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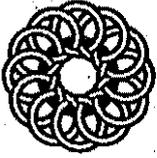
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**National Round Table on the Environment and the Economy
Table ronde nationale sur l'environnement et l'économie**

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Domestic Emissions Trading

**Extended Description of Option 1:
A Voluntary Credit Trading Program for Greenhouse Gases**

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Extended Description of Option 1: A Voluntary Credit Trading Program for Greenhouse Gases

INTRODUCTION

A July 1998 National Round Table on the Environment and the Economy (NRTEE) paper on *Possible Designs for a Domestic Emissions Trading Program for Greenhouse Gases* identified fourteen possible designs for a domestic emissions trading program for greenhouse gases. Six of those designs were selected for further analysis. The fourteen designs and the six selected for further analysis are shown in Table 1.

This paper provides an extended description of one of the options selected; Option 1: A Voluntary Credit Trading Program for Greenhouse Gases. This paper covers:

- A description of the voluntary credit trading program
- Brief descriptions of existing voluntary credit trading programs
- The emissions covered by the trading program
- The sources required to participate in the program
- The number of sources involved
- Share of total emissions covered by participants
- How the trading program would be administered
- How emissions would be measured
- Possible complementary policies
- Special issues raised by the design
- Transitional issues related to a change in the policy setting
- Evaluation of the option against key criteria

DESCRIPTION OF THE TRADING PROGRAM

Option 1 is a voluntary credit trading program for greenhouse gases in the context of a potential *future* national commitment to limit greenhouse gas emissions. This is the current situation; Canada and a number of other countries have signed the Kyoto Protocol, which includes commitments to limit greenhouse gas emissions during the period 2008 through 2012.¹ The Protocol has not yet, however, entered into force. As a result, the prospect of a potential future commitment to limit greenhouse gas emissions exists. But there is no limit on emissions of greenhouse gases at the present time.

A voluntary credit trading program is feasible in this setting. In a voluntary credit trading program some sources create credits by documenting the impacts of emissions reduction

¹ The Kyoto Protocol sets out emission limitation commitments for 38 countries, including Canada, and the European Union. Canada's commitment is to limit average emissions for the period 2008-2012 to 94% of 1990 emissions.

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or sequestration measures they have implemented. Other entities voluntarily purchase some of these credits. Voluntary purchases of credits could be motivated by belief of a need for action, by a desire to enhance the corporate image, to meet a voluntary target such as a commitment under the Voluntary Challenge and Registry, to attempt to forestall a future commitment or regulation, or to better understand emission reduction credit trading for greenhouse gases. A government commitment to provide "credit for early action" makes voluntary creation and purchase of credits more attractive.

Table 1: Summary of Possible Designs and Recommended Short List

Design	Short List	Description
Prospect of future commitment to limit GHG emissions		
1	✓	Voluntary credit trading
2		Voluntary cap and trade system
No specific prospect of a commitment to limit GHG emissions		
3		Voluntary credit trading
Commitment to limit GHG emissions exists		
4	✓	Cap on carbon content of fossil fuels produced and imported with trading by producers, importers and exporters
5		Cap on carbon content of fossil fuels crossing provincial and international borders, with trading by owners of the fuels
6		Cap on the carbon content of fossil fuels implemented at the narrowest point in the distribution chain, with trading by owners of the fuels
7		Voluntary credit trading
8	✓	Voluntary credit trading with mandatory performance standards
9		Mandatory credit trading
10		Voluntary cap and trade system
11	✓	Cap on emissions by fossil fuel users, trading by large fuel users and oil companies for transportation fuels
12		Same as previous option, but excluding transportation sector
13	✓	Same as option 11 but with no opportunity to purchase credits or allowances from sequestration or sources outside the program
14	✓	Cap on emissions by fossil fuel users, trading by large fuel users and municipalities for transportation and commercial/residential buildings

A voluntary credit trading program would probably be established, managed and financed by the participants. The participants would likely include representatives of the various

stakeholders, including sources of greenhouse gas emissions, governments as potential future regulators, environmental groups, consumer groups, and labour organizations.

Participants must establish a process for credit creation. Usually they establish criteria that emission reduction or sequestration actions must meet and then review individual actions against those criteria. Typically, credits must be real, measurable, and additional. To be additional, credits should represent real reductions from the emission levels that, or higher sequestration rates than, would otherwise prevail under the applicable voluntary and regulatory policies and measures. In addition, actions to sequester greenhouse gases must lead to long-term sequestration.

Voluntary credit trading programs typically review proposed credit creation actions, regardless of whether credits are ultimately expected to be approved by the regulatory authority. The review process addresses the issues that arise in the application of the criteria to various emissions reduction and sequestration measures. That often involves judgements as to what is "reasonable" for issues such as the baseline, measurement accuracy, monitoring cost, and long-term sequestration.

Voluntary credit trading programs usually also review proposed credit uses. The main uses for credits during the course of a voluntary trading program are to meet a voluntary commitment or to partially offset emissions in the hope of forestalling a regulation.² The decision to use credits will be based on a strategic assessment of the possible implications for the distribution of responsibility for reducing emissions under a future regulatory regime. Once a decision to use credits has been made, the main concern for greenhouse gas credits, is whether the proposed use leads to increases in ancillary emissions that could have adverse human health or environmental impacts.

Every voluntary credit trading program has a registry to track the credits created, changes in ownership and credit uses. Some programs develop a registry to meet their specific needs, while other programs contract for the use of an existing registry. Like all operating decisions, this choice is made by the participants.

