



NATIONAL ROUND TABLE ON THE ENVIRONMENT AND THE ECONOMY
TABLE RONDE NATIONALE SUR L'ENVIRONNEMENT ET L'ÉCONOMIE

NRTEE Official Reports Copyright and Reproduction Notice

All **NRTEE Official Reports** (“Works”), provided on this USB memory key and identified in the **NRTEE Official Reports List** folder, contain their individual copyright and reproduction notice. The notice in each of these Works is replaced and superseded by the following copyright and reproduction notice, effective February 22, 2013:

© This Work is protected by copyright and made available for personal or public non-commercial use and may be reproduced, in part or in whole, and by any means, and may be further distributed for non-commercial use, without charge or further permission. All users are required to indicate that the reproduction, whether in part or in whole, is a copy of a Work of the National Round Table on the Environment and the Economy (NRTEE). Reproduction, in whole or in part, of this Work for the purpose of commercial redistribution is strictly prohibited. Furthermore, no right to modify or alter in any manner the Work is hereby granted.

Consultant Reports Copyright and Reproduction Notice

All **Consultant Reports** (“Works”), provided on this USB memory key and identified in the **Consultant Reports List** folder, were prepared for, or commissioned by, the National Round Table on the Environment and the Economy (“NRTEE”) in support of its research efforts, and may or may not reflect the views of the NRTEE. Such Works may not contain a copyright notice as they were not intended for public release when they were so prepared or commissioned. In the absence of a copyright notice, and where a copyright notice may in fact appear, the following notice shall be read together with the Work and, where applicable, replace and supersede any existing copyright notice, effective February 22, 2013:

© This Work is protected by copyright and made available for personal or public non-commercial use and may be reproduced, in part or in whole, and by any means, and may be further distributed for non-commercial use, without charge or further permission. All users are required to indicate that the reproduction, in part or in whole, is a copy of a Work of the National Round Table on the Environment and the Economy (NRTEE). Reproduction, in whole or in part, of this Work for the purpose of commercial redistribution is strictly prohibited. Furthermore, no right to modify or alter in any manner the Work is hereby granted.



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

NRT-1998054
Pembina Institute for Appropriate Development & Margaree
Consultants Inc.
Andrew Pape, Robert Hornung and Erik Haites
Domestic Emissions Trading

**Possible Criteria for the Creation of Emission Reduction Credits Under a
Domestic Emission Reduction Credit Trading Program**

Issue 9

Prepared for:

Multistakeholder Expert Group on Domestic Emissions Trading

Prepared by:

**Andrew Pape and Robert Hornung
Pembina Institute for Appropriate Development**

and

**Erik Haites
Margaree Consultants Inc.**

September 1998

POSSIBLE CRITERIA FOR THE CREATION OF EMISSION REDUCTION CREDITS UNDER A DOMESTIC EMISSION REDUCTION CREDIT TRADING PROGRAM

INTRODUCTION

This paper is one of a series of papers prepared for the NRTEE's Multistakeholder Expert Group on Domestic Emissions Trading that examine key design issues that must be addressed in the development and implementation of a variety of possible domestic emission trading systems for greenhouse gases.

The NRTEE process is examining a number of potential domestic emissions trading systems that incorporate domestic credit trading (NRTEE Options 1, 8, 11, 14). Within a greenhouse gas credit trading system, participants create emission reduction credits by taking specific actions to reduce greenhouse gas emissions. In general terms, a credit is awarded for the difference between what emissions would have been if the action had not been taken (the baseline or reference case) and actual greenhouse gas emissions after the action has been taken.¹

All emission reduction credit trading systems must grapple with the issue of what emission reductions resulting from specific actions should be eligible for credit under the system. More specifically, these systems must establish criteria that must be met for emission reductions to be eligible for credit.

This paper examines the issue of possible criteria for the creation of emission reduction credits under a domestic emission reduction credit trading program. It begins by providing a rationale for the use of such criteria and then offers some examples of the types of criteria currently used in existing emission reduction credit trading programs. The paper then outlines and describes a number of criteria that most emission reduction trading programs consider must be met for an emission reduction activity to be credited. This is followed by a discussion of an important but controversial criterion that must be considered in all credit trading programs: additionality. The paper then examines a final set of criteria that might be considered to ensure that credited emission reduction activities are of the highest possible quality.

