Progress on greenhouse gas emissions trading: a country-by-country review

National Round Table
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There are many stages to implementing a domestic emissions trading system. These include:

- internal consideration of the concept;
- analysis of potential design options;
- consultation with affected and interested stakeholders;
- determination and announcement of design elements; and
- implementation of the system.

Many industrialized countries are actively exploring, designing, and, in some cases, implementing domestic emission trading schemes as part of their efforts to meet their greenhouse gas (GHG) reduction targets under the Kyoto Protocol. A number of private initiatives have also been launched to explore key issues related to emissions trading.

The purpose of this backgrounder is to provide a summary of progress to date by key countries, and to highlight innovative initiatives underway within the private sector to advance the concept of emissions trading.

This survey provides a general and qualitative overview based on readily available information. It does not constitute a detailed analysis or ranking of current performance by various countries in implementing emissions trading.

Summary of Findings

Many industrialized countries are actively exploring, designing, and, in some cases, implementing domestic emission trading schemes as part of their efforts to meet their greenhouse gas (GHG) reduction targets under the Kyoto Protocol.

The European Union has emerged as a leader within the international community by virtue of its newly-announced proposal to adopt a legal framework for emissions trading. The system, which will come into effect in 2005, is expected to cover 45% of EU emissions. Within the context of an EU-wide 'cap' or limit on emissions, Member States will allocate permits to participating companies, which include a wide range of sectors (such as oil refiners, electricity generators, metal smelters and cement producers).

The United Kingdom has also established a unique emissions trading system. The UK system is a voluntary system that relies more on incentives than penalties to reduce emissions. It was designed by a joint government-industry working group and affords companies the opportunity to participate by either negotiating a firm limit on their emissions, or by generating project-based credits outside of a cap that can be traded more broadly into the system.

Denmark is experimenting with a limited trading scheme in one sector - electricity generation. In this system, the Danish government is setting a limit on the largest power generation companies, on the basis of their historical emissions. This system is expected to cover approximately 30% of the country's emissions.

Norway has recently announced plans to implement a domestic emissions trading scheme by 2005, which would replace Norway's existing carbon dioxide tax law.

A number of other countries, including Australia, Japan, and Germany, are exploring the potential for domestic emissions trading. However, most of these countries are still in the initial planning, analysis and consultative stages

Canada has also been exploring domestic emissions trading as a possible element of its implementation

strategy for the Kyoto Protocol. Much analytical work has been done to date on the potential design of such a system. In addition, a number of pilot projects and private sector trades have been undertaken in Canada that provide decision-makers with valuable information on how such a system could be implemented effectively. In addition, the province of Ontario has recently announced the design of a trading system for two non-GHG air pollutants, the first regulated emissions trading system in Canada.

At the same time, however, limited progress has been made on the definition of an overall national framework for emissions trading in Canada. A national debate has not yet occurred on either the design or implications of a domestic emissions trading system for Canada. This is a critical step that will need to be undertaken prior to final decisions on how to implement the Kyoto Protocol.

As such, Canada is in the 'middle of the pack' in the design and implementation of emissions trading systems internationally.

European Union

Summary: *The European Union (EU) has emerged in the vanguard of countries' efforts to design and implement an international emissions trading system. The EU has recently announced a proposal to implement a legal framework for an emissions trading scheme that will come into effect in 2005. This scheme will cover emissions from a wide range of industrial sectors, representing 45% of EU emissions. Member States will have the responsibility of allocating permits to participating companies.*

The European Union has 15 member states that have agreed to a joint emissions reduction target under the Kyoto Protocol. Collectively, the member states will reduce their GHG emissions by 8% of 1990 levels by 2012. A so-called "burden sharing" agreement has been reached by member states to allocate the responsibilities for achieving the target. This agreement will see some EU members reducing their emissions significantly (Germany, Denmark and the United Kingdom), others stabilizing the emissions to 1990 levels (France), and allow some members to actually increase their emissions over 1990 levels (Spain, Portugal, Greece).

In October 2001, the European Commission adopted a package of measures to combat climate change, including a proposal for the European Community to ratify the Kyoto Protocol and a draft Directive on the implementation of an EU-wide GHG emissions trading system.[1] The objective of the proposed Directive is to establish an EU emissions trading framework and an EU-wide market for emissions. The European Commission has stated that the system will need to:

- ensure equal treatment for companies of comparable size;
- minimize the potential for competition being distorted;
- ensure synergy with existing legislation;
- ensure compatibility with the scheme developed at the international level beyond the EU.

Under this proposal, an EU emissions trading scheme would become effective in 2005. During its first phase (2005 – 2007) it will apply to CO_2 only. The cap and trade scheme will initially cover emissions from large industrial and energy activities, which will capture approximately 45% of the EU's total CO_2 emissions projected for 2010.[2]

Smaller emissions sources not captured by the emissions trading system would likely be covered by equivalent policies and measures, with an option of trading into the regime via credit creation. The

1 Brussels, 23 October 2001. Proposal on a Council Decision Concerning the Conclusion on Behalf of the European Community of the Kyoto Protocol to the UNFCCC and the Joint Fulfillment of Commitments Thereunder. http://europa.eu.int/comm/environment/climat/com/01579_en.pdf

2 http://europa.eu.int/comm/environment/climat/com/01579_en.pdf

Commission will decide on extending the Directive to cover other sectors and greenhouse gases in 2004.

Member states are responsible for allocating permits to companies covered under the directive. The number of these permits will be reduced over time. Between 2005 and 2007, member states will grant permits free of charge in accordance to national allocation plans approved by the Commission.[3] The Commission will decide on a harmonized allocation procedure by the first Kyoto commitment period.

Firms that fail to produce sufficient permits to equal their emissions, or buy credits to make up for any shortfall, will have to pay a harmonized penalty charge. Guidelines for monitoring, reporting and verification will be detailed by the Commission at a later stage.

New entrant companies would be allocated permits on similar terms as those established for companies in the same sector. New member states could not be incorporated into the EU burden sharing agreement until 2013, but the EU emissions trading scheme could be designed to recognize their domestic schemes. As well, mutual recognition of emissions trading schemes could allow European Economic Area countries to trade within the EU emissions trading programme.