A voluntary credit trading program can be implemented as a pilot program or as a full-fledged program. Three pilot programs of this type have already been established, the Pilot Emission Reduction Trading (PERT) and Greenhouse Gas Emission Reduction Trading (GERT) pilot programs in Canada and the "project-based" stream of the NESCAUM demonstration program in the United States.³ Historically, the number of

² If the motivation for participating in the voluntary trading program is a belief in the need for action or to improve the corporate image, this can probably best be done by creating credits and not selling or using them. Many proposals for "credit for early action" encourage credit creation and banking for later use to help meet future regulatory obligations. Thus, "credit for early action" may discourage use of credits during a voluntary trading program.

³ NESCAUM is the Northeast States for Coordinated Air Use Management, an organization of the air quality directors of Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island and Vermont.

sources that create or use credits in a pilot program ranges from 10 to 25. The PERT and GERT projects are discussed in the next section.

A full-fledged voluntary credit trading program would require a mechanism to give value to the credits. A government commitment to provide some form of "credit for early action" or to allow the credits to be used for specified purposes would meet this requirement. The value obviously depends on the nature of the government commitment and nature of the "credit" or the uses allowed. And the level of activity will depend on the value given to the credits by the government commitment.

A vague commitment or a restricted range of possible uses means the credits have relatively little value. Both the PERT and GERT projects have received such commitments, in part, because such a commitment is consistent with the level of activity desired in a pilot program. A full-fledged voluntary credit trading program would require a government commitment that gives the credits a much higher value, such as an explicit commitment to accept the credits fully toward compliance with future regulatory obligations.

A full-fledged voluntary credit trading program would presumably have many more participants than a pilot program, say at least one hundred. Most pilot programs operate by consensus. That would be impractical for a full-fledged program. The participants would instead have to establish an organization to administer the trading program reporting to a board of directors or executive committee chosen by the participants.

EXISTING VOLUNTARY CREDIT TRADING PROGRAMS

Pilot Emission Reduction Trading (PERT)

The Pilot Emission Reduction Trading (PERT) project is a demonstration project established in 1996 to:

- evaluate the environmental and economic benefits of using emission reduction credit trading as a tool to improve air quality in the Windsor-Quebec Corridor;
- examine the compatibility of credit with the regulatory framework in Ontario;
- identify and resolve stakeholder concerns with trading program design elements; and
- design a trading system for Ontario and bordering airsheds that is acceptable, easy to use, and can be integrated with other trading systems.

PERT is a self-funded and non-profit organization. It is managed by a multi-stakeholder Working Group and supervised by an Executive Committee. Large industrial organizations, governments, consultants and smaller organizations contribute financially to the operations of the Working Group. Health and environmental organizations

participate voluntarily and are provided limited reimbursement for travel and other expenses.

The PERT Working Group and its various task teams develop an annual workplan, recruit new members, develop communications and other outreach activities, review credit creation and use protocols, and work with governments and others to promote emission reduction credit trading as a strategy for air pollutant emissions reduction.

The primary focus of the PERT project is NO_x and VOC emissions in southern Ontario. However, participants are requested to track changes in emissions of all pollutants as a result of actions under PERT. A summary of the credit creations, trades, uses and retirements posted to the registry through 1997 is presented in Table 2.⁴ The data reflect approximately 10 credit creation actions, most of which last several years. A few participants have implemented more than one credit creation action, so the data reflect the actions of 5 to 10 companies. Many of the credit creation actions by PERT participants had not yet been listed with the registry and so are not reflected in the data in Table 2.⁵

All of the trades and uses registered represent purchases by one participant to help meet a voluntary commitment. Most of the credits created were banked (held as balances) in anticipation of agreement on a letter of understanding with the provincial Ministry of the Environment. The letter of understanding, signed in July 1998, enables actions under the pilot project to be used to meet potential future regulatory obligations. Specifically,

"[i]n the event the project does not lead to a trading program, all emission reductions created or transacted in the project will be recognized as early progress towards future requirements or regulations or towards all self-imposed commitments. If the project leads to a trading program, all emission reductions created or transacted by corporate participants in the project will be subject to the rules of that program."

Although, the primary focus of the PERT project is NO_x and VOC emissions, CO₂ accounts for most of the reductions achieved to date.⁶ This simply reflects the fact that most sources of NO_x or VOC emissions are also sources of much larger quantities of

⁴ PERT participants have agreed to retire 10% of the credits created to benefit the environment. Companies that create credits under PERT have been permitted to claim emissions reductions back to 1994.

⁵ During 1997, 15 credit creation protocols were reviewed by PERT. Only five had been listed on the registry as of June 1998. Reasons for not listing credits on the registry include plans to hold the credits for internal use, delays in securing senior management approval to proceed with registration, and waiting for the PERT letter of understanding to be officially signed by the Ontario Minister of the Environment. Only emissions reduction credits listed on the Clean Air Action Corporation registry are recognized by PERT.

⁶ Although not shown in the summary data in Table 2, NO_x and VOC emission reductions achieved during the ozone season and non-ozone season are tracked separately.