Once criteria for credit creation have been agreed to, it is necessary to apply the criteria to specific emission reduction projects. This is not a straightforward task. After all, each emission reduction action is different and therefore the application of the criteria inevitably involves the use of judgement. The paper concludes with an example that illustrates the challenges associated with applying criteria for credit creation in the real world. That example will help demonstrate that an institutional mechanism must be established in any credit trading program that uses criteria for credit creation to both assess emission reductions and resolve differences in judgement. This paper does not address either the mechanics of such a system or the issue of who should be responsible for it. These issues are, however, addressed in some detail in NRTEE Issue Paper 8.²

WHY ESTABLISH CRITERIA FOR THE CREATION OF EMISSION REDUCTION CREDITS?

An emission reduction credit trading system for greenhouse gases would be established as a means to pursue a specific national commitment, such as that contained in the Kyoto Protocol, for greenhouse gas emissions reduction. Accordingly, one would want to ensure that any actions credited under the program contributed to this objective. As a result, there is a broad consensus that an emissions reduction credit trading program should include criteria that help to ensure that

¹ For the purposes of this paper, a reduction refers to activities that reduce, sequester, or avoid emissions.

² The paper is entitled "Analysis of Emissions Trading Program Design Features".

actions credited are contributing to the commitment. Emission reduction activities that do not meet these criteria would not be eligible to become an emission reduction credit.

The establishment of such criteria also:

- enhances the credibility and robustness of the emission reduction credit trading market,
- ensures a level playing field and common set of rules for participants in the program, and
- minimizes uncertainties for program participants.

A greenhouse gas emission reduction credit trading system may also have additional objectives that extend beyond greenhouse gas emissions reduction. These might address a number of economic, social or other environmental concerns. If this is the case, additional criteria for the creation of emission reduction credits could be developed to pursue these objectives.

CRITERIA FOR CREDIT CREATION IN EXISTING EMISSION REDUCTION CREDIT TRADING PROGRAMS

Examples of criteria from three credit trading programs are included in this section. This includes Canada's Greenhouse Gas Emission Reduction Trading Pilot, the U.S. Initiative on Joint Implementation, and a number of U.S. Credit Trading programs that have been established to deal with a variety of pollutants. The first two examples are programs which do not establish regulatory credit – but rather are pilot initiatives for trading of emission reductions with the potential for future credit. The latter stems from mandatory emission regulations, but provides some flexibility in the way that entities can comply with those regulations.

Greenhouse Gas Emission Reduction Trading (GERT) Pilot

The Greenhouse Gas Emission Reduction Trading (GERT) Pilot was established by the government of British Columbia and the Greater Vancouver Regional District as a mechanism for recognizing voluntary offset trades between entities who want to take early action on greenhouse gas emissions reduction. It now also includes the provinces of Alberta, Saskatchewan, Nova Scotia, Québec, and two federal government departments. NRTEE Option 1 essentially represents what would happen with a full scale implementation of GERT in Canada.³

The GERT Pilot is a voluntary, “buyer-beware” mechanism, implying that participants have no guarantee that the Registered Emission Reductions (RER)⁴ generated and traded under the program will be able to be applied against potential future regulatory requirements. However, each of the participating governments has signed a “Memorandum of Understanding” (MOU) which commits them to, “... recognize emission reductions from trades registered under the Pilot as progress towards possible compliance obligations in the context of any future greenhouse gas trading regime ...”. Participating governments have also indicated that they will not penalize firms that take early action in reducing GHG emissions through the GERT Pilot.

To receive an RER from the GERT pilot, emission reduction projects must meet a variety of eligibility criteria. The ultimate value of the RERs in any future regulatory regime is likely to be highly dependent on the extent to which the project has clearly and unambiguously addressed these criteria.

³ The paper describing this option is entitled “A Voluntary Credit Trading Program for Greenhouse Gases”.

⁴ Registered Emission Reductions are essentially the credits created through the GERT program.