The EU emissions trading scheme will be designed to be compatible with International Emissions Trading rules under the Kyoto Protocol.

Additional Reference Information

Recent EU documents on climate change policy, background information and the costs of climate change are available at the EU Climate Change Publications Web page: http://europa.eu.int/comm/environment/climat/docs.htm

United Kingdom

Summary: *The United Kingdom has also established a unique emissions trading system. The UK system, is a voluntary system that relies more on incentives than penalties to reduce emissions. It was designed by a joint government-industry working group and affords companies the opportunity to participate by either negotiating a firm limit on their emissions, or by generating project-based credits outside of a cap that can be traded more broadly into the system.*

The United Kingdom's national GHG emission reduction target is 12.5 % below 1990 levels for the first Kyoto commitment period (2008 – 2012). It is one of the few industrialized countries on track to achieve its target. The vast majority of its post-1990 emission reductions have been primarily due to the transition from coal to natural gas as a fuel source for electricity generation over the past 10 years.

An initial assessment of the potential design of an emissions trading system in the United Kingdom was undertaken by a multi-stakeholder "Emissions Trading Group". This group proposed a series of general criteria for a domestic trading system, which included:

- that it achieve an environmental objective and that it represent a more cost-effective means of doing so than other measures;
- that it be credible, transparent and founded on simplicity;
- that it be equitable; and
- that credit for past action be given.

The structure of the U.K. emissions trading system will complement the design of the Climate Change Levy (CCL), an economic instrument at the core of the United Kingdom's domestic climate change strategy. By negotiating a greenhouse gas emissions agreement with the national government, energy-intensive economic sectors area offered the

3 http://www.europa.eu.int/rapid/start/cgi/guesten.ksh?p_action.gettxt=gt&doc=IP/01/1465|0|RAPID&lg=EN;

opportunity to receive an 80% discount in the rate of the CCL taxes. When the CCL went into effect on April 1, 2001, 40 agreements had already been signed between the government and energy-intensive sectors. It was intended that the domestic emissions trading system would be introduced concurrent with the CCL in April 2001. However, due to delays, the U.K. emissions trading scheme will not come into effect until April 2002.

Participation in the proposed emissions trading program will be voluntary and will be overseen by an emission trading authority. Firms in the program would able to participate in one of four ways:

- Firms that **are not** subject to the CCL would be given a financial incentive to make absolute emissions reduction commitments against a 1998-2000 baseline. The government has so far set aside £215m ($305m), over the period 2003-2004 to 2007-2008, to purchase emission reductions through a bidding process. Firms that are successful in the bidding process will be compelled to deliver five equal annual emissions reductions to qualify for their incentive. Permits equal to the target would be allocated each year on the basis of past emissions.
- Firms that already have CCL agreements (emissions or energy targets) will not receive permits directly but would have the right to trade permits; purchased permits could be used to assist them in meeting their targets. Many of these firms' targets are output-based (relative rather than absolute targets). A "gateway" mechanism will be used to control the amount of permits flowing through the system from this sector.
- Organizations can also sell credits into the system by delivering emission savings projects ("project participants"). Project rules are still under development.
- Organizations/entities can also participate by simply opening an account in the registry in order to buy and sell permits, without undertaking emissions reduction targets or project activities.

The system will provide a mechanism for treating 'new entrants' into the system. This could include withholding a certain number of permits each year that could be then auctioned to new entrants. Late entrants (i.e. those firms that operate sources that were emitting at the outset of the scheme but did not volunteer in the first years) would be awarded permits according to the allocation rules.

Program participants would have the option to agree to targets for all six greenhouse gases covered by the Kyoto Protocol or for CO_2 alone. If participants find themselves in a state of non-compliance they will have the option of either purchasing permits or credits or facing the original Climate Change Levy. The Emissions Trading Authority will have the capacity to expel companies that break the scheme's rules on a regular basis.

The United Kingdom's domestic emissions trading scheme may be integrated with the international Kyoto mechanisms.

Additional Reference Information

For further information on United Kingdom's Greenhouse Gas Emissions Trading Scheme see:http://www.defra.gov.uk/environment/climatechange/trading/pdf/trading-summary.pdf

For an analysis of responses to the consultation document see: http://www.defra.gov.uk/environment/consult/ggetrade/resp_analysis/index.htm

Denmark

Summary: *Denmark is experimenting with emissions trading on a pilot basis with the electricity generation sector. In this system, the Danish government sets a limit on the largest power generation companies, on the basis of their historical emissions. This system is expected to cover approximately 30% of the country's emissions.*

The Kyoto Protocol and the EU burden sharing agreement commits Denmark to reduce GHG emissions by 21% below 1990 levels during the first commitment period, between 2008 and 2012. Denmark has also set a national target for CO_2 reductions at 20% below 1988 levels by 2005. However, emissions in the transport and electricity generating sectors have grown considerably in recent years, as a result of strong economic growth and rising electricity exports to Sweden and Norway. Consequently, estimates released by the Danish government in March 2000 indicate that existing policies and measures will only result in a 16.6% emissions reduction during the first commitment period.

Denmark has established a pilot CO_2 trading system,[4] initially set to run between 2001 and 2003, to reduce emissions from the electricity sector. Trading will be undertaken within a cap and trade system designed and operated by the Danish Energy Agency. Every aspect of the current design of the emissions trading system is subject to change, pending the results of the three-year pilot project.

The trading system covers nine large emitters in the electricity-generating sector. These companies represent more than 90% of the total CO_2 emissions from that sector, and approximately 30% of total Danish GHG emissions. The electricity sector is the only GHG emitting sector that is not subject to the carbon taxes and energy efficiency measures that are widely applied throughout Denmark's economy.

Initial permits were allocated to firms according to their historical GHG emission levels between 1994 and 1998 (in other words, these permits were 'grandfathered'). New producers in the Danish electricity market will be allocated allowances relative to their estimated CO_2 emissions.

The trading program includes an industry-wide cap of 22 million metric tons of CO_2 in 2001. This cap is scheduled to be further tightened by one million tons each year until 2003.