Table 2: PERT Creation, Trading and Retirement Summary Report
(tonnes)

(Adapted from Clean Air Action Corporation Emissions Registry)

Pollutant/year	1994	1995	1996	1997	Totals
CO Created			38	38	76
CO Traded			38	38	76
CO Retired			4	4	8
CO Used					
CO Balance			34	34	68
# CO Creations			1	1	2
NO _x Created	397	2,651	4,660	6,252	13,960
NO _x Traded*		334	1,007*	2	1,343*
NO _x Retired	40	321	573	540	1,474
NO _x Used		111	214		325
NO _x Balance	357	2,219	4,236	5,712	12,524
# NO _x Creations	1	6	7	4	18
CO ₂ Created	128,167	284,936	363,757	326,044	1,102,904
CO ₂ Traded					
CO ₂ Retired	12,817	28,494	36,376	32,604	110,291
CO ₂ Used					
CO ₂ Balance	115,350	256,442	327,381	293,440	992,613
#CO ₂ Creations	3	4	4	1	12
SO ₂ Created	867	1,363	1,708	1,829	5,767
SO ₂ Traded					
SO ₂ Retired	87	136	171	183	577
SO ₂ Used					
SO ₂ Balance	780	1,227	1,537	1,646	5,190
#SO ₂ Creations	3	4	4	1	12
VOC Created			6	6	12
VOC Traded			6	6	12
VOC Retired			1	1	2
VOC Balance			5	5	10
# VOC Creations			1	1	2

* Trading in 1996 included 363 tonnes NO_x added to PERT inventory from Detroit Edison

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CO₂ emissions. So actions to reduce NO_x or VOC emissions often lead to much larger reductions of CO₂ emissions as well.⁷

Credit creation actions are documented in the form of a "protocol" that describes the actions implemented and the reductions achieved. The protocols are reviewed by the PERT registration team and the PERT Working Group to ensure that the reductions are real and surplus. The role of PERT in the review of the protocols is to gain information that would assist in the development of a successful emission trading program. Review does not imply approval of the protocol, this authority remains with the provincial Ministry of the Environment.

Working Group reviews are attached to the file provided to the registry and are available to anyone purchasing the credits. Issues that have arisen in the review of credit creation protocols include:

- Are the reductions real? Have they actually occurred? Have they been appropriately estimated? Are the baseline emissions well established and accurate?
- Is the emissions reduction claimed as credit truly surplus to a mandatory requirement or voluntary commitment?
- Are the emissions reductions additional? Would they have been implemented anyway? Were they implemented to improve environmental performance?
- Are the emissions reductions verifiable? Have the best measurement technologies been used to arrive at the reduction estimates? Is the quantification replicable?
- Who owns the credits? For example, in the case of demand side energy savings introduced by an electric utility and ultimately reflected in the cost of electricity, does the energy consumer or the utility own the credit?

One of the major activities of the PERT Working Group is to develop a draft trading rule that could serve as a template for the Ministry of the Environment should it consider emissions reduction credit trading in Ontario. The development of this rule started with a review of relevant trading rules, guidances, policies and regulations developed in the United States. Participants are currently formulating a proposal for the draft rule, which is expected to include the following components:

- Emissions Reduction Credits - including identification of eligible substance, sources of emissions, units of measurement, credit eligibility criteria, computation of the emissions reduction credit, baseline determination issues, credit life, eligibility of credits for shutdown, and critical dates for generating credits;

⁷ Actions to reduce NO_x or VOC emissions do not always reduce CO₂ emissions; sometimes they increase CO₂ emissions.

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- Credit Use and Transfer - including participant eligibility, user liability, eligible credit uses, trading zone and inter-jurisdictional trading, trading ratios, ozone season, 10% environmental donation, credit transfer and credit banking;
- Registry, Reporting and Monitoring - including requirements for subscription to a registry, notices, protocols for creation and use, monitoring, documentation requirements, reporting requirements of activity, prices and confidentiality of proprietary information;
- Audit and Verification - including authority of the Ministry to require information, defer uses pending and audit, order a third party audit, determine credit eligibility, require annual reports, perform a program audit and administer prohibitions, restrictions and penalties.

The rule is intended to be simple enough to encourage trade while maintaining environmental integrity. It is expected that the draft rule will be available for submission to the Ontario Ministry of the Environment when the PERT project terminates in March 1999.

Greenhouse Gas Emission Reduction Trading (GERT)

In 1996 British Columbia, along with Environment Canada and the Greater Vancouver Regional District, funded a design study for an offsets pilot. The study "Requirements for a Pilot Greenhouse Gas Offsets Program in British Columbia: A Discussion Paper" was released in March 1997.⁸

The Greenhouse Gas Emission Reduction Trading Pilot (GERT) was launched by a multi-stakeholder partnership in June 1998. The partners in the pilot include representatives of provincial, federal and local government agencies, the private sector, labour and environmental groups. Participating governments include: Alberta Departments of Energy and Environmental Protection, BC Ministries of Energy and Mines, and Environment, Lands and Parks, Environment Canada and Natural Resources Canada, Greater Vancouver Regional District, Nova Scotia Natural Resources, Quebec Ministry of Natural Resources, and Saskatchewan Energy & Mines.

The GERT Pilot is designed to:

- Provide all participants with practical experience in emission reduction trading;

⁸ Alchemy Consulting Inc., Constable Associates Consulting Inc. and Margaree Consultants Inc. in association with BOVAR Environmental, *Requirements for a Pilot Greenhouse Gas Offsets Program in British Columbia: A Discussion Paper*, prepared for Environment Canada, BC Ministry of Employment and Investment, BC Ministry of Environment, Lands and Parks, Greater Vancouver Regional District, and Fraser Valley Regional District, March 1997.

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- Assess environmental and economic benefits of emission reduction trading;
- Test and evaluate the technical, administrative and legal elements of an emission reduction trading system;
- Maximize involvement of the private sector by emphasizing the use of business principles to achieve environmental and economic objectives;
- Encourage identification and joint investment in GHG emission reduction, avoidance and/or sequestration activities; and
- Help build the foundation for a possible future emission reduction trading system.

