 November 2009 the details of this scheme were finalised. From 1 July 2010, the stationary energy, fishing, industrial processes and liquid fossil fuels sectors were covered by this scheme. Synthetic gases and waste disposal will be covered in 2013. The agriculture sector will be covered from 1 January 2015. When fully implemented emissions of all six of the above mentioned greenhouse gases from these sectors will be controlled by this scheme.

There are two notable features of this scheme. The first is that there is no set national emissions limit (or cap). The second is that the emissions permits are initially directly purchased from the NZ Government at a set price of NZ$25 per permit. These two features are not normally present in a cap-and-trade scheme. This scheme will be reviewed in 2011.  

Switzerland

A Swiss Emissions Trading Scheme took effect on 1 January 2008, at the same time that a CO₂ tax was introduced. Essentially affected Swiss companies can either pay a CO₂ tax, or participate in an emissions trading scheme. Those companies that participate in the trading scheme are exempted from the CO₂ tax (which ranges from Swiss francs 12 to 36 per tonne of CO₂).

Emission allowances are freely allocated to participating companies. The number of allowances issued equals the affected company’s emissions limit. From 2008, emission allowances equivalent to the amount of CO₂ emitted (whether above or below the participating companies emissions limit) have to be surrendered annually. Spare allowances can be sold. Where non-compliance occurs (that is, where the adequate number of emissions allowances is not surrendered) the CO₂ tax is paid retrospectively for each tonne of CO₂ emitted not covered by surrendered permits.

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The scheme covers energy intensive sectors such as cement, paper and pulp, glass and ceramics industries. Emissions credits generated by the project-based flexibility mechanisms of the Kyoto Protocol (see below) can be surrendered in place of the Swiss emissions allowances.  

A 2009 report from the Swiss Federal Office for the Environment shows that companies emitted only about 2.6 million tonnes of CO$_2$, falling well below the total permissible quantity of 3.1 million tonnes. That said, the scheme is small and few permit trades occur. 

The Swiss parliament is currently debating the revision of the Swiss scheme to make it more compatible with the EU ETS. The European Commission and the Swiss government have commenced discussions on linking the Swiss scheme with the EU ETS. 

United States 

Commencing operations on 1 January 2009 the Regional Greenhouse Gas Initiative (RGGI) is the first mandatory cap-and-trade program in the US for CO$_2$. Currently, ten north-eastern and mid-Atlantic US states participate. 

RGGI sets a cap on emissions of carbon dioxide from power plants in participating states, and allows affected firms to trade emission allowances. The program began by capping emissions at 2009 levels, and seeks to reduce covered emissions by 10 per cent over 2009 levels by 2018. Emitters continuously monitor and report their emissions, and penalties for non-compliance are enforced according to each participating state’s rules. Member states have agreed to each set aside at least 25 per cent of their emission allowances for public benefit purposes, such as promoting renewable energy and energy efficiency or mitigating possible increases in consumer energy prices. In practice, apparently 80 per cent of auction revenues are so spent. The RGGI also allows the use of offset projects (that is, projects generating emissions credits) for compliance, but these projects must meet

24. Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont. The following states/provinces have RGGI observer status: Pennsylvania, District of Columbia, Québec, New Brunswick and Ontario (the latter three are Canadian provinces). Québec and Ontario have passed enabling legislation for cap-and-trade schemes.
strict standards to ensure the offset’s quality. The number of offsets accepted by the scheme is limited to 3.3 per cent of an individual participant’s liability, to ensure that significant emissions reductions occur. A recent report has noted that CO₂ emissions in the RGGI area have declined by 33 per cent since 2005, largely due to this scheme.

EU ETS Phases II and III

The European Union’s Emissions Trading Scheme (EU ETS) is currently the main driving force in the global carbon market. How this scheme develops will affect the global carbon market for some years to come. Briefly, the caps or emissions limits of this scheme are reducing, the number of emission allowances or permits sold at auction is increasing and the coverage of the scheme is expanding. An increased number of Kyoto Protocol sourced emission credits will be used under the EU ETS.

The EU ETS is now in its second phase. European GHG emissions covered by the scheme have begun to reduce significantly, though a large part of recent falls have been due to the effects of the recent GFC. About 2 billion allowances (emissions permits) are issued each year. From 2010 onwards, the number allowances issued is to reduce by 1.74 per cent annually through to 2013.