A penalty of DKK 40 (~US$ 7) is applied for every metric tonne of CO_2 that is emitted beyond a given firm's individual cap. The size of the fine is relatively low,[5] to ensure that the competitiveness of firms is not affected significantly when the value of exporting electricity is high.

Additional Reference Information

For information on Denmark's emissions trading system and legal texts:
http://www.ens.dk/uk/energy_reform/emissions_trading/index.htm

Netherlands

Summary: *The Netherlands has signaled its interest in using emissions trading as one mechanism for meeting its greenhouse gas target, and has suggested that it could establish a system by 2005. A National Committee was established in 2000 to research design issues related to a domestic emissions trading scheme. This Committee is expected to report back later this year. The Netherlands has established a procurement program purchase of emissions reduction credits from other countries.*

The Netherlands' GHG emission reduction target under the EU burden sharing agreement is 6% below 1990 levels for the first Kyoto commitment period (2008-2012). This corresponds to a 21% reduction relative to national projections.

The Dutch government plans to achieve 50% of its target through domestic measures and the other half by using the Kyoto market mechanisms. The use of emissions trading was discussed in Part II of the

4 http://www.ens.dk/uk/energy_reform/emissions_trading/Danish_CO_2_cap_Final.pdf

5 In comparison to the long-term international market price for carbon, the Danish fine is indeed low. However, the fine is higher than current prices for carbon. For example, through the Dutch ERUPT system, carbon credits are purchased between 1-5 US$ per metric tonne of carbon dioxide.

government's Climate Policy Implementation Plan, issued in March 2000[6].

The Netherlands first began exploring domestic emissions trading in November 1999, when the Ministry of Economic Affairs issued a request for proposals to complete an advisory study on "Technical Aspects of Emissions Trading". The study's purpose was to guide Dutch policy makers in designing domestic emissions trading programs for a variety of applications, potentially including sulfur dioxide (SO_2), nitrogen oxides (NOx), and greenhouse gases.

In addition, the Netherlands Ministry of the Environment (VROM) is now developing a rate-based system for consideration as part of a proposed NOx emissions-trading program. Rather than a traditional grandfathering approach - which gives existing market participants a guaranteed emissions level but restricts future entry - this modified rate-based approach would establish a steadily declining performance standard rate (PSR) of emissions per unit of energy. This concept in emissions trading could have implications in the domestic control of greenhouse gas emissions.

The Social and Economic Council (SER),[7] the main advisory body on national and international social and economic policy issues to the Dutch government, has recommended that Netherlands participate in greenhouse gas emissions trading at an EU level, but not purely at the domestic level. In August 2000 a National Committee was established to research design issues involved in a domestic emissions trading scheme. The Committee is scheduled to deliver its recommendations to the Minister of Environment in 2001 The Netherlands government has expressed an interest in setting up a CO_2-trading system by 2004-2005.

In addition, under the terms of a program called ERU-PT, the Dutch Ministry of Economic Affairs has provided funds for the acquisition of Emissions Reduction Units (ERUs) from Eastern European and former Soviet Union countries. The procurement tender allows any company, worldwide, to bid for projects that generate emissions reductions. The approach is unique in that it has only one buyer – the Dutch government – purchasing emissions reductions from numerous sellers in different countries.

Additional Reference Information

Ministry of Housing, Spatial Planning and the Environment: http://www.minvrom.nl

Norway

Summary: *The government of Norway has been exploring the potential design of an emissions trading system since 1998. In August 2001, the Government released a white paper[8] on climate policy, which included recommendations on a domestic emissions trading system, which would replace the current carbon dioxide tax law. The proposed emissions trading scheme is pending parliamentary approval. Foundations of the trading scheme are being developed and would be functioning as early as 2005.*

Norway has a commitment under the Kyoto Protocol to limit the increase in its GHG emissions to 1% above 1990 levels for the first commitment period between 2008 and 2012. National estimates indicate that greenhouse gas reductions of the order of 17%, compared to a business-as-usual scenario, will be required to achieve the Kyoto target.

In 1998, the Norwegian parliament requested that the government appoint a Commission of Experts to draw up a proposal for a domestic greenhouse gas emissions trading system. The Commission

6 http://www.vrom.nl/pagina.html?id=1&goto=40

7 http://www.ser.nl/default.asp?desc=adviezen_00_06

8 http://odin.dep.no/md/engelsk/publ/stmeld/022001-040012/index-hov001-b-n-a.html

completed a report outlining such a system in 2000.[9] The Commission of Experts recommended that participation in the emission trading system should be obligatory for industries that are presently exempt from CO_2 taxes. These industries include: emissions from production of primary aluminium, magnesium, steel, ferro-alloys, carbides and fertilizers, and oil and gas terminals; emissions from the use of gas in refineries, gas terminals and petrochemicals, and both process and combustion emissions from cement production.[10] The CO_2 tax covers about 60% of CO_2 emissions and about 47% of total greenhouse gas emissions.[11] The Commission noted a trading system that included all point sources suitable for regulation[12] would be able to capture about 90% of greenhouse gas emissions (based on 1997 levels.

Under the prescribed system, participants will have to submit permits to the authorities starting in 2008. The Commission was split regarding whether the initial permits would be grandfathered or auctioned. However, the Commission did agree that:

- The system should apply to all greenhouse gases under Kyoto Protocol.
- Permits, in principle, should be sold by the State through auctions, although a gratis allocation component would be likely and would be on the basis of 1990 emission levels.
- New entrants will have to purchase permits through the domestic trading system or the international Kyoto mechanisms.
- Permits should be allocated on a long-term basis, but for a defined period.
- Allocation of permits should be open and transparent. Rules must be developed to ensure a well-functioning market.

In August 2001, the Government released a white paper[13] to parliament on Norwegian climate policy, which includes recommendations on a domestic emissions trading system largely based on the conclusions drawn by the Commission of Experts. The emissions trading programme would be one of the most important long-term climate policy instruments and would assist Norway in making "demonstrable progress" by 2005.[14] Norway's domestic emissions trading plan calls for a prompt 2005 start but would be fully operational by 2008.