The GERT pilot is administered by a Pilot Manager who reports to a Steering Committee of senior representatives from participating stakeholder groups. A Technical Committee, with parallel stakeholder representation, will prepare the administrative elements (eligibility rules, measurement protocols, etc.), review projects, record and track trades, and develop an evaluation framework for the pilot as a whole.

Industry participants agree to bring forward, for review by the pilot Technical Committee, emission reduction projects and trades, which result in emissions reduction, avoidance or sequestration and to share detailed information on these projects and trades. The Technical Committee reviews projects and trades to assess whether they meet the criteria and rules established by GERT.

To be eligible for review by GERT, an emission reduction project must have started generating emission reductions no earlier than January 1, 1997. Projects can reduce or sequester any greenhouse gas. Projects can be located anywhere, but either the buyer or the seller must be Canadian. If the project is located outside of Canada, the buyer must report the reduction only in Canada. As well, if either the buyer or seller is outside the country, use of the emission reduction for compliance purposes will depend on future international trading agreements signed by Canada. Canadian participants must be registered in Canada's Climate Change Voluntary Challenge and Registry (VCR) Program.

The pilot will only consider projects where a trade occurs. To be eligible for registration, projects must result in emission reductions that are real, measurable, verifiable and surplus, which have been defined by GERT as follows:

- **Real.** An emission reduction is real if it is a reduction in actual emissions, resulting from a specific and identifiable action or undertaking, net of any leakage of emissions to a third party or jurisdiction.
- **Measurable.** An emission reduction is measurable if the actual level of greenhouse gas emissions with the project, and the level of greenhouse gas emissions in the reference case, can be quantified.

- **Verifiable.** An emission reduction is verifiable if the calculation methodology is acceptable, transparent and replicable and the raw data required to verify/audit the calculations are available.
- **Surplus.** An emission reduction is surplus if it represents a reduction that is not otherwise required by law. If legal requirements affecting greenhouse gas emissions by source come into effect during the life of the project, then the reference case(s) must be adjusted to reflect the new requirements.

The Technical Committee has not yet achieved consensus on a definition of "project additionality", but is interested in exploring, on a project-by-project basis, the merits and methods for applying this criterion. Therefore, while the demonstration of "project additionality" is not mandatory for the registration of an emission reduction, participants may be requested to submit information relevant to its assessment as part of the review process⁹.

Emission reductions that satisfy GERT conditions and reporting requirements will be designated as Registered Emission Reductions and will be recognized by government partners in GERT. Reporting must be done by participants to the trade on an annual basis and filed with GERT during the first quarter following the end of the calendar year. After this information has been reviewed and accepted by the Technical Committee as having met the conditions of the registered trade, the emission reductions will be registered. The Technical Committee may require a third party review/audit at the participant's expense.

For the immediate future, buyers can use emission reductions to meet their own voluntary greenhouse gas emissions reduction targets at lower cost. For example, companies and municipalities can include GERT trades as part of their action plans registered with the Voluntary Challenge and Registry Program (VCR Program).

In the longer term, "Government partners will recognize emission reductions from trades registered under the Pilot as progress toward possible compliance obligations in the context of any future greenhouse gas trading regime. The form this recognition takes shall be consistent with any future international and domestic greenhouse gas trading rules." In addition, "Government partners will work to ensure that participants are not penalised, with respect to the setting of potential future emission limits, for having undertaken the emission reductions from trades registered under the Pilot..."

Government partners may restrict the amount of emission reductions considered under the pilot. GERT will operate until December 31, 1999, unless extended by the partners.

⁹ See C. Rolfe, "Additionality: What is it? Does it Matter?", Report prepared for the Technical Committee of the Greenhouse Gas Emission Reduction Trading Pilot, available from the Pilot website at <<http://www.gert.org>>.

EMISSIONS COVERED BY THE TRADING PROGRAM

The greenhouse gas emission sources and sinks covered by a voluntary credit trading program in the context of a potential *future* national commitment can be determined by the program participants. Including as wide a range of sources and sinks as possible is desirable to gain experience with issues specific to different sources/gases and sinks and to get as much diversity in control costs as possible. This is true for a pilot program or a voluntary credit trading program.

Credit toward future regulatory commitments may be given for actions under the program. This may require actions under the voluntary credit trading program to meet the conditions, criteria, and standards of the future regulatory policies. Those policies might limit the eligible range of gases/sources and sinks. To the extent that such limitations can be anticipated, they will tend to focus actions on measures likely to satisfy the future regulatory policies.

SOURCES REQUIRED TO PARTICIPATE IN THE PROGRAM

None. Participation in a voluntary credit trading program is voluntary.

NUMBER OF SOURCES INVOLVED

Participation is voluntary, so it is difficult to project how many sources will choose to become involved. Participation entails commitments of money, staff time, and emission reduction or sequestration actions or credit purchases. Sources have a variety of reasons to participate in a voluntary credit trading program, including belief in a need for action, a desire to enhance the corporate image, to meet a voluntary target, to attempt to forestall future regulation, to better understand emissions reduction credit trading, or to benefit from a government commitment to provide "credit for early action".

Many of the reasons for participating in a voluntary credit trading program are specific to each firm. Thus it is difficult to predict how many sources will believe that one or more of these reasons is sufficiently important to incur the costs of participating in a voluntary credit trading program. Historically, however, the number sources that participate in a pilot trading program has been of the order of 10 to 25.

As discussed earlier, a full-fledged voluntary credit trading program would require a mechanism to give value to the credits; some form of "credit for early action" or specified uses for the credits. The level of participation and of credit creation and trading activity will depend on the value given to the credits by the government commitment. A full-fledged program, presumably, should be much larger than a pilot program, say at least 100 sources as participants.