At the beginning of Phase III (2013–2021), the annual number of permits issued will again be about 2 billion (to allow for the expanded coverage of this scheme), again to be reduced by about 1.74 per cent annually in the following years (that is, by about 37 million in 2014). Each emissions permit is equal to one tonne of CO₂. Thus the EU is aiming to reduce the overall emissions limits covered by the scheme by about 37 million tonnes annually.

During Phase III the bulk of emissions permits will no longer be freely given to industry, but be auctioned by participating states. Various sectors covered by the scheme must start by purchasing

20 per cent of their emissions permits at auctions in 2013. That rate will rise gradually to 70 per cent in 2020, with a view to reaching 100 per cent in 2027. Power producers will be obliged to acquire all of their emissions allowances at auctions so as to prevent windfall profits. Any increase in auctioning increases the scheme’s impact on emitters.

To facilitate the transition to low-carbon fuels for countries with high dependence on fossil fuel or insufficient connection to the European electricity network, a limited concession is available. Ten EU member states can apply for reduced auctioning rates in power production. Where this concession applies at least 30 per cent of the required permits will have to be bought at auction in 2013, gradually rising to 100 per cent in 2020 or later years. But recipients of this concession must invest in clean technology to the market value of the permits freely received.

Each EU or participating state will determine the use of its revenues from auctioning the permits. The Commission recommends (but not requires) that at least half of the proceeds from the scheme received by EU members are used to fight climate change in the EU and abroad and also to alleviate the social consequences of moving towards a low-carbon economy.

The coverage of the EU ETS will expand. From 2013, the scheme will be extended to also include other sectors and greenhouse gases. CO₂ emissions from petrochemicals, ammonia and aluminium will be included, as will nitrous oxide (N₂O) emissions from the production of nitric, adipic and glycolalicy acid production and perfluorocarbons from the aluminium sector. The capture, transport, and geological storage of all greenhouse gas emissions will also be included in the scheme. Firms will be able to acquit their liabilities if they undertake these actions in respect of their own emissions. These new sectors will receive allowances free of charge according to EU-wide rules, in the same way as other industrial sectors already covered (that is, an increasing amount of allowances will have to be purchased by auction). As of 2012, aviation will also be included in the EU ETS. While smaller facilities may be exempted from the scheme from 2013 they may only be excluded if they adopt other measures that will achieve a contribution to emission reductions equal to their emissions.
China

China has a number of established regional emissions trading arrangements. Chinese agencies have been investigating the concept of emissions trading for the control of sulphur dioxide emissions since the 1980s. A number of trial and research emissions trading schemes were set up in the 1990’s. In 2001, experimental emissions trading commenced in four provinces (Shang-dong, Shanxi, Suzhou and Henan), three cities (Shanghai, Tianjing and Niuzhou), and in one power production company (Hua-Neng Group). This is commonly known as 4+3+1 programme. Further, China currently has eight other environmental exchanges in operation, the latest commencing in June 2010. Generally, these exchanges are pilot schemes, with participation on a voluntary basis with no central government role. They appear to be based on regional stock exchanges. Though China is gaining a great deal of emissions trading experience through these schemes it should be kept in mind that its main policy instruments are direct controls and increased amounts of electricity sourced from renewable energy.

Japan

Japanese industry has operated a voluntary emissions trading scheme since 2005. Japan has established regionally-based emissions trading schemes covering the Tokyo area. A second scheme will commence operation in Saitama province in April 2011. These schemes will be linked from 2012.

Kyoto Protocol schemes

There exists a substantial market in emissions units set up under the UNFCCC, and particularly the Kyoto Protocol to that convention. Briefly, parties with commitments under the Kyoto Protocol have accepted targets for limiting or reducing emissions. These targets are expressed as levels of allowed emissions, or ‘assigned amounts’ over the 2008–2012 commitment period. The allowed emissions are divided into ‘assigned amount units’ (AAUs). Countries with spare AAUs can sell them either to

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38. ‘China’s eighth environmental exchange opens’, People’s Daily Online, 3 June 2010, viewed 21 September 2010, http://english.peopledaily.com.cn/90001/90776/90882/7010194.html The eight exchange to open was in Dalian, a coastal city in Liaoning Province. Exchanges in Beijing, Shanghai, Tianjin, Hebei, Yunnan, Shanxi and Hubei have operated similar exchanges since August 2008.
third parties or to other countries whose emissions exceed their Kyoto target. Eastern European
countries, particularly Russia, have a large number of surplus AAUs. Countries with these
commitments meet them by surrendering AAUs or other Kyoto Protocol emission units to the UN.42

Other emission units are generated by projects undertaken under the Protocol’s Clean Development
Mechanism (CDM) or Joint Implementation mechanism (JI). Further, ‘removal units’ are recognised
under the protocol as arising from forestry and other land use activities, but are not actively traded.
The main emission units traded are:

• AAUs

• Certified Emissions Reductions Units (CER) under the CDM, and

• Emission Reduction Units (ERU) under the JI.

