AETF review
Australasian Emissions Trading Forum

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A MILESTONE ON A LONG ROAD

The forthcoming UN Climate Change conference in Montreal will be a major milestone on the long road to effective global emission management as it will include the first meeting of the parties to the Kyoto Protocol. It is expected to be the largest climate change meeting since the Kyoto Protocol was adopted in 1997 with some 8000 – 10000 participants attending. As well as the official intergovernmental deliberations related to the Climate Change Convention and the Kyoto Protocol there will be over 90 side events reporting and discussing the full range of scientific, technological, commercial and policy developments related to climate change and emissions trading.

Our first article in this issue reviews what can be expected from this meeting on key issues such as the further development of the Kyoto market mechanisms and the start of negotiations on post Kyoto policies.

As well as being the host for this major international meeting, Canada is also demonstrating an ongoing commitment to emissions trading through the implementation of a trading program for large industrial sources. Canada has been a pioneer in piloting emissions trading approaches over a number of years and is now moving to a comprehensive national scheme. Our second article outlines the structure and implementation arrangements for the scheme.

Our third article presents the findings from an in-depth special report on Carbon Dioxide Capture and Storage (CCS), also known as geosequestration, by the Intergovernmental Panel on Climate Change. Our particular interest is on the costs and economic potential of CCS. Three key findings in this regard are that (i) the physical potential for CCS is substantial, (ii) CCS systems are unlikely to be deployed on a large scale in the absence of substantial limits on greenhouse gas emissions to the atmosphere, and (iii) deployment starts to be significant when carbon prices begin to reach US$25-30 per t CO_2.

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What Can Be Expected from the COP/MOP?

Tony Beck, AETF

From now on the regular annual UN Climate Change conference will be known as the COP/MOP.
The reason for this arcane UN acronym is that the conference will now involve parties to both the Kyoto Protocol as well as the ongoing UN Framework Convention on Climate Change. Canada will host the first Meeting of the Parties to the Kyoto Protocol (MOP1) in Montreal in conjunction with the eleventh session of the Conference of the Parties to the Climate Change Convention (COP11).

The Montreal conference will be an historic event marking the entry into force of the Kyoto Protocol. It is anticipated to be the largest intergovernmental climate conference since the Kyoto Protocol was adopted in 1997. Some 8,000–10,000 participants are expected to attend for both the official sessions and the extensive program of side events.
The conference will deal with a wide range of specific issues but in broad terms it will be focused on:

- Ensuring Kyoto and its market mechanisms work, and
- Determining what should follow Kyoto ie. Post 2012

Source: IISD

Ensuring the Kyoto market works

With the Kyoto commitment period approaching and emissions trading in place in Europe and under active development in several other countries, the state of the Kyoto emissions market is attracting unprecedented business interest. A focus at the COP/MOP will be the further development of the Kyoto market mechanisms, i.e. international emissions trading, the Clean Development Mechanism (CDM) and Joint Implementation (JI), to help Kyoto parties in meeting their commitments.

As things stand the supply of credits is tight making it a sellers market for any country or company that can generate good quality credits. Charles Cormier of the World Bank carbon finance business recently highlighted the extent of this sellers market pointing out that Western Europe, Japan and Canada together may need as many as 3.5 billion tonnes of CO_2 equivalent credits by 2012 to meet their commitments. He put the cost of acquiring those credits at €30 billion (US$36 billion) at recent prices.

Many in the market are looking to CDM to generate a reasonable proportion of the necessary credits from abatement projects in developing countries.
But project approvals have been slow with only about 30 projects so far approved and another 300 awaiting approval. The CDM Board and its clients have been pushing for a significant increase in resources to accelerate the approval rate and this will be a key issue for the COP/MOP.

Joint Implementation

An important new market development expected from the COP/MOP will be the establishment of the JI Supervisory Committee to facilitate and approve JI projects. Joint Implementation allows projects in Annex 1 (developed country) parties to generate salable emission credits known as “Emission Reduction Units” or ERUs. Unlike CDM where emission credits (CERs) can be generated from abatement prior to the Kyoto commitment period, credits from JI projects arise from abatement only within the commitment period (2008-2012).