As currently envisioned, the trading scheme would:

- Be compatible with the Kyoto mechanisms;
- Replace Norway's existing carbon dioxide tax law;
- Regulate four greenhouse gases under the Kyoto Protocol (carbon dioxide from combustion processes, nitrous oxide, perfluorocarbons, and sulfur hexafluoride from industrial processes), which accounted for 80% of Norway's GHG emissions in 1990.
- Allow banking during the commitment period but not across commitment periods.

Allocation methods have not been specified, but a combination of grandfathering and auctioning is expected.

9 Norwegian Ministry of the Environment: "A Quota System for Climatic Gases: An Instrument to Meet Norway's Commitments under the Kyoto Protocol". NOU 2000:1, http://www.odin.dep.no

10 http://odin.dep.no/odinarkiv/norsk/dep/md/1999/eng/022021-220003/index-dok000-b-n-a.html

11 Norwegian Ministry of the Environment: "A Quota System for Climatic Gases: An Instrument to Meet Norway's Commitments under the Kyoto Protocol". NOU 2000:1
http://odin.dep.no/odinarkiv/norsk/dep/md/1999/eng/022021-220003/index-dok000-b-n-a.html
Norway's Second National Communications under the UNFCCC, April 1997.

12 "All emissions, which can be allocated to an entity with a reasonable degree of certainty and at reasonable cost, would then be covered by the quota system." http://odin.dep.no/odinarkiv/norsk/dep/md/1999/eng/022021-220003/index-dok000-b-n-a.html

13 http://odin.dep.no/md/engelsk/publ/stmeld/022001-040012/index-hov001-b-n-a.html

14 Norwegian Environment Ministry Develops Emissions Trading Mechanism. October 10, 2001. International Environment Reporter. Vol24:21.

Canada

Summary: *To date, Canada's experience with emissions trading consists of analysis and consultations, voluntary trial programmes implemented as public-private partnerships, and private sector trades.*

Canada has committed to a 6% reduction in greenhouse gas emissions below 1990 levels for the first Kyoto commitment period. Projections based on Canada's emissions profile suggests that by 2010, a 26% reduction in greenhouse gases will be required to meet the Kyoto target.

Between 1998 and 2000, two multi-stakeholder committees, as part of Canada's National Climate Change Process,[15] were convened to explore issues related to domestic emissions trading: the Tradeable Permits Working Group and the Credits for Early Action Table. The Tradeable Permits Working Group (TPWG)[16] explored the potential contribution that a domestic emissions trading scheme could make towards achieving Canada's GHG reduction target. In a 2000 Options Report,[17] the TPWG analyzed two design options:

- A downstream design (targeting large final emitters[18]), which would capture approximately 400 to 500 Canadian firms representing about 35% of Canada's total GHG emissions; and
- An upstream or midstream design (aiming from broadly based coverage[19]), which would include about 100 to 500 entities and cover about 75% of Canada's total GHG emissions.

The TPWG suggested that permits could be allocated primarily by auctioning in addition to a gratis (free) allocation component. The revenue derived from auctioning permits would be recycled to address potential equity concerns (e.g. reductions in personal and corporate income taxes). A portion of permits would be allocated free of charge and on a continuous basis to compensate sectors that directly compete with industries in countries without greenhouse gas reduction commitments. Firms with comparatively more emissions-intensive capital than competitive alternative technologies would also be given permits at no cost, but on a transitional basis.[20]

With support from the Analysis and Modelling Group (AMG)[21] two new intergovernmental working groups are undertaking further analysis on issues related to domestic emissions trading in Canada: the Domestic Emissions Trading Working Group (DETWG)[22] and the Emissions Allocation and Burden Sharing Working Group (EABSWG).[23]

The DETWG is mandated to deliver recommendations on emissions trading options by early 2002. The EABSWG is considering how emissions could be allocated by regions or sectors. This work is being done at the request of the provinces and territories. Other priorities for the working groups include analyzing implementation issues within a North American context, as well as competitiveness issues across Canada and related to the U.S.

15 An intergovernmental process established to develop Canada's implementation strategy on climate change.

16 http://www.nccp.ca/NCCP/national_process/issues/tradable_e.html#TradablePermits Working Group

17 http://www.nccp.ca/html/tables/pdf/options/Englishb.pdf

18 Including electricity generators, industrial emitters, and possible large transportation carriers.

19 Includes emissions from fossil fuel combustion, non-combustion CO_2 and most other final emitter GHGs.

20 TPWG, April 2000. Using Tradeable Emissions Permits to Achieve Domestic Greenhouse Gas Objectives: Options Report. http://www.nccp.ca/html/tables/pdf/options/Englishb.pdf

21 The AMG is an intergovernmental group established as a part of the NCCP. When it was first established, the AMG's main objective was evaluating the overall economic and environmental implications of Canada complying with its Kyoto commitments. However, the National Air Issues Coordinating Committee (intergovernmental group that manages the NCCP) has supported a continuing role for the AMG, such as analysis issues related to Kyoto ratification. http://www.nccp.ca/NCCP/pdf/media/AMG_Wkpln.pdf

22 http://www.nccp.ca/NCCP/pdf/media/DETWGRevisedTextforTranslationBT16052001.doc

23 http://www.nccp.ca/NCCP/pdf/media/ALL_BU%7E1.PDF

New measures under Canada's National Implementation Strategy on Climate Change will be announced following ratification of the Kyoto Protocol. It is anticipated that a domestic emissions trading scheme will be a major economic instrument considered for implementation at that time.

Pilot Trading Programs

Two joint private-public emissions credit trading pilot programmes have been implemented in Canada to evaluate emissions trading as a cost-effective way for industry to reduce emissions of various pollutants. The Ontario Pilot Emissions Reduction Trading (PERT)[24] Project, a voluntary, industry-led, multi-stakeholder initiative, was established in 1996 and applied to GHGs and other air pollutants emitted in the Windsor -Quebec City corridor. Members received credits and recognition from the Ontario Ministry of Environment for emissions reduced over and above what was required by regulation.

The Greenhouse Gas Emission Reduction Trading (GERT)[25] Pilot, initiated in 1998 as a voluntary joint initiative between the federal government, provinces, industry, labour and environmental groups, reviews emissions reduction projects to ensure that credits generated for trades reflect additional,[26] measurable and verifiable emissions reductions. GERT will be receiving projects for evaluation until December 2001.[27]

In addition, in October 2001, the government of Ontario announced Canada's first regulated emissions trading system. The system will start up in 2002 and will initially be limited to electricity generators in the province. While it currently covers only emissions of pollutants responsible for acid rain and smog (not greenhouse gases), the government has suggested that the system could in future extend to other industrial sectors and pollutants (including greenhouse gases).