The following table shows the volumes and values of the trade in these units between 2005 and
2009.

<table>
<thead>
<tr>
<th>Year</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAU (MtCO₂e)</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>23</td>
<td>155</td>
</tr>
<tr>
<td>AAU ($USm)</td>
<td>276</td>
<td>2,003</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary CDM (MtCO₂e)</td>
<td>341</td>
<td>537</td>
<td>552</td>
<td>404</td>
<td>211</td>
</tr>
<tr>
<td>Primary CDM ($USm)</td>
<td>2,417</td>
<td>5,804</td>
<td>7,433</td>
<td>6,511</td>
<td>2,687</td>
</tr>
<tr>
<td>JI (MtCO₂e)</td>
<td>11</td>
<td>16</td>
<td>41</td>
<td>25</td>
<td>26</td>
</tr>
<tr>
<td>JI ($USm)</td>
<td>68</td>
<td>141</td>
<td>499</td>
<td>367</td>
<td>354</td>
</tr>
<tr>
<td>Total (MtCO₂e)</td>
<td>352</td>
<td>553</td>
<td>593</td>
<td>452</td>
<td>392</td>
</tr>
<tr>
<td>Total ($USm)</td>
<td>2,485</td>
<td>5,945</td>
<td>7,932</td>
<td>7,154</td>
<td>5,044</td>
</tr>
</tbody>
</table>

Source: Kossoy and Ambrosi43

Despite the recent decline in the size of the Kyoto Protocol market it is still large and operating. As
the end of the Kyoto Protocol’s first commitment period nears (2012), the trade in AAUs is expected
to increase.

But, there are some worrying trends. The recent decline in this market’s turnover has been
attributed to:

• the increasing amount of time taken to have either CDM or JI projects approved and the units
  issued. This is primarily caused by the relevant UN agency being under resourced for the task at
  hand

• the GFC, as project developers and financiers seeking lower risk investments

42. UNFCCC, ‘Emissions Trading’ UNFCCC website, viewed 25 October 2010,
http:// unfccc.int/kyoto_protocol/mechanisms/emissions_trading/items/2731.php
43. A Kossoy (K Coopor in 2009 and earlier years) and P Ambrosi, op. cit.
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- lower emission unit prices reducing returns from these projects. It is not as attractive as it once was to undertake these projects

- the exhaustion of low risk, technically simple, project opportunities. That is, the low-hanging fruit has been picked. This issue, and the first three issues noted above, have led to the supply of new projects has been far lower than in previous years

- some doubt about the environmental effectiveness of some CDM and JI projects, and

- uncertainty over the long term demand due to:
  - the large oversupply of Kyoto protocol emissions units, particularly AAUs
  - the lack of national emissions trading schemes in the US and Australia (which reduces the potential demand for Kyoto Protocol units)
  - the lack of a new UNFCCC agreement after the end of the Kyoto Protocol commitment period (that is, after 2012)
  - the restricted use of the CDM and JI units in the European Union’s emissions trading scheme, and
  - the success that some countries (such as Australia) have had in meeting their Kyoto Protocol commitments without the need to purchase additional units.  

These problems should not obscure the fundamental point that the Kyoto Protocol trading schemes are existing international arrangements that can be used to link various national schemes. They also facilitate the transfer of capital to the developing world for projects benefiting the whole world. Further, they also provide an opportunity to undertake GHG emissions reduction or absorption projects at the lowest possible cost. Such advantages should not be lightly cast aside.

**Proposed schemes**

**Canada**

In March 2008 the Canadian government outlined a baseline-and-credit trading scheme. Its targets are expressed in terms of emissions intensity rather than absolute limits (initially to apply from 2010), which may lead to absolute reductions in emissions of GHG emissions from industry by 2020, based on 2007 growth forecasts.  
During the period 2020–2025 the Canadian Government intends to move to a cap-and-trade approach. The stated reason is to take account of the emissions trading

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schemes developing elsewhere in North America (particularly at the federal level). Obviously, with the recent rejection of emissions trading legislation by the US Congress, Canada’s plan to link into any US national trading scheme will be, at best, delayed for a considerable period of time. Canada’s emissions trading policy, at a federal level, seems tied to that of the United States. But individual provinces are participants or observers in the mainly US-based regional initiatives.