Nevertheless, JI will provide an additional source of credits, particularly from abatement projects not otherwise covered by a domestic emissions trading framework. Currently eastern European countries, Russia and New Zealand are seen as the most prospective JI hosts. However, if Australia ever becomes a party to the Kyoto Protocol, Australian abatement projects would be expected to attract significant JI interest.

It is generally accepted that Australia has excellent potential to generate emission credits, particularly through forestry and land rehabilitation projects, and JI funding would promote the generation and marketing of these credits. In the late 1990’s there was considerable interest from major Japanese utilities and manufacturers, in investing in Australian forestry projects in the expectation that Australia would be a party to the Protocol and the resulting credits could be exported to assist Japan in meeting its Kyoto commitments.

Demand for credits from Japanese companies has continued to grow but they have had to look elsewhere to meet that demand. Tohoku Electric Power, for example, one of Japan’s largest electricity utilities, has recently confirmed that it will buy almost a million certified emissions credits from Honduran CDM projects.

What should follow Kyoto?

The Montreal COP/MOP will also see the formal beginning of the debate on next steps towards effective global management of greenhouse gas emissions. Various ideas have started to be floated that could ultimately contribute to a post-2012 outcome. Some key options, which are not necessarily mutually exclusive, include:

Extended emissions trading

A common view across a range of players is that future policies should be cost effective and market driven. There is widespread support for an approach that will provide a "price signal" to emitters although positions vary on how and when such an approach should develop. The EU favours an extension of the EU ETS and Kyoto approaches. Others are less supportive of the cap and trade approach although are vague about what alternative market structure they favour. A market with a cap on permit prices could be an option.

Backcasting

The concept of backcasting from a future global target to determine what needs to be done in the short and medium term is gaining currency. In some cases the future target is couched in terms of atmospheric concentrations of greenhouse gases, for example, limiting atmospheric concentrations to twice pre-industrial levels. In other cases it is in terms of global mean temperature rise, for example, limiting temperature rise to 2 degrees C.

Under various assumptions the trajectory for global, national and/or sectoral emissions that would be needed to meet a given target can be estimated.

Contraction and convergence

This concept has been promoted by the Global Commons Institute for a number of years but is gaining renewed relevance in the post-2012 debate. It sets a future target for atmospheric concentrations (contraction) to be achieved by working towards a convergence of per capita emissions across all countries. They claim that 'equal per capita shares' is the most equitable approach to determining when and how greenhouse gases should be abated. In effect, C&C would mean significant cuts in emissions in developed countries while some increase in per capita emissions for developing countries may be possible. The transition could be facilitated through a trading mechanism.

A sectoral approach

Taking a sectoral approach to future emission control could be a way to more effectively involve developing countries, an issue that threatens to bog down negotiations. Abatement measures, policies and/or targets would be developed for the major emitting sectors and would apply globally across developed and developing countries.

One approach could be to identify world's best practice for each sector and focus abatement efforts on those situations where emission rates are above that benchmark, whether those situations are in developed or developing countries. 'Sectoral' CDM could be used in developing countries to channel investment into the highest priority sectoral projects.

Technology to the rescue

Technology will play a fundamental role in future emission management. However, views vary widely on the role of new versus existing technology, how the development and adoption of new technology should be encouraged, and the timing of technology related action.

The EU favours an immediate market incentive to develop and adopt emission friendly technology. They argue that there is substantial scope for emission abatement using existing 'best practice' without having to wait for new technology to be available.

The US (and Australia) on the other hand favour an extensive publicly funded technology R & D phase to bring down the cost of emission friendly technology and thereby encourage its adoption in the future.

Progress?