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Participation in either a pilot program or a full-fledged program might increase if future regulatory policies become more imminent, especially if credit trading is among, or preferred to, the policy options being considered to meet the future commitment.

SHARE OF TOTAL EMISSIONS COVERED BY PARTICIPANTS

Because participation is voluntary, it is difficult to project how many sources will choose to become involved and scale of the credit creation and use actions they undertake.

Coverage can be measured in terms of the share of total sources covered, share of total emissions covered, or share of emissions reduced. In pilot programs, the number of participants is small (10 to 25) and they generally represent only a small percentage of all sources and total emissions of the relevant pollutants. Likewise, the credits created (used) in a pilot program typically represent only a small fraction (less than 1%) of the total emissions of the same pollutant by the entities creating (using) the credits.

The incentives for participants in pilot programs to implement emissions reductions historically have been very weak. A full-fledged voluntary credit trading program would require stronger incentives, such as "credit for early action" or specified uses for credits. That would probably lead to both larger emission reductions by participating sources and broader participation, thus raising the share of total emissions covered substantially.

HOW THE TRADING PROGRAM WOULD BE ADMINISTERED

A voluntary credit trading program would probably be established, managed and financed by the participants. The participants would probably include representatives of the various stakeholders: sources of greenhouse gas emissions, governments as potential future regulators, environmental groups, consumer groups, and labour organizations.

A typical organizational structure includes an executive committee, an operations committee and numerous task forces.

- The executive committee or board of directors provides policy direction and so meets relatively infrequently. Members are typically senior staff from the organizations represented.
- The operations committee guides the day to day operation of the program and typically meets monthly. Members of the operations committee are staff from participating organizations knowledgeable of environmental issues or emissions trading.
- Task forces or sub-committees are often established to deal with specific issues. They typically consist of members of the operations committee, supplemented by additional experts.

Participants agree upon a budget. This requires them to agree on a fee structure, which may include membership fees for various categories of participant and fees for various activities, such as review of a credit creation, use or trade. When developing the budget, participants also agree on issues such as, day-to-day operation of the program, funding participation by non-profit organizations, and outreach activities such as workshops.

A registry is established. Every voluntary credit trading program has a registry to track the credits created, changes in ownership and credit uses. Some programs develop a registry to meet their specific needs, while other programs contract for the use of an existing registry. Like all operating decisions, the choice of a registry is made by the participants.

In a pilot program the number of sources is generally sufficiently small that all participants are represented on the operations committee and that decisions can be made by consensus. That would not be possible for a full-fledged program with over 100 sources. The participants would instead have to establish an organization to administer the trading program reporting to a board of directors or executive committee chosen by the participants. A full-fledged voluntary credit trading program would also tend to rely more on employees or contracted staff than a pilot program for its day-to-day operation.

HOW EMISSIONS WOULD BE MEASURED

Participants must establish a process for credit creation. Credits are created by sources who implement measures to reduce their emissions below a suitable baseline or to increase emissions sequestration above a suitable baseline. This means that credit creation involves specification of a suitable baseline and of criteria for credit creation.

The Secretariat for the United Nations Framework Convention on Climate Change concluded that the baseline for a credit creation project should be constructed before the measures are implemented and should include an indication of greenhouse gas emissions expected to occur in the absence of the project.¹⁰ In developing the baseline:

- Preferential consideration should be given to using the technology which would have been the most likely *marginal* addition to the host country economy;
- Project boundaries should be appropriate to the scale and complexity of the activity, so as to incorporate consideration of possible leakage; and

¹⁰ Climate Change Secretariat, "Work on Methodological Issues," FCCC/SBSTA/1997/INF.3, Subsidiary Body for Scientific and Technological Advice, Seventh Session, Bonn, 20-29 October, 1997. The report deals with methodological issues relating to Activities Implemented Jointly (AIJ), a form of voluntary credit trading for greenhouse gas emissions.

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- Selection of the relevant time frame should be guided by consideration of the technical or financial characteristics of the activity or by policy factors.

The Secretariat also concluded that the baseline for a project should remain fixed, so as to ensure predictability for investors. But, for projects with long lifetimes, participants might propose revisions to the baseline at appropriate intervals. For a given class of projects, the appropriate methodology of constructing a baseline may change over time due to technological change or a change in the policy context.

If there exists a prospect of a potential *future* national commitment to limit greenhouse gas emissions sources have an incentive to begin to reduce their emissions to be better able to meet their potential future obligations. This incentive to begin to reduce emissions should be reflected in the baselines. In practice, it is very difficult to determine what emission reduction or sequestration actions are simply prudent business decisions. Thus, it is very difficult to define the appropriate baseline and whether the reductions are "additional" or would have occurred anyway.

Credits must represent real reductions from the emission levels that would otherwise prevail. This involves establishing criteria the credits must meet and establishing a process to assess credit creation actions against those criteria.¹¹ Typically, credits must be real, measurable, and additional. In addition, actions to sequester greenhouse gases must lead to long-term sequestration.