China

Press reports indicate that China is planning to pilot additional domestic emissions trading schemes in selected regions, for selected economic sectors, from 2015 as part of next five year plan (2011–2016). Few details are available at this stage but these exchanges will be set up on a stand-alone basis and not part of existing stock exchanges. Reportedly, the Chinese province of Guangdong is planning to introduce a carbon trading mechanism and Hebi province has volunteered for a carbon trading scheme. Again, few details are available at this stage.

Japan

The Japanese government has released a draft outline of a nationwide mandatory GHG emissions trading scheme (amongst other measures) to commence operation in April 2013. The proposed scheme will cover companies that have at least one facility emitting 10,000 tonnes or more of CO₂ per year. About 4,000 businesses are affected by the trading proposal. Legislation to implement this scheme has been passed by Japan’s lower house but it has not yet been considered by the upper house. The government has now resubmitted this legislation to the Japanese parliament.

India

The Indian government is considering setting up a nation-wide cap-and-trade scheme. It will test the concept with two pilot schemes in the states of Gujarat and Tamil Nadu. If these pilot schemes are

48. A Ochs and H Ma (Worldwatch Institute), ‘China’s cap-and-trade push’, *Climate Spectator Online*, 14 September 2010. This was only one of a number of articles from different sources reporting this announcement by National Development and Reform Commission Deputy Director Xie Zhenhua.
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successful other states would set up their own schemes and eventually create a nation-wide arrangement. India is also considering two other related trading schemes:

- the Perform Achieve and Trade (PAT) mechanism for trading energy efficiency certificates is expected to become operational in 2011, with an initial commitment period of three years. The scheme will cover 714 installations in nine energy-intensive sectors. By 2014 the scheme is expected to generate 98 million tonnes of CO₂ in emission reductions per year, and

- the Renewable Energy Certificate (REC) mechanism is intended to support an increase in installed renewable capacity from 15 to 65 Giga-watts in five years and is expected to become operational in 2011. RECs will only be issued to renewable energy generators, but will be freely tradable. RECs will be traded through regulator-approved power exchanges, within a set price band.

United States

Though without a national GHG emissions trading scheme, the United States is seen as the home of emissions trading. The concept originated in this country and it continues to have the highest number of operating schemes.

The Western Climate Initiative (WCI) is a collaboration among seven states and four Canadian provinces that addresses climate change through a regional cap-and-trade program and other measures. Recently, Californian voters voted to continue with the implementation of an emissions trading in that state that will eventually link into the WCI. Other WCI participants, such as the state


53. A Kossoy and P Ambrosi, op. cit., p. 34

54. For information on these schemes see US Environmental Protection Agency (EPA), Clean Air Markets, EPA website, viewed 9 November 2010, http://www.epa.gov/airmarkt/index.html

55. See United States Government Accounting Office, Briefing to ranking member, House Committee on Oversight and Reform, Carbon trading – current situation and oversight – consideration for policy makers, 19 August 2010, viewed 19 October 2010, http://www.gao.gov/new.items/d10851r.pdf Members of the Initiative are Arizona, California, New Mexico, Oregon, Washington Utah and Montana as well as the Canadian Provinces of British Columbia, Québec, Ontario and Manitoba. The WCI now represents approximately 73 per cent of Canada’s economy and 20 per cent of America’s economy. Observes to this Initiative are: the US states of Alaska, Colorado, Idaho, Kansas, Nevada and Wyoming as well as the Canadian province of Saskatchewan. Mexican state observes are Baja California, Chihuahua, Coahuila, Nuevo Leon, Sonora and Tamaulipas. The importance of noting the full list of observers is that it indicates potential members of this, and other, regional arrangements.

56. C Whetzel, ‘California voters reject measure to stall implementation of state global warming law’, World Climate Change Report, 3 November 2010, viewed 4 November 2010,
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of New Mexico and the province of British Columbia have begun the process of setting up their own emissions trading schemes to be part of this initiative.\(^{57}\) These developments dramatically increase the likelihood that the WCI will commence operation in 2012.