Progress can be expected on Kyoto operational issues but it is unrealistic to expect agreement at this meeting on the post-Kyoto question. It is useful to bear in mind that negotiations on the Kyoto Protocol were initiated in 1995 (the Berlin Mandate), the framework was agreed in 1997 (the Kyoto Protocol), the details were (mostly) agreed in 2001 (the Marrakesh Accords), and it eventually came into force in 2005.

Using this Kyoto Protocol negotiation path as a guide it can be expected that at this early stage a wide range of options and negotiating positions will be tabled as ambit claims with little in the way of consensus emerging. What could emerge is a "Montreal Mandate" that would set the parameters for what is likely to be a protracted and at times, acrimonious, policy debate. The AETF will continue to monitor and report on this debate.

Tony Beck is Joint Coordinator of the AETF and will attend the COP/MOP as a member of the International Chamber of Commerce delegation.

Canada Moves on Domestic Emissions Trading

Erik Haites, Margaree Consultants

Steps to implement a greenhouse gas emissions trading program for large industrial sources are now underway in Canada. In July 2005 the government published a "Notice of intent to regulate greenhouse gas emissions by Large Final Emitters" under the Canadian Environmental Protection Act. Discussion papers on elements of the regulatory framework are expected to be released in late 2005 and early 2006. The proposed Large Final Emitter (LFE) regulations will be published following public consultations on the discussion papers. The final regulations are expected to come into force in 2007 so the program can begin on January 1, 2008.

Canada's 2005 climate change plan reaffirmed the government's intent to implement a trading program for the greenhouse gas emissions of large final emitters.[1] Over the previous 2.5 years work on design of the LFE program had been undertaken by Natural Resources Canada. The decision to implement the program using the Environmental Protection Act led to transfer of responsibility of the program to Environment Canada with almost completely new staff.

Firms covered

LFEs are firms in the thermal electricity, oil and gas, and mining and manufacturing sectors that have average annual GHG emissions per facility of 8 kt CO_2e or more and average annual emissions of 20kg CO_2e or more per C$1000 of output. LFEs include: electricity generators that use natural gas, oil or coal; firms engaged in oil and gas production, processing, transmission and distribution; chemicals; fertilizers; pulp and paper; mining; smelting and refining; aluminum; steel; cement; lime; and glass. Other manufacturing industries, such as assembly operations, are excluded.

The LFE program will cover about 700 firms.[2] They are responsible for almost half of Canada's greenhouse gas emissions. As usual, a minority of the firms, 80 to 90, are responsible for most, 85%, of the total emissions covered by the scheme. The projected average annual emission reduction by these sources for 2008-2012 is 45 $MtCO_2$e, down from 55 $MtCO_2$e in the 2002 climate change plan.

1 Government of Canada, 2005. *Moving Forward on Climate Change: A Plan for Honouring Our Kyoto Commitment,* www.climatechange.gc.ca/kyoto_commitments

2 An issue yet to be resolved is whether the participants are firms or facilities. A de minimis threshold of 20 or 50 kt CO_2e per year for a firm had been proposed by Natural Resources Canada.

LFEs will have mandatory emission intensity targets (tCO_2e per unit of physical output). Fixed process emissions will have a 0% reduction target for 2008-2012.[3] All other emissions will have a 15% intensity reduction target relative to a 2010 business-as-usual forecast, not to exceed a reduction of 12% of total emissions.[4] Emission intensity targets for large new facilities and existing facilities undergoing major transformations or expansions would be based on Best Available Technology Economically Achievable.

Compliance

LFEs will be able to comply by reducing their own emissions, buying credits from other LFEs, CDM credits (CERs), JI credits (ERUs), "greened" AAUs, domestic offset credits, or Technology Investment Units.[5] While LFEs will be able to use Kyoto units for compliance, they will not be able to exchange LFE credits for Kyoto units for sale internationally.

LFEs may buy Technology Investment Units at a cost of C$15/$tCO_2$e to a maximum overall contribution of 9 $MtCO_2$e per year for compliance.[6] Money from the sale of Technology Investment Units will go into a fund that will help finance research into, or the development or demonstration of, technologies or processes to reduce greenhouse gas emissions from industrial sources or to remove greenhouse gases from the atmosphere in the course of an industrial operation. Since LFEs should benefit from the technology development in the long run, they may prefer this compliance option over the purchase of credits even if the price of credits is lower.