Private Sector and Trading

In addition to participating in pilot trading programs (above), there are a number of Canadian companies actively engaged in bilateral trades and/or international emissions trading organizations. For example, Manitoba Hydro, Ontario Power Generation and Suncor Energy are participating in the design phase of a voluntary emissions trading scheme through the Chicago Climate Exchange (see below).[28]

Canadian firms such as Transalta Utilities and Epcor in Alberta, as well as Ontario Power Generation, have also conducted voluntary bilateral emission trades within Canada and internationally. A number of Canadian companies, including Transalta, Epcor, Ontario Power Generation, BC Hydro and Nova Scotia Power, are members of the Greenhouse Emissions Management Consortium (GEMCo),[29] a not-for-profit Canadian corporation formed by the private sector to demonstrate leadership in developing voluntary and market-based approaches to greenhouse gas emissions management.

Another company, TransAlta, is actively engaged in the International Emissions Trading Association (IETA),[30] which has the objective of establishing a marketplace for buying and selling greenhouse gas emission offsets.

24 http://www.pert.org/pert.html
25 http://www.gert.org/
26 Over and above what is required by law.
27 http://www.gert.org/links/documents/pdf/GERT%20Newsletter%20No.2.pdf
28 http://www.chicagoclimatex.com/html/about.html
29 http://www.gemco.org/
30 http://ieta.org/IETA2/Index_New.htm

Australia

Summary: *A number of proposals for a domestic emissions trading system have been explored and promoted in Australia. However, no decisions on the establishment of such a system will be made prior to the government's decision on ratifying the Kyoto Protocol.*

Australia agreed to a national GHG emission target of 108% of 1990 levels in the Kyoto Protocol, making it one of the few developed countries with a target that allows further increases in emissions. National estimates indicate that, to achieve this target, GHG reductions of approximately 17% will be required, compared to a business-as-usual scenario, by the end of the first commitment period (2012).

The implementation of a domestic emissions trading program is being seriously considered in Australia. In 1998, the House of Representatives Standing Committee on the Environment, Recreation and the Arts recommended an early trial of emissions trading with the following elements:[31]

- Participation in the early trial would be voluntary.
- The pilot program would cover CO_2, methane (CH_4), and nitrous oxide (N_2O) emissions, which make up 99.6% of Australia's total emissions.[32]
- Initial permit allocations would be determined according to emission levels at the beginning of the pilot and grandfathered.
- The pilot program would result in a mandatory program in the future.
- Emission reductions achieved by participants during the trial period would be recognized under a mandatory emissions trading regime.
- Participants in the voluntary program could also receive preferential treatment during the initial allocation of permits under a mandatory trading program.

The Australian Greenhouse Office (AGO), responsible for the coordination of the national climate change programme, has established an Expert Group and an Emissions Trading Sub Committee of the Council of Australian Governments (CoAG) in order to consult with State and Territory Governments on the development of an emissions trading program.

The AGO has also circulated a document that examined the implications and feasibility of establishing a domestic emissions trading system in Australia. This report concluded that:

- A cap and trade system was most desirable, and could be supplemented by trading of some project-based credits for greater coverage.
- Permits would be used at any time during the 2008-2012 commitment period or banked.
- The cap and trade system would provide wide coverage of the energy supply industry and an emphasis on large emitters.
- Both grandfathering and auctions might be used.
- The DET system would recognize credits generated through international market mechanisms under the Protocol.

In 1999, the Australia Institute, an independent public policy research centre, also presented a proposal for the design of a domestic emissions trading system.[33] Under this proposal the pilot phase recommended by the House of Representatives Standing Committee on the Environment, Recreation

31 http://www.aph.gov.au/house/committee/environ/index.htm

32 Australia's Second National Communication to the UNFCCC indicates that in 1997 PFC emissions accounted for 0.4% of total GHG emissions. http://www.unfccc.int/resource/docs/natc/ausnc2.pdf

33 Hamilton, C. and Hurton, H. 1999. Business Tax and Environment: Emissions Trading as a Tax Reform Option. Australia Institute, Discussion Paper #22. http://www.tai.org.au/publications/DP22.shtml

and Arts is bypassed in favor of a mandatory trading system that would begin in 2001 and continue until the end of the first commitment period in 2012. Participants would be limited to the 160 largest source emitters. This upstream system would cover only CO_2 emissions from fossil fuel combustion, which would constitute approximately 72% of Australia's total GHG emissions. Initial permit allocation would be carried out through an auction.

Emissions trading options have been well analyzed in Australia. However, it is unclear if and when a trading system will be implemented. The decision to put a trading system in place will be tied to a decision on ratification of the Protocol, a debate that is currently ongoing. If the Australian parliament decides to ratify the Protocol a domestic emissions trading regime could be implemented within two years of that decision.

Germany

Summary: *The federal government in Germany has expressed interest in designing a domestic emissions trading system, and has presented some elements of a design framework at a September 2001 EU hearing on emissions trading. A pilot trading project has, however, been initiated in Hesse, to test different aspects of a potential system.*

The German contribution to attaining the EU's collective GHG emissions target of –8% of 1990 levels under the Article 4 provision of the Kyoto Protocol is a reduction of 21% from 1990 levels. National estimates indicate that GHG reductions of the order of 20%, compared to a business-as-usual scenario, will be required to reach the Kyoto target by the end of the first commitment period in 2012.

As part of the climate change plan, the federal government has also stated its intentions to make use of the Kyoto mechanisms. The government has set up a consulting group together with industry and other business groups, which will design the framework for a national emissions trading program. Their work is nearing completion and a full report is expected by the end of 2001. Some of their findings have been presented to a September 2001 EU hearing on emissions trading. At that hearing, the government commented on guidelines for the emissions cap that participants would adopt, on how the initial distribution of allowances would be handled, and on the sectoral scope and greenhouse gas coverage of the eventual system.