The Midwestern Greenhouse Gas Reduction Accord is an agreement among six mid-western states and one Canadian province to establish a greenhouse gas reduction program.\(^{58}\) However, the Accord’s progress appears to be languishing.\(^{59}\) Whether the recent progress of the WCI reignites the Accord remains to be seen.

Other countries

Media reports indicate that Taiwan is planning to introduce a pilot domestic emissions trading scheme, with details to be released by the end of 2010.\(^{60}\) A number of South American countries also appear to be considering the introduction of a domestic emissions trading scheme.\(^{61}\) Reportedly, Ukraine has invited Belarus, Russia and the Kazakhstan to participate in a cap-and-trade scheme though such a scheme is some years away from realisation.\(^{62}\) Finally, South Korea is finalising the design of its own emissions trading scheme.\(^{63}\)

Conclusions

Emissions trading is not dead. Nor is it sleeping. That it has slipped from the Australian policy spotlight does not mean that the rest of the world takes the same attitude. Linking Australia’s GHG emissions reductions to the rest of the world will require linking to some of the above schemes.


\(^{58}\) Members of the Accord are the US States Illinois, Iowa, Kansas, Michigan, Minnesota, and Wisconsin, as well as the Canadian Province of Manitoba. Observes to the Accord are Indiana, Ohio, Ontario (Canadian Province) and South Dakota. Wisconsin has introduced legislation to establish a cap-and-trade scheme.


\(^{61}\) V Volcovici, ‘Chile to weigh options for domestic ETS’, Point Carbon, 9 September 2010; ‘Fragmented carbon market develops in Latin America’, Point Carbon, 9 September 2010 and A Kossoy and P Ambrosi, op. cit., p. 32.


\(^{63}\) S Reklev, ‘South Korea readies ETS rules’, Point Carbon, 8 November 2010.
Yet a distinct trend is noticeable. Instead of striking a grand global bargain, individual countries and regions have been busy either planning, implementing or expanding their own trading schemes. This represents a ‘bottom-up’ solution to introducing emissions trading on a global scale through the capacity of such schemes to link to other regimes. For example, both the EU ETS and the New Zealand scheme have this capacity. Further, many of these schemes are already linked by the acceptance of CERs and EAUs arising from the Kyoto Protocol schemes noted above. It may be messy and inconsistent but these developments hold out the possibility that global emissions trading will occur by default, rather than by any grand international bargain. And such linking may well reduce the overall cost of reducing GHG emissions if adopting the emissions trading approach.  

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Appendix A – Major operating greenhouse gas emissions trading schemes

The above developments indicate that the number of emissions trading schemes continues to increase. The following table summarises the main features of major existing GHG emissions trading schemes. In this table the following terms mean:

- Cap-and-trade means an aggregate cap (or limit) on emissions made within a particular area is established. This overall cap is progressively reduced over time towards the long term emissions target. Individual emitters are then given a limit on their particular emissions, within this overall cap. Emissions permits are distributed to each participant in line with that entity’s emissions limit. Participants surrender permits covering their emissions. These participants are then allowed to trade their permits amongst themselves and third parties, to either cover their emissions above their permitted limits, or to sell surplus permits

- Baseline-and-credit means a trading scheme where, generally, participants receive permits to cover their emissions above a set baseline. Participants surrender enough emissions permits to cover their emissions above their particular baseline. Third parties create emissions offsets that can be purchased to cover any excess emissions above the baseline.