The criteria are only the starting point. Virtually every emission reduction or sequestration project is unique in some respects. Thus each emission reduction or

¹¹ Issues related to the criteria for credit creation are discussed at length in a separate NRTEE paper for Issue 9. As discussed earlier PERT requires emissions reductions to be "real", "quantifiable" and "surplus." PERT defines the baseline as the emissions that would otherwise occur, so reductions from the baseline are automatically "additional." GERT requires emissions reductions to be "real", "measurable", "verifiable" and "surplus." GERT is interested in exploring, on a project-by-project basis, the merits and methods for applying an "additionality" criterion. The Climate Change Secretariat, "Work on Methodological Issues," FCCC/SBSTA/1997/INF.3, Subsidiary Body for Scientific and Technological Advice, Seventh Session, Bonn, 20-29 October, 1997 deals with methodological issues relating to Activities Implemented Jointly (AIJ), a form of voluntary credit trading for greenhouse gas emissions. It defines the criteria as follows:

- The environmental benefits of an emission reduction or sequestration action would be recognized as *real* if the actual GHG emissions or sequestration can be shown to differ from a credible and probable baseline scenario, taking leakage into account.
- The environmental benefits of an emission reduction or sequestration action are considered to be *measurable* if the actual level of GHG emissions of the project case and the level of GHG emission in the baseline scenario can be established with a reasonable degree of certainty.
- The environmental benefits of an emission reduction or sequestration action can be recognized as *additional* if it can be demonstrated that the resulting environmental benefits related to GHG would not have otherwise occurred. The reduction or sequestration must also be surplus to any regulatory requirements.
- The environmental benefits of an emission sequestration action can be recognized as *long-term* if the emissions are sequestered for an appropriate period of time which may extend beyond the life of the project.

sequestration action needs to be assessed against the criteria to determine whether leads to the creation of credits.

Two approaches to assessing credit creation actions against the criteria are possible, depending on the approach taken to liability for the validity of the credits; seller liability or buyer liability.¹²

- The trading program can establish a review process that leads to approval of the credits. Once the credits have been approved by the trading program, they can be purchased and used without risk of rejection. This approach is most consistent with a system of seller liability.
- The trading program can establish a review process, but it does not approve or reject credits. Responsibility for approving credits remains with the regulatory authority when the credits are ultimately used. This approach is most consistent with a system of buyer liability.

The review process addresses the issues that arise in the application of the criteria to a various emissions reduction and sequestration measures.¹³ That often involves judgements as to what is "reasonable" for issues such as the baseline, measurement accuracy, monitoring cost, and long-term sequestration. Debating those judgements is useful, regardless of whether the ultimate authority resides with the trading program or the regulatory authority.

POSSIBLE COMPLEMENTARY POLICIES

Given the prospect of a potential *future* national commitment to limit greenhouse gas emissions, sources have an incentive to begin to reduce their emissions to be better able to meet their potential future obligations. Governments likewise should begin to implement policies that will facilitate achievement of the future national commitment, yet are not too costly in case the commitment does not come into force. The complementary

¹² See the NRTEE paper on Issue 8 for a discussion of liability for the validity of credits or allowances. Liability establishes which party is responsible for ensuring that the credits are valid when they are traded. If the seller is responsible, the buyer can accept the allowances knowing they will be valid. If the seller does not meet its commitments it incurs the penalties for non-compliance. If the buyer is responsible, it must decide whether the seller is likely to comply with its commitments before purchasing the allowances. If the buyer is responsible and the seller later needs the allowances to achieve compliance, the sale will be invalidated; the seller keeps the allowances and the buyer resorts to the contract provisions and the legal system to recover any payments that have been made. The buyer may also need to purchase replacement allowances quickly to achieve compliance.

¹³ As discussed earlier, PERT reviews credit creation actions but does not approve the credits. It has adopted a principle of buyer liability. The Ministry of the Environment will determine whether the credits meet the applicable criteria when the credit creator or buyer tries to use them for compliance purposes. GERT has decided that the Technical Committee will determine the number of credits created by actions undertaken by participants.

policies should become more stringent as the potential commitment becomes more imminent.

A voluntary credit trading program could be complemented initially by other voluntary programs, such as energy efficiency targets, and information programs to encourage greenhouse gas emission reductions. If the prospect of a future national commitment became more imminent, more costly and more compulsory programs could be introduced. These might include standards and regulations to reduce greenhouse gas emissions from new appliances, equipment, vehicles, buildings, and industrial processes. Procurement standards, various economic incentives, and more ambitious voluntary targets, perhaps with penalties for underachievement could also be introduced.

As noted above, a full-fledged voluntary credit trading program would require a government commitment to provide some form of "credit for early action" or to allow the credits to be used for specified purposes to provide sufficient incentive for sources to participate on the desired scale.

Although sources have an incentive to begin to reduce their emissions to be better able to meet their potential future obligations, they also run a risk by implementing emissions reduction actions before those future obligations have been defined. Sources that begin to reduce their emissions before their future obligations are defined run a risk that those obligations will not recognize the early action. The result could be more onerous obligations for sources that have implemented early reductions (and hence benefited the environment) than for sources that have increased their emissions in the interim (and hence damaged the environment). This is clearly a perverse incentive.

Appropriate recognition or "credit for early action" can correct this perverse incentive. The "credit" could take a variety of forms, including adjustment of the baseline for determining future obligations, financial incentives such as tax credits, or a commitment to accept credits created toward compliance with future obligations. The form of the "credit for early action" could be affected by the future national commitment.¹⁴

Different forms of "credit for early action" provide different levels of incentive for emissions reduction and trading prior to actual implementation of an emission limitation commitment. Adjusting the baseline to reflect early emissions reductions protects sources against more onerous obligations due to such actions. Tax incentives and recognition toward compliance with future obligations can provide positive incentives. Those incentives could be quite large if the baseline for determining future obligations is also adjusted. Regardless of the nature of the "credit for early action," it improves the business case for actions to reduce emissions and so should increase the volume of early emission reductions.

¹⁴ For example, countries with commitments to limit their greenhouse gas emissions during the 2008-2012 period under the Kyoto Protocol can not count reductions achieved domestically before that time toward their commitment. Such a country could still recognize early reductions domestically, but it would then need to achieve larger reductions during the 2008-2012 period.