Some of the eligibility criteria are mandatory and must be met if an emission reduction project is to receive an RER. The mandatory criteria are the following:

- **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. Leakage occurs when a project causes or results in an increase in GHGs in another time or place.
- **Measurable** – An emission reduction is measurable if the actual level of GHG emissions with the project in place, and the level of GHG emissions in the reference case (what would have occurred without the project in place), 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 is available.
- **Surplus** – An emission reduction is surplus if it represents a reduction that is not otherwise required. If legal requirements affecting GHG emissions come into effect during the life of the project, then the reference case(s) must be adjusted to reflect the new requirements.

The GERT Pilot has also identified several other criteria that may be used to assess emission reduction projects seeking an RER. While none of these criteria are mandatory, and failure to meet these criteria will not disqualify a project from receiving an RER, performance against these criteria may well influence the probability that RERs awarded will be recognized under any future regulatory regime. These criteria include:

- **Project additionality** – The GERT Pilot Technical Committee has not yet achieved consensus on a definition of “project additionality”, but is exploring the merits and methods for applying additionality on a project-by-project basis.
- **Other environmental and socio-economic impacts** – Participants are requested to document significant non-greenhouse-gas impacts of the project, such as local air quality or other impacts on the environment as well as socio-economic impacts (both positive and negative).
- **Third party review** – Participants may be asked by the GERT Technical Committee to provide for third party verification / auditing of the reference case, actual emissions and/or emission reduction calculation.

As of yet, no trades have been reviewed under the GERT Pilot. As such, there has been no application to date of the criteria outlined above.

Pilot Emission Reduction Trading Program – PERT

The Pilot Emission Reduction Trading Program (PERT) in Ontario originated as a trading program for local air pollutants (e.g., NO_x, VOCs, PM-10) and has only recently expanded to include greenhouse gases. PERT will recognize any greenhouse gas emission reductions that meet the following criteria: “real”, “quantifiable”, “surplus” “verifiable” and have “duration” (long-term). Clearly, there is a lot of similarity between GERT and PERT in this area.

PERT establishes emission reduction credits (ERCs) for emission reductions and these can be traded between firms. It is anticipated that the Ontario government will offer some form of recognition for these ERCs in the future (discussions are currently underway about what form such recognition might take), but currently PERT is limited to a learning program that offers modest value toward regulatory risk management. It should also be noted that 10% of all emission reductions created under PERT are retired as a donation to “environmental benefit”. As a result, ERC’s only represent the remaining 90% of any emissions reduction.

U.S. Initiative on Joint Implementation

The U.S. Initiative on Joint Implementation (USIJI) is a voluntary emission reduction trading mechanism designed to foster GHG offset trades between entities in the U.S. and those in non-industrialized (non-Annex-II) countries. It corresponds with the Activities Implemented Jointly (AIJ) Pilot Phase, established in 1995 as part of the UN Framework Convention on Climate Change. Project proponents must demonstrate that their project meets the following standards and criteria⁵.

- **Has the acceptance of the host country government** – This is included to ensure that the project is compatible with host country development goals. The project proponents must obtain a letter of acceptance for the project from the host country government and submit it to the USIJI office.
- **Will reduce or sequester net GHG emissions** – This criterion, also referred to as “emissions additionality”, requires that project developers develop estimates for the reference (baseline) and project scenarios and demonstrate that the project will generate GHG benefits above and beyond those in the reference scenario. Reference scenario predictions should be consistent with (1) prevailing standards of environmental protection in the country involved; (2) existing business practices within the particular sector of industry; and (3) trends and changes in these standards and practices. The proponents are required to provide data and methodological information sufficient to measure emissions with and without the project.
- **Provides for tracking and verifying the emissions reduced or sequestered by the project** – The USIJI project criteria require that project developers include provisions for monitoring and externally verifying project results.
- **That benefits gained will not be lost over time** – The USIJI project criteria require that project developers provide adequate assurance that GHG benefits generated by their project will not be lost or reversed. Of particular concern is “leakage”, that on-site GHG benefits generated by the project may be offset by a project-related increase in emissions outside of the project area.
- **Was developed or realized because of the USIJI Program** – This criterion, also referred to as “program additionality”, requires that the offset project was initiated as a result of, or in reasonable anticipation of, the USIJI. Developers must demonstrate that, given prevailing regulations, policies, technologies, practices, and trends, their project would not have been introduced in the absence of USIJI. In cases where a previous project is being extended or continued, the project proponents must demonstrate that the existence of the USIJI enabled them to overcome barriers to implementation, such as the lack of funding, lack of government support, need for technical assistance, or difficulty identifying project sponsors.
- **Demonstrates “financial additionality”** – implying that projects should not represent a simple repackaging of projects associated with federal or multilateral funds that would have been available in absence of the offsets market.
- **The project application to USIJI should identify associated environmental and developmental benefits** – this includes non-GHG environmental benefits such as biodiversity conservation, watershed protection, reduced consumption of nonrenewable resources, increased availability of electricity, public education and training, local economic development, and technology transfer.