Table 4: Major emissions trading schemes

<table>
<thead>
<tr>
<th>Country</th>
<th>Scheme Name</th>
<th>Scheme Type</th>
<th>Compliance or Voluntary</th>
<th>Coverage</th>
<th>Outcomes</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>NSW Greenhouse Gas Abatement Scheme</td>
<td>Baseline-and-credit</td>
<td>Compliance for power generators, retailers and large consumers. Other participants have elected to join the scheme.</td>
<td>NSW and ACT, six greenhouse gases mentioned in Kyoto Protocol</td>
<td>Emissions reduced, but not by as much as claimed(^{65})</td>
<td>Will cease operation if and when a national trading scheme commences operation. Energy efficiency component continues after this point.</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>Country</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Europe</td>
<td>European Union Emissions Trading Scheme</td>
<td>Cap-and-trade</td>
<td>Compliance</td>
<td>All European Union members plus three others. About 40 per cent of total European CO₂ emissions covered.</td>
<td>Emissions reducing since 2008, but majority of reductions due to depressed economic conditions.</td>
<td>The scheme is progressively lowering targets, expanding coverage and implementing full auctioning of permits. This should lead to further emissions reductions.</td>
</tr>
<tr>
<td>Japan</td>
<td>Japanese Voluntary Emissions Trading Scheme</td>
<td>Baseline-and-credit. Participants receive government subsidies to help fund emissions reductions.</td>
<td>Voluntary, though companies failing to reach targets have to return subsidies to government.</td>
<td>Firms volunteer to participate. Covers 45 per cent of Japan’s CO₂ emissions compared to 1990 levels.</td>
<td>Modest CO₂ emissions reductions achieved. Rates of emissions reduction accelerated in 2009, though this may be due to impact of economic downturn. Low</td>
<td>OECD is concerned that the voluntary approach is not cost effective and provides no incentive to reduce emissions beyond voluntary agreement. Low capacity of scheme to cope with risk and uncertainty.</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>New Zealand</td>
<td>New Zealand Emissions Trading Scheme</td>
<td>Cap-and-trade</td>
<td>Compliance</td>
<td>Being progressively implemented. From 1 July 2010 forestry, stationary energy, fishing, industrial processes and liquid fossil fuels sectors covered. All six Kyoto protocol gases covered from 2013. Agriculture included in 2015.</td>
<td>Too early to assess effectiveness.</td>
<td>New Zealand is the first country to legislate for a comprehensive trading scheme covering all six Kyoto protocol gases and wide coverage of economic sectors.</td>
</tr>
<tr>
<td>Switzerland</td>
<td>Swiss emissions</td>
<td>Baseline-and-credit (though</td>
<td>Compliance</td>
<td>Firms choose to participate to</td>
<td>Modest emissions</td>
<td>Possible linking with EU ETS</td>
</tr>
</tbody>
</table>

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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>Regional Greenhouse Gas Initiative</td>
<td>Cap-and-trade</td>
<td>Compliance</td>
<td>CO₂ emissions of fossil fuel-fired power plants 25 megawatts or greater in size in 10 North Eastern and Mid Atlantic US states (currently 209 facilities region-wide)</td>
<td>CO₂ emissions in the RGGI region have declined from approximately 184.4 million tons in 2005 to 123.7 million tons in 2009, or 33 percent.</td>
<td>RGGI emissions permit price currently around US$1.90, which is close to, if not at, the scheme’s floor price.</td>
</tr>
<tr>
<td>United States</td>
<td>Clean Development</td>
<td>Baseline-and-</td>
<td>Voluntary</td>
<td>Projects only in developing</td>
<td>Operational since 2006. According</td>
<td>Beset by administrative problems and doubts about</td>
</tr>
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70. New York State Government, Energy Research and Development Authority, op. cit.
<table>
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<tbody>
<tr>
<td>Nations</td>
<td>Mechanism</td>
<td>credit</td>
<td></td>
<td>countries, potentially all six Kyoto Protocol GHGs</td>
<td>to the CDM Executive Board there are 2,456 registered projects and about 489 million CERs issued. About 1,840 million CERs are expected to be issued by 2012. Each CER represents one tonne of CO$_2$e avoided emissions.(^{71})</td>
<td>the effectiveness of some CERs issued.</td>
</tr>
<tr>
<td>United Nations</td>
<td>Joint Implementation Mechanism</td>
<td>Baseline-and-credit</td>
<td>Voluntary</td>
<td>Projects in developed countries (potentially including</td>
<td>214 projects visible on JI website.(^{73}) Few projects approved to accelerate in period up to 2012.</td>
<td></td>
</tr>
</tbody>
</table>

\(^{71}\) UNFCCC, Clean Development Mechanism, UNFCCC website, viewed 27 October 2010, [http://cdm.unfccc.int/index.html](http://cdm.unfccc.int/index.html)

\(^{73}\) UNFCCC, Joint Implementation, JI Projects, UNFCCC website, as at 27 October 2010, [http://ji.unfccc.int/ProjectInfo.html](http://ji.unfccc.int/ProjectInfo.html) This number almost certainly this does not equal the total number of JI projects submitted for approval.
### Greenhouse Gas Emissions: still trading after all these years

<table>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Australia) but most commonly in so called economies in transition (i.e. Russia and Eastern Europe). Potentially all six Kyoto Protocol GHGs</td>
<td>date.</td>
<td></td>
</tr>
</tbody>
</table>

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