SPECIAL ISSUES RAISED BY THE DESIGN

A voluntary credit trading program for greenhouse gases in the context of a potential future national commitment to limit greenhouse gas emissions on its own does not raise any special issues. However, the possibility that some of the credits may be used for compliance with future regulatory obligations as a result of "credit for early action" raises two issues: ownership of credits and the possibility of double counting.

Ownership of any credits created must be clearly and unambiguously established if they can be used toward future regulatory obligations or can receive other forms of "credit for early action," such as tax incentives. Likewise, procedures must be implemented to ensure there is no double counting or reporting of credits created. Existing programs for voluntary greenhouse gas emissions reduction, such as the VCR and AII, suffer from double (or multiple) reporting of reductions and are not concerned with ownership. Both PERT and GERT seek to ensure that ownership is clear and that double counting or reporting is not possible. A voluntary credit trading program would need to do likewise.

TRANSITIONAL ISSUES RELATED TO A CHANGE IN THE POLICY SETTING

This voluntary option assumes the prospect of a future national commitment to limit greenhouse gas emissions. That policy setting could change in either of two ways:

- The prospect of a national commitment to limit greenhouse gas emissions no longer exists. This would be the case if the Kyoto Protocol does not come into force.
- A commitment to limit greenhouse gas emissions exists and policies to meet that commitment are being implemented. This would be the case if Canada ratifies the Kyoto Protocol, the Protocol comes into force, and policies are implemented in Canada to meet that commitment prior to and/or during the commitment period.

If the prospect of a national commitment to limit greenhouse gas emissions no longer exists, the voluntary credit trading program could continue to operate with no change. Participation would probably decline since the expected benefits of learning about emissions trading, influencing future regulatory policies, and earning credit for early action would be smaller. But no specific changes would be required to the credit trading program.

If a commitment to limit greenhouse gas emissions comes into force and policies to meet that commitment are being implemented the voluntary credit trading program would need to change. In this situation all sources of greenhouse gas emissions covered by the national commitment are expected to bear their fair share of the burden of meeting the commitment. Each source of greenhouse gas emissions will be subject to policies that

require it, directly or indirectly, to limit its emissions to a level consistent with its share of the national commitment. Some, but probably not all, sources are required or allowed to participate in domestic emissions trading. Sources outside the trading program are assumed to be subject to other policies, such as efficiency standards, taxes, controls on products, etc.

The voluntary credit trading program then must evolve into a trading program that ensures participating sources limit their emissions to a level consistent with their share of the national commitment. This requires that emissions limits be established, directly or indirectly, for the participants and effective enforcement with penalties for non-compliance. Assuming that some form of emissions trading program is implemented for the participants in the voluntary credit trading program, the options are:

- Voluntary credit trading with mandatory performance standards (option 8); or
- A cap and trade system with adjustments to cope with the credits for early action (options 4, 11, 13 or 14).

Since the voluntary credit trading program could include a diverse set of participants it is possible that both options might apply to different participants.

Some or all of the participants in the voluntary credit trading program could be subject to mandatory performance standards once the national commitment comes into force. The performance standards could limit emissions per unit of output (input). Total emissions by these sources would then depend on the emissions standard and the level of output (input). As discussed in the NRTEE paper on Option 8, such performance standards can be defined in ways that allow trading to achieve compliance. The lead in gasoline and the averaging, banking and trading (ABT) provisions of the heavy-duty engine emissions standards are examples of American trading programs of this type.¹⁵

If the national commitment to limit greenhouse gas emissions is defined as a total quantity, performance standards defined in terms of emissions per unit of output (input) have the disadvantage of not controlling total emissions very precisely. A cap and trade system sets a limit on total emissions and so allows more precise management of compliance with the national commitment.

Some or all of the participants in the voluntary credit trading program also could be required to participate in a cap and trade program once the national commitment comes into force. A cap on total allowable emissions by participating sources would be established. Allowances could be auctioned or distributed to participants *gratis* using an agreed allocation rule. Participants would need to monitor their actual emissions and remit allowances equal to their actual emissions to the regulatory authority. Options 4, 11, 13 and 14 are trading systems of this type involving different sets of participants.

¹⁵ These programs are discussed in NRTEE Issue Paper 6, *Analysis of Options for Gratis Distribution of Allowances*.

A program of "credit for early action" as part of the voluntary credit trading program could create credits that can be used for compliance with obligations after the national commitment comes into force. If early reductions can not be counted toward the national commitment, as is the case under the Kyoto Protocol, the obligations imposed on sources during the commitment period have to be made more stringent by the amount of the accumulated early credits. That would require more stringent emissions standards or a lower cap on total emissions under the options described above.

The "credits for early action" might need to meet the rules established for the trading programs implemented after the national commitment comes into force before they can be used for compliance with obligations during this period. This may reduce the quantity of accumulated credits somewhat. Using the remaining "credits for early action" for compliance under the trading programs implemented to meet the national commitment is straightforward as long as they can be expressed in the same unit (e.g., one tonne of CO₂-equivalent emissions) as the allowances or credits for the trading programs.

It is also possible that a national commitment to limit greenhouse gas emissions could be met without the use of a domestic emissions trading program. Credits created during the commitment period or "credits for early action" might still have some uses under such a regulatory regime. Uses embodied in American credit trading programs for emissions other than greenhouse gases include:

- Requiring new sources locating in non-attainment areas, whose emissions exceed a specified threshold, to purchase credits created by other sources in the area at least equal to their allowed emissions.
- Allowing expanding sources to use credits to offset some of the increased emissions and so qualify for a simpler, less-costly regulatory approval process.
- Requiring sources to purchase credits as part of the penalty for violating emissions regulations or as a condition for receiving a variance from environmental regulations.