Price assurance mechanism

The Government has committed to implement a "price assurance mechanism" to ensure that LFEs will be able to meet their regulatory obligations at

3 Some emissions, such as transportation emissions, may be excluded. Offset credits could be earned for reduction of excluded emissions.

4 Natural Resources Canada had proposed that the intensity targets decline by 3% per year from 106% of the 2010 target in 2008 to 94% of the 2010 target in 2012.

5 A participant's credit allocation will be calculated in terms of t CO_2e using the intensity target and its actual output during the year. Each credit will permit the owner to emit 1 t CO_2e during or after a specified year.

6 Thus the Fund will not exceed C$675 million. The government is not expecting emission reductions due to spending by the Technology Fund during 2008-2012.

a cost of no more than C$15/t$CO_2$e (estimated to be about US$10/t$CO_2$e) for the period 2008–2012. Details of this mechanism are not yet available. Natural Resources Canada had proposed that a participant that wished to use this mechanism would enter into an agreement for a maximum quantity prior to the start of the year. It would pay a premium (unspecified), like an insurance premium, for the price guarantee. To receive price guarantee units, the participant would pay the government $15 per credit for the lesser of the quantity needed to achieve compliance (after using all allocated units) and the maximum quantity agreed at the start of the year. Price guarantee units would not be tradable.

Credit for early action and industrial competitiveness are considered to be addressed by the emission intensity targets. No additional provisions are being considered. While not explicitly mentioned, it is expected that credit banking, but not borrowing, will be allowed. Accounting and tax treatment of credit purchases and sales have not yet been proposed. A penalty of no more than C$200 per tonne of excess emissions is proposed.

Federal/provincial implementation

The federal Government is prepared to negotiate equivalency or administrative agreements with interested provinces and territories to implement the LFE program in a manner that will ensure national consistency while allowing for a single regulator in any given jurisdiction.

Federal, provincial and territorial governments are working to develop a single, harmonized system for mandatory reporting of greenhouse gas emissions and related information. Participants will be required to report emissions and production data for a given calendar year by June 30 of the following year, leading to assessment of compliance by September 30, and a true up period ending on December 31.

Offset credits

The federal government also has launched public consultations on a proposed Offset System for greenhouse gases. It is designed to encourage cost-effective incremental reductions or removals (carbon storage) of greenhouse gases in activities not covered by federal greenhouse gas regulations. Projects are expected to include increased sequestration by forest and agricultural soil sinks, storage in geological reservoirs, reduction of landfill gas emissions, and emission reductions resulting from clean energy, demand-side management, and co-generation.

Some reductions/removals eligible to earn offset credits will not contribute to meeting Canada's Kyoto commitment. Emission reductions in other countries by Canadian firms engaged in cross-border trucking may be eligible. Geological storage of CO_2 imported from the United States may be eligible. Forest management projects may be eligible even if Canada does not include forest management in its Kyoto accounting.[7] Emission reductions from January 1, 2006 may be eligible. So it will not be possible to exchange offset credits for Kyoto units.[8]

Offset credits can be sold to LFEs or the federal government's Climate Fund. The Climate Fund is likely to be the larger market; it plans to buy 75 to 115 MtCO_2e of domestic and international units annually while the reduction target for LFEs is 45 MtCO_2e per year.

The process proposed for the Offset System is similar to that of the Clean Development Mechanism (CDM). A project will need to use an approved "quantification protocol" or "quantification methodology". The protocol/methodology will specify the project boundary, baseline, leakage, and monitoring requirements. The participants must demonstrate they have clear legal ownership of the reductions/removals. The offset program authority will validate the proposed project.