An emissions trading pilot project was conducted in Hesse, Germany, funded jointly by the federal government development agency for small- and medium-sized enterprises, eight companies from eight industrial sectors, the Deutsche Ausgleichsbank, and the Environmental Ministry of the State of Hesse. The goals of the project were to:

- demonstrate the viability of emissions trading in a pre-compliance environment;
- test a workable trading framework;
- encourage the participation of small and medium-sized companies;
- identify internal reduction options;
- analyze costs of entering into an emissions trading system; and
- prepare companies for future emissions trading through capacity building.

The pilot project phase began in August 2000 and ended in May 2001. The results reported form the Hesse emissions trading simulation indicated that companies not only achieved emissions reductions cost-effectively but also profited through the built-in incentives of the opt-in system. Companies that engaged early were the ones who benefited the most.[34]

34 Solsbery, L., Director-ERM. "Results of ERM Emissions Trading Simulations in Germany and in the UK Incentives Bidding Scheme". Carbon Finance Conference, 8 October 2001.

In October 2000, the German government established a multi-stakeholder working group to analyze domestic greenhouse gas emissions trading options in the context of an EU-wide system. Results from the working group are detailed in "*Emissions Trading as a Means to Combat the Impacts of Greenhouse Gases*"[35] and were forwarded to the EU Commission in a position paper released in September 2001.[36] These reports suggest that an EU-wide emissions trading system should:

- begin with a voluntary pilot phase coupled with economic incentives limited to three years, with the option of introducing binding commitments to interested to member states.
- grandfather initial allocations with the possibility of auctioning a certain share. An early base year/period should be chosen for initial allocation so that "early actors" are considered.
- include the six greenhouse gases under the Kyoto Protocol but in a phased approach, beginning with carbon dioxide.
- include all sectors (even transport and households).
- have standardized and transparent monitoring, verification and reporting procedures.

ensure comparable penalties for non-compliance, even at the pilot stage.

Additional Reference Information

For a complete description of German climate change policies and progress to date in reducing greenhouse gas emissions, see: http://www.bmu.de/english/fset800.htm.

New Zealand

Summary: *While the New Zealand government has announced that a domestic emissions trading program is its preferred policy measure for meeting its Kyoto commitments, the potential design of such a system has not yet been determined.*

Under the Kyoto Protocol, New Zealand has agreed to stabilize its GHG emissions to 1990 levels by 2008 - 2012. National estimates indicate that greenhouse gas reductions in the order of 20%, compared to a business-as-usual scenario, will be required to achieve this target.

The New Zealand Government has announced that its preferred policy measure for the first Kyoto commitment period is a domestic emissions trading program that is fully compatible with the international emission trading regime established under the Protocol.

The Ministry of the Environment prepared a consultation document in January 1999 on how best to respond to New Zealand's commitments under the Kyoto Protocol. This document, *Climate Change Domestic Policy Options Statement*,[37] outlined three options for the use of economic instruments prior to 2008:

- allocation of New Zealand's Kyoto Protocol assigned amount of allowed emissions to firms as an incentive for voluntary pre-2008 action.
- use of a hybrid economic instrument consisting of a low-level carbon charge on 'small' emitters and a pilot emissions trading system ('permits' and 'credits') for 'large' emitters.
- application of a low-level carbon charge.

The Ministry of the Environment received over 3500 submissions in response to the *Climate Change Domestic Policy Options Statement*. Several common

35 http://www.bmu.de/english/download/files/greenhouse_gases.pdf
36 http://www.bmu.de/english/download/files/greenhouse_gases2.pdf
37 http://www.ieta.org/climatepos.pdf

themes emerged from the submissions from the business and environmental community, including:

- the need to cover all sectors and all gases in a domestic emission trading system;
- general support for facilitation of forward trading;
- the need for emissions reduction efforts to focus on complementary measures in addition to emission trading in the short-term; and
- strong opposition to a carbon charge, or tax.

The Minister of Environment stated in August 2000 that the first stage of New Zealand's domestic policy program would focus on energy efficiency measures; further work and time was required to develop more complex economic and regulatory options, and to provide detailed analyses of the impacts of the various economic and sectoral measures. The decision on a carbon charge will not be taken until after the tax inquiry report in late 2001, at which point the government will also consider the possibility of a pilot emissions trading programme.

Additional Reference Information

New Zealand Climate Change Programme's Web sitehttp://www.climatechange.govt.nz/sp

For more information on the New Zealand climate change policy development process, see: http://www.mfe.govt.nz/issues/ccsolutions.htm.

Sweden

Summary: *Design work has been initiated in Sweden to explore potential elements of a domestic emissions trading system. A national bill on emissions trading could be prepared for implementation in 2002.*

Under the EU burden sharing agreement, Sweden has been allocated a greenhouse gas target of 4% above 1990 GHG emission levels by 2012.

In 1999, two commissions were appointed to analyze the implications of different approaches to greenhouse gas mitigation. Based on the EU's Green Paper issued in February 2000, the Swedish Minister of Environment[38] produced a report for a proposed domestic emissions trading scheme in April of that same year. According to this report, a national bill on emissions trading could be ready for implementation by 2002. This scheme would include the six sectors mentioned in the Green Paper plus upstream sectors, such as the transport sector and households.

Permits would be allocated by auction according to the "polluter pays" principle, with new entries into the system allocated permits on the same basis as their industry counterparts. The proposal mentions that such permit auctions may conflict with current Swedish law concerning companies' past emission property rights. This could result in companies being allocated free permits through grandfathering.

The proposed emissions trading scheme would be compatible with the Kyoto mechanisms.

United States

Summary: *While the United States is not formally participating in discussions on the future of the Kyoto Protocol, the administration is currently reviewing options for future actions to address climate change. While there is considerable uncertainty at the present time regarding the US approach, the Congressional Budget Office has released an analysis of different proposals for trading. In addition, several greenhouse gas emissions trading initiatives are being planned or implemented at the state level.*

If the United States were to agree to the provisions of the Kyoto Protocol, it would need to reduce its greenhouse gas emissions by 7% below 1990 levels by 2008-2012. The United States is the world's largest emitter of greenhouse gases , accounting for approximately 23% of global emissions and 42% of

38 http://miljo.regeringen.se/english/english_index.htm

industrialized country emissions. National estimates indicate that greenhouse gas reductions of the order of 19%, compared to a business-as-usual scenario, would be required to reach the Kyoto target by the first commitment period.