In summary, the transition to a policy setting where the prospect of a national commitment no longer exists requires no change to a voluntary credit trading program, although interest in the program is likely to decline. If a national commitment to limit greenhouse gas emissions comes into force, participants in the voluntary credit trading program would be subject to regulations or taxes with no trading options, mandatory performance standards with voluntary credit trading, or a cap and trade system. The transition to any of those options should be relatively straightforward even with a program of "credit for early action."

EVALUATION OF THE OPTION USING PROPOSED CRITERIA

The criteria proposed for use in the evaluation of the emissions trading options are summarized in Table 3. These criteria are drawn from *Analysis of the Potential for a Greenhouse Gas Trading System for North America*, Commission for Environmental Cooperation, Montreal, May 1997, chapter 3, pp. 32-42, and are described fully there.

Table 3: Criteria for Evaluating Proposed Greenhouse Gas Emissions Trading Systems

Economic efficiency
Cost-effectiveness
Transactions costs
Comprehensiveness
Equity
International equity
Domestic equity
Industrial equity
Technical feasibility
Technical flexibility
Timing
Leakage
Political feasibility
Domestic political compatibility
International compatibility
Sovereignty
Administrative feasibility
Measurability
Verifiability
Enforceability

Cost-effectiveness. Emissions trading should minimize the cost of reducing greenhouse gas emissions to individuals, firms and society. This criterion does not apply to a voluntary credit trading program in the context of a potential future national commitment to limit greenhouse gas emissions because there is no limit on emissions. The voluntary credit trading program is implemented to gain practical experience with emissions trading, to influence future policy, and to earn credits for early action. Individual participants must assess whether these benefits justify the costs of participation. They always have the option of not participating.

Transactions costs. Transactions costs for emissions trading programs should be minimized. Transactions costs for a voluntary credit trading program are likely to be relatively high. One of the reasons for implementing such a program is to gain practical experience with emissions trading. Understanding the issues raised by credit creation through different actions will tend to raise transactions costs.

Comprehensiveness. An emissions trading program should cover as broad a range of greenhouse gas sources and sinks as possible. In principle, a voluntary credit trading program allows all sources and sinks to participate. Participation in a pilot program generally represents only a small fraction of total sources and emissions. Depending upon the strength of the incentives provided, a full-fledged program could attract significant participation.

International equity. An emissions trading program should be fair to developing countries. This criterion does not apply to a voluntary domestic credit trading program.

Domestic equity. An emissions trading program should be equitable in terms of its impacts on different income groups and regions. The volume of credit creation and the total costs of a voluntary credit trading program are likely to be small in a pilot program and somewhat larger in a full-fledged program. In either case the impacts on different income groups or regions are likely to be too small to detect.

Industrial equity. An emissions trading program should treat different industries and sectors fairly (not necessarily equally). Participation in a voluntary credit trading program is voluntary. Firms that choose to participate presumably do so because they believe the potential benefits justify the costs. Others are not required to participate.

Technical flexibility. An emissions trading program should allow maximum flexibility in terms of the choice of reduction or sequestration technology to implement. A voluntary credit trading program is likely to meet this criterion, since one of the objectives is to better understand the issues raised by different reduction and sequestration options.

Timing. An emissions trading program should allow maximum flexibility in the timing of reduction or sequestration actions. A voluntary credit trading program is likely to meet this criterion, since participants are not required to meet specified emissions limits by particular dates.

Leakage. An emissions trading program should minimize increases in emissions elsewhere. A voluntary credit trading program would try to minimize leakage through its rules governing credit creation, such as the definition of the baseline and determination of additionality. Furthermore, participants typically implement actions that are cost-effective and/or relatively small. As a result, emission reduction actions are unlikely to lead to large shifts in production, and hence greenhouse gas emissions.

Domestic political compatibility. An emissions trading program should minimize potential conflicts with existing and future domestic policies. This criterion is important

for a trading program implemented in the context of a potential future commitment to limit greenhouse gas emissions. A voluntary credit trading program meets this criterion well. It does not affect current policy and permits an easy transition to almost any policy adopted to meet a national emissions limitation commitment if it comes into force.

International compatibility. An emissions trading program should minimize potential conflicts with existing and future international regimes. A voluntary domestic credit trading program meets this criterion. It is compatible with current international arrangements concerning greenhouse gas emissions, such as the pilot phase of Activities Implemented Jointly. A voluntary credit trading program also provides a relatively easy transition to virtually any set of policies needed to comply with future international commitments, such as those of the Kyoto Protocol.

Sovereignty. An emissions trading program should minimize the need for international oversight and interference. A voluntary domestic credit trading program requires no international oversight.

Measurability. An emissions trading program should minimize the uncertainty and complexity of measuring emissions reduced or sequestered. A voluntary credit trading program has as one of its objectives to better understand the options available for measuring emissions reduced or sequestered through different actions implemented for various gases/sources. The more successful a voluntary credit trading program, the better it is likely to meet this criterion.

Verifiability. An emissions trading program should increase confidence on the part of participants and other stakeholders that the emissions reductions claimed have been achieved. Since a voluntary credit trading program is implemented to learn about emission reduction and sequestration options rather than to meet an emissions limit, this criterion may not always be met very well. If "credit for early action" is adopted as part of the voluntary credit trading program, the need for verifiability increases.

Enforceability. An emissions trading program should maximize compliance with emission limitation commitments. This criterion does not apply to a voluntary credit trading program because neither the participants nor the country has an emission limitation commitment.