The emission reductions/removals must be verified ex post by an accredited independent expert at intervals selected by the project participants. The offset program authority issues credits based on the report by the accredited expert. All projects have a fixed registration period of eight years that can be renewed if the project is re-validated possibly with a revised baseline. Registration periods must be contiguous.

Margaree Consultants are energy and environment consultants based in Toronto. Dr Erik Haites has consulted to a number of governments and the UNFCCC Secretariat on emissions trading issues.

7 Provisions to address non-permanence also may differ from those for the Kyoto Protocol.

8 Canada will not host Joint Implementation projects.

9 Protocols will be developed by government experts for specified project types based on methodologies approved by the CDM and other programs. If a suitable protocol is not available, a new methodology can be proposed.

Costs and Economic Potential of Carbon Capture and Storage

IPCC Special Report

The Intergovernmental Panel on Climate Change has just released a major technical and economic assessment of the potential of carbon dioxide capture and storage (CCS), also known as geosequestration. This article draws directly on the chapter dealing with the costs and economic potential of CCS.[1] Of particular interest is the conclusion from reviewed modeling that deployment of CCS systems starts to be significant when carbon prices reach approximately US$25-30/t$CO_2$ or A$33-40/t$CO_2$.

The major components of a carbon dioxide capture and storage (CCS) system include capture (separation plus compression), transport, and storage (including measurement, monitoring and verification) (see diagram). In one form or another, these components are commercially available. However, there is relatively little commercial experience with configuring all of these components into fully integrated CCS systems at the kinds of scales which would likely characterize their future deployment. The literature reports a fairly wide range of costs for employing CCS systems with fossil-fired power production and various industrial processes. The range spanned by these cost estimates is driven primarily by site-specific considerations such as the technology characteristics of the power plant or industrial facility, the specific characteristics of the storage site, and the required transportation distance of carbon dioxide (CO_2). In addition, estimates of the future performance of components of the capture, transport, storage, measurement and monitoring systems are uncertain. The literature reflects a widely held belief that the cost of building and operating CO_2 capture systems will fall over time as a result of technological advances.

Component costs

The cost of employing a full CCS system for electricity generation from a fossil-fired power plant is dominated by the cost of capture. The application of capture technology would add about 1.8 to 3.4 US cents/kWh to the cost of electricity from a pulverized coal power plant, 0.9 to 2.2 US cents/kWh to the cost for electricity from an integrated gasification combined cycle coal power plant, and 1.2 to 2.4 US cents/kWh from a natural-gas combined-cycle power plant. Transport and storage costs would add between –1 and 1 US cents/kWh to this range for coal plants, and about half as much for gas plants. The negative costs are associated with assumed offsetting revenues from CO_2 storage in enhanced oil recovery (EOR) or enhanced coal bed methane (ECBM) projects. Typical costs for transportation and geological storage from coal plants would range from 0.05–0.6 US cents/kWh. CCS technologies can also be applied to other industrial processes, such as hydrogen (H_2) production. In some of these non-power applications, the cost of capture is lower than for capture from fossil-fired power plants, but the concentrations and partial pressures of CO_2 in the flue gases from these sources vary widely, as do the costs. In addition to fossil-based energy conversion processes, CCS may be applied to biomass-fed energy systems to create useful energy (electricity or transportation fuels). The product cost of these systems is very sensitive to the potential price of the carbon permit and the associated credits obtained with systems resulting in negative emissions. These systems can be fuelled solely by biomass, or biomass can be co-fired in conventional coal-burning plants, in which case the quantity is normally limited to about 10–15% of the energy input.

Emission limits needed

Energy and economic models are used to study future scenarios for CCS deployment and costs. These models indicate that CCS systems are unlikely to be deployed on a large scale in the absence of an explicit policy that substantially limits greenhouse gas emissions to the atmosphere. The literature and current industrial experience indicate that, in the absence of measures to limit CO_2 emissions, there are only small, niche opportunities for the deployment of CCS technologies. These early opportunities for CCS deployment – that are likely to involve CO_2 captured from high-purity, low-cost sources and used for a value-added application such as EOR or ECBM production – could provide valuable early experience with CCS deployment, and create parts of the infrastructure and knowledge base needed for the future large-scale deployment of CCS systems.