⁵ USIJI. Activities Implemented Jointly: Second Report to the Secretariat of the United Nations Framework Convention on Climate Change. November, 1997.

U.S. Credit Trading Programs – Project Based

Several credit trading programs have been established in the U.S. since 1977 for criteria pollutants such as CO, NO_x, and SO₂. The first programs to require criteria for credit creation were programs that required new sources, in areas in non-attainment with national ambient air quality standards, to offset any new emissions generated with emission reductions elsewhere in the same airshed. These programs used the following criteria established by the U.S. Environmental Protection Agency: permanent, surplus, enforceable, and quantifiable.

The “surplus” criterion means that emission reductions are surplus to regulatory requirements, but also requires actual net atmospheric emissions to be reduced – synonymous with the “real” criterion in other credit trading programs. Credits created in these programs were measured in tons/year with an indefinite life, rather than being determined on an annual basis as is the case with the GERT pilot and other credit trading programs that have been implemented in North America. This was because new projects produced a “stream” of new emissions into the future, and these had to be offset by a “stream” of emission reductions. As such, the criteria needed to ensure that emission reductions would continue indefinitely. The “permanent” and “enforceable” criteria ensure that this will be the case.

U.S. Credit Trading Programs – Standard Based

Some U.S. credit trading programs (e.g., lead, heavy duty engine emission standards) have little in the way of criteria for credit creation. In these programs, credit creation and use is only possible for entities subject to the standard. The standard defines the base case or reference case and the credit represents the difference between the standard and actual emission levels. The regulations outlining the standard specify measurement protocols and reporting requirements. As a result, the only criterion needed to create a credit in these programs is “surplus” – actual performance must be better than the standard.

The Kyoto Protocol’s Project Based Flexibility Mechanisms

The Kyoto Protocol created two emission reduction credit trading mechanisms. Joint implementation is a mechanism for emission reduction credit trading between Annex I Parties (industrialized countries and countries with economies in transition). The Clean Development Mechanism facilitates emission reduction credit trading between Annex I Parties and developing countries.

While many questions remain about how these mechanisms will be implemented, operated and administered, the Kyoto Protocol itself provides some insight into what criteria will be used to determine what emission reductions will be creditable under these programs.

The criteria for joint implementation are:

- the project must be approved by the Parties involved,
- the project must provide a reduction in emissions by sources, or an enhancement of removals by sinks, that is additional to any that would otherwise occur,
- the project must involve countries that are in compliance with their emissions inventory and reporting obligations, and
- the acquisition of emission reduction units shall be supplemental to domestic actions for the purposes of meeting national emissions target commitments.

⁹ UNCTAD. Greenhouse Gas Emissions Trading – Defining the Principles, Modalities, Rules, and Guidelines for Verification, Reporting and Accountability. Draft, July, 1998.

The criteria for the Clean Development Mechanism are similar with the additional objectives that projects must provide real, measurable and long-term benefits related to the mitigation of climate change, and must also assist developing countries in achieving sustainable development.

BROADLY ACCEPTED CRITERIA FOR CREDIT CREATION THAT ARE DESIGNED TO GUARANTEE ENVIRONMENTAL EFFECTIVENESS

Existing emission reduction credit trading initiatives require that emission reductions seeking to be certified as credits meet certain eligibility criteria. Criteria that are broadly applied across programs are criteria that are designed to guarantee that environmental benefits are being achieved as a result of the project. This section outlines these criteria in detail.

1. Emission Reductions Must Represent Real Reductions in Atmospheric Emissions

Initially, this may appear to be a straightforward criterion – if emissions are not being reduced, then no credit is created. However, determining whether