With the Bush Administration's opposition to the Kyoto Protocol and on-going review of options for future actions to address climate change, there is considerable uncertainty as to what measures and initiatives the United States will pursue to address greenhouse gas emissions. In June 2001, the U.S. Congressional Budget Office (CBO) released an analysis on four proposals on the design of a domestic cap and trade greenhouse gas emissions trading programme.[39] The criteria for evaluation included: ease of implementation, carbon-target certainty, incremental cost-certainty (i.e. limits on the cost the U.S. economy would bear), cost-effectiveness, and distributional effects. The four proposals analyzed were:[40]

- *Upstream Option 1*: based on the proposal made by Resources for the Future and Americans for Equitable Climate Solutions. Upstream fossil fuel suppliers would be required to purchase allowances (permits), the cost of which would be capped at $25 per allowance. Revenue from the auctions would be distributed equally to U.S. residents and stakeholders adversely affected by the policy due to supply chain effects (e.g. increase in electricity prices or products that are energy-intensive).
- *Upstream Option 2*: similar to Option 1 with two exceptions- the price of allowances would not be capped and revenue generated through auction of allowances would be used to reduce corporate income taxes.
- *Downstream Option 1*: based on the model proposed by the Progressive Policy Institute.[41] Emissions would be capped at current levels and lowered by 1 % each year. Under this option, large carbon dioxide emitters would be required to hold allowances, which would be grandfathered to them based on the current year's emissions estimates and would decline by one 1% each subsequent year.
- *Downstream Option 2*: similar to proposals introduced to the 106th Congress (H.R. 2569, H.R. 2980, and S. 1369). A cap on emissions would be restricted to units of the fossil-fuel-fired electricity-generating sector above a certain size. Each unit would receive an annual allocation of permits on the basis of their expected annual production multiplied by a generation performance standard.[42]

Although the CBO did not directly endorse any specific option, the analysis concluded that upstream programmes hold several advantages over downstream programmes, including ease of implementation and incentives to achieve the most cost-efficient emissions reductions for the economy as a whole. The CBO stated that the key design issues where trade-offs would have to be made involve decisions on how to allocate the permits (for example, if auctioned, where does the revenue go?) and whether to cap the price of the permits.

Several greenhouse gas emissions trading initiatives are being planned or implemented at the state level. For example, Illinois (Senate Bill 372),[43] New Hampshire (House Bill 284-FN), and Massachusetts (DEP Regulation 310 CMR 7.29)[44] are reviewing legislation that would place caps or targets on

39 CBO, June 2001. An Evaluation of Cap-and-Trade Programs for Reducing U.S. Carbon Emissions. http://www.cbo.gov/showdoc.cfm?index=2876&sequence=0&from=7

40 http://www.cbo.gov/showdoc.cfm?index=2876&sequence=0&from=7

41 http://www.ppionline.org/ppi_ci.cfm?knlgAreaID=116&subsecID=149&contentID=644

42 A generation performance standard (GPS) is obtained by dividing the cap by the amount of electricity projected to be produced for a given year.

43 http://www.legis.state.il.us

44 http://yosemite.epa.gov/globalwarming/ghg.nsf/actions/LegislativeInitiatives

emissions of nitrogen oxides, sulfur dioxide, and carbon dioxide (as well as mercury in Illinois and New Hampshire) on fossil-fueled power plants that meet certain criteria. These programmes would include the possibility of meeting the carbon dioxide requirements through the purchase of credits from certified greenhouse gas offset projects and/or trading of emissions reductions. Also, Oregon passed legislative measures that establish carbon dioxide emission standards for utilities and allows credits from CO_2 offsets.[45] Finally, New Jersey adopted new rules establishing provisions to set up an emissions trading programme for the generation and banking of greenhouse gas credits. All six gases under the Kyoto Protocol will be covered. These new rules are in line with New Jersey's administrative order to voluntarily reduce greenhouse gas emissions by 3.5% below 1990 levels by 2005.[46]

45 House Bill 3283 http://www.leg.state.or.us

46 http://yosemite.epa.gov/globalwarming/ghg.nsf/actions/LegislativeInitiatives

What are organizations and companies doing to implement greenhouse gas emissions trading?

Chicago Climate Exchange (CCX)

Thirty-seven major firms have indicated their intent to participate in the design phase of a voluntary pilot trading market called the Chicago Climate Exchange (CCX).[47] Based on a feasibility study funded by the Joyce Foundation, it is proposed that the pilot market would start in seven Midwest states, include emissions offset projects in Brazil, and expand over time nationally and internationally.

The objective of the Chicago Climate Exchange is to:

- demonstrate that greenhouse gas trading can achieve real reductions in emissions across different business sectors;
- help discover the price of reducing greenhouse gases; and,
- develop the standard frameworks for monitoring emissions, determining offsets and conducting trades needed for a successful market.

The design stage of the pilot trading market is expected to be completed by the end of 2001. Participants in the market design phase include: Ford, DuPont, Suncor Energy, British Petroleum, STMicroelectronics, Temple-Inland, Alliant Energy, Calpine, Cinergy, NiSource, PG&E National Energy Group, Wisconsin Energy, and ZAPCO; Argiliance, the Iowa Farm Bureau and International Paper.

The trading system is expected to be ready for launch by mid-2002. The number of firms that will participate at the trading stage will be contingent upon the rules developed during the design phase.

The CCX intends to implement a cap and trade system with credits from non-capped agricultural and forestry sinks, and a limited number of credits from renewable energy projects. Greenhouse gas emissions sources from participating companies in seven midwestern states (Illinois, Indiana, Iowa, Michigan, Minnesota, Ohio and Wisconsin) will be capped based on their emissions in 1999 and companies will be issued with an equivalent amount of tradable emission permits.

Permit allocation would be reduced according a phased schedule for reducing emissions 5% by 2005, a 2% reduction from 1999 levels by 2002, and 1% per year thereafter until 2005. In 2003, it is intended to extend the system to include other regions of the United States, Mexico, and Canada; in 2005, invitations to participate will be extended beyond North America .