With greenhouse gas emission limits imposed, many integrated assessment analyses indicate that CCS systems will be competitive with other large-scale mitigation options, such as nuclear power and renewable energy technologies. Most energy and economic modelling done to date suggests that the deployment of CCS systems starts to be significant

1 IPCC (2005), Special Report on Carbon Dioxide Capture and Storage, Chapter 8, Exec. Summary www.ipcc.ch/activity/srccs/index.htm

when carbon prices begin to reach approximately 25–30 US$/tCO$_2$ (90–110 US$/tC). They foresee the large-scale deployment of CCS systems within a few decades from the start of any significant regime for mitigating global warming. The literature indicates that deployment of CCS systems will increase in line with the stringency of the modelled emission reduction regime. Least-cost CO$_2$ concentration stabilization scenarios, that also take into account the economic efficiency of the system, indicate that emissions mitigation becomes progressively more stringent over time.

Timing of deployment

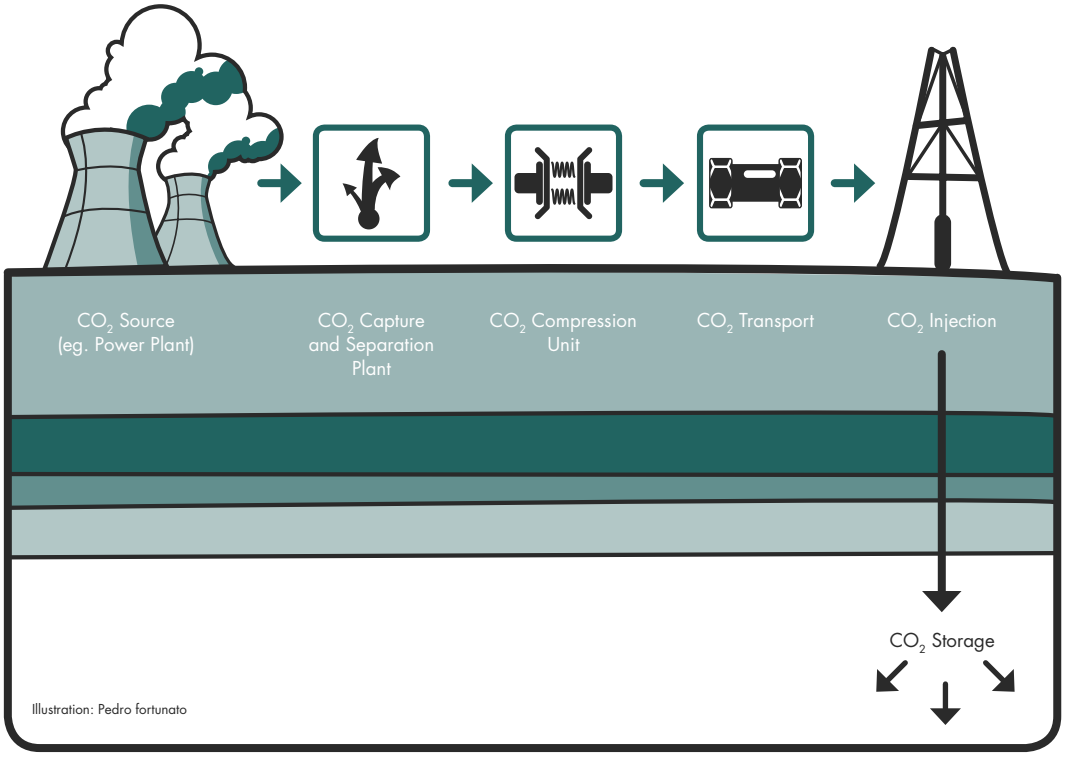
Most analyses indicate that, notwithstanding significant penetration of CCS systems by 2050, the majority of CCS deployment will occur in the second half of this century. They also indicate that early CCS deployment will be in the industrialized nations, with deployment eventually spreading worldwide. While different scenarios vary the quantitative mix of technologies needed to meet the modelled emissions constraint, the literature consensus is that CCS could be an important component of a broad portfolio of energy technologies and emission reduction approaches. In addition, CCS technologies are compatible with the deployment of other potentially important long-term greenhouse gas mitigation technologies such as H$_2$ production from biomass and fossil fuels.