Standard protocols on monitoring, reporting, and verification will be developed in the design phase. Although no compliance system has been proposed, there will be a self-governing structure to oversee rules, monitoring and trade.

Shell International

Shell has embraced the use of market mechanisms as an important tool for achieving the greatest emission reductions at the least possible cost. In January 2000, Shell launched the Shell Tradable Emissions Permits System (STEPS),[48] a cap and trade system in which permits are to be traded between 2000 and 2002 towards a 2% emission reduction target from 1998 levels.

47 http://www.chicagoclimatex.com/html/initial.html

48 http://www.shell.com/download/steps/steps.pdf

Both CO_2 and methane (CH_4) are covered in the system. Permits are allocated (grandfathered) to participating branches of the company for each of the 3 years to promote long-term compliance strategies and forward trading. Participation in the system is voluntary and is limited to branches of the company that operate in industrialized countries. So far six business units have committed to participate, representing about a third of Shell's GHG emissions and over half of its industrialized-country emissions.

Trading takes place under the guidance of a trading manager in the Group's electricity and gas trading organization, who administers the system and acts as a broker and market maker. Five per cent of the permits are retained to be auctioned by the trading manager to improve liquidity as needed. If a participant is not in compliance,[49] the trading manager will issue a fine equivalent to 3 times the fourth quarter average permit price for each permit that they are short. Seller liability will prevail in all trades.

It is anticipated that STEPS will eventually be expanded to include each division of the company. Work is currently being done to establish guidelines for inclusion of credits generated from CDM projects in the STEPS program.

British Petroleum (BP)

BP began experimenting with emissions trading in 1998 as a means of attaining its internal emission reduction target of 10% emissions reductions below 1990 levels during Kyoto's first commitment period between 2008 and 2012. After working in partnership with Environmental Defense,[50] a U.S.-based environmental group, BP launched a company-wide emissions trading system in January 2000. Because of the global nature of BP's business, its trading system is, in effect, the first global emissions trading system.

The BP emissions trading system[51] is a cap and trade system in which permits are allocated annually to every business unit within the company. New permits will be issued each year in accordance with a new company-wide cap, which is adjusted as part of a process to achieve the -10% reduction target. Permits are allocated according to 1998 emissions levels and one permit must be remitted for each tonne of CO_2 equivalent emitted. Both CO_2 and CH_4 are included in the system. Excess permits may be banked, but banking is limited for each business unit to 5% of their initial allocation, in order to promote trading.

All trades are enacted under the guidance of Oil Trading International, the company's oil trading branch, acting as a central broker that maintains a central registry to record all of the transactions. To facilitate the achievement of cost effective GHG emission reductions, a database of emission reduction initiatives will be kept within the company as well.

Since January 1, 2000, the company has traded 2.7 million tonnes of CO_2 internally. The average price of CO_2 in these transactions has been approximately $7.60 per tonne. The costs and revenues from CO_2 transactions will appear on every business unit's financial records and have an impact on their bottom line financial performance. Permits associated with divestitures or closures will be cancelled and new facilities that are brought into the company will be subject to an emissions cap as well.

Partnership for Climate Action

In October 2000, seven large corporations and the U.S.-based environmental group Environmental Defense established the Partnership for Climate Action. Its purpose is to promote market-based mechanisms as a means of achieving early and

49 That is, if the permits they hold at the end of the compliance period are not equivalent to their emissions.

50 http://www.edf.org

51 http://www.bp.com/key_issues/environmental/climate_change/index.asp

credible action to reduce greenhouse gas emissions in an efficient and cost-effective manner. Other goals include sharing experiences and encouraging additional companies to join the Partnership.

The Partnership for Climate Action companies include the petroleum and petrochemical companies BP (UK) and Shell International (UK/Holland), the energy company Suncor (Canada), the chemical company DuPont (US), the electric utility Ontario Power Generation (Canada) and the world's second and third largest aluminum companies, Alcan (Canada) and Pechiney (France). Environmental Defense's role is to give technical advice and publish audited inventories of the companies' greenhouse gas emissions. In June, 2001, Mexico`s national oil and gas company, PEMEX, joined the Partnership and pledged to reduce emissions 1% from 1999 levels, using an internal permit trading scheme.

Each member that joins the Partnership for Climate Action must agree to:

- publicly declare a global greenhouse gas emission limitation commitment, backed by management actions, policies and incentives to achieve it ;
- measure, track, and publicly report net greenhouse gas emissions performance;
- employ innovative strategies to work with other partners, and with its customers and suppliers, to maximize opportunities to reduce greenhouse gas emissions through demonstrations, products and services; and
- lead through example, positive engagement, collaboration, public communication, and sharing of experience-based knowledge and effective technology.

Each company in the Partnership for Climate Action has set a firm target for reducing GHG emissions. These targets will result in an annual reduction of at least 80 million tonnes of CO_2-equivalent by 2010, from a combined 1990 emissions total of 360 million tonnes.

At this early stage, the emphasis of the Partnership is on setting targets and establishing a framework for measuring and reporting emissions, not on emissions trading between companies. It is up to the companies themselves to determine how market mechanisms may be used to attain their targets. For example, Ontario Power Generation uses offsets to count against its target, whereas Shell and BP rely solely on internal emission reductions through company-wide trading. Trading between companies may be piloted in the future.

The partners have agreed to make efforts to track emissions trading transactions in independent registries, as they become available. The Partners will ask these registries to provide regular public reports on the group's emissions trading performance. Any missed commitments will be publicly reported and addressed by the Partnership. Partners are expected to elaborate on non-performance remedies, with advice from Environmental Defense. These remedies are/will be reviewed, adopted and enforced by senior management of each company. Each company already has some management policies or incentives to promote compliance, including accountability for non-performance. Further remedies that are currently in use or under discussion include:

- internal corporate sanctions;
- acquiring the needed reductions from another partner;
- purchasing eligible offsets from the external marketplace; or
- making up shortfalls during a compliance "true-up" period.

Additional Reference Information

Partnership for Climate Actions' actions and policies http://www.environmentaldefense.org/pubs/Filings/PCA.html