Potential abatement

Published estimates (for CO$_2$ stabilization scenarios between 450–750 ppmv) of the global cumulative amount of CO$_2$ that might be stored over the course of this century in the ocean and various geological formations span a wide range: from very small contributions to thousands of gigatonnes of CO$_2$. This wide range can largely be explained by the uncertainty of long-term, socio-economic, demographic and technological change, the main drivers of future CO$_2$ emissions. However, it is important to note that the majority of stabilization scenarios from 450–750 ppmv tend to cluster in the range of 220–2200 GtCO$_2$ (60–600 GtC).
This demand for CO$_2$ storage appears to be within global estimates of total CO$_2$ storage capacity.
The actual use of CCS is likely to be lower than the estimates for economic potential indicated by these energy and economic models, as there are other barriers to technology development not adequately accounted for in these modelling frameworks. Examples include concerns about environmental impact, the lack of a clear legal framework and uncertainty about how quickly learning-by-doing will lower costs.

On the question of the implications of gradual leakage from reservoirs, from an economic perspective, such leakage – if it were to occur – can be thought of as another potential source of future CO$_2$ emissions, with the cost of offsetting this leaked CO$_2$ being equal to the cost of emission offsets when the stored CO$_2$ leaks to the atmosphere. Within this purely economic framework, the few studies that have looked at this topic indicate that some CO$_2$ leakage can be accommodated while progressing towards the goal of stabilizing atmospheric concentrations of CO$_2$.

For more information on CCS see www.co2crc.com.au



AETF Business Roundtable

The AETF's Business Roundtable recently marked two years of successful operation since its launch at the ASX in Sydney in late 2003. The Business Roundtable came about following interest from a number of major companies in a business group to access information and discuss issues related to emissions trading and climate policy.

Membership has grown steadily and now includes over 30 companies and agencies from all key sectors including resources, utilities, technology, forestry, consulting, financial services and market development.

In 2005 the Roundtable has met for four scheduled meetings and one special meeting to discuss national and international emissions trading developments. Guest speakers and discussion leaders during the year have included:

- Jan Adams, Ambassador for the Environment, DFAT
- Anthea Harris, Team Leader, National Emissions Trading Taskforce
- Michael Robinson, CEO, CRC for Greenhouse Accounting
- Olivia Hartridge, Senior Advisor, European Emissions Trading Scheme
- David Hemmings, NSW Dept. of Energy, Utilities and Sustainability
- Jean-Bernard Carrasco, International Climate Change Team, AGO
- Petrea Bradford, Manager Environmental Markets, Origin Energy
- Andrew Grant, Managing Director, CO2 Australia
- Tony Beck and Malcolm Gray, AETF

With interest and activity related to emissions trading continuing to grow both nationally and internationally, the AETF anticipates that 2006 will be another active year for its Business Roundtable. Membership enquiries are welcome (see box).

Business Roundtable membership

Membership for 2006 is open to companies on an annual subscription basis. Members are entitled to:

- Attend quarterly meetings of the Roundtable, involving market and policy briefings and information sharing opportunities
- Access to an information sharing electronic network, members' pages on the AETF website, and special meetings that may be organised from time to time.
- Reports giving an Australian perspective on key national and international developments. These cover Kyoto and non-Kyoto related markets and domestic developments.
- Discounts on registrations for regular AETF seminars and workshops.

Annual membership fee is $3300 (plus an initial joining fee of $550.) For more information contact the AETF Coordinators (details below) or go to www.aetf.net.au/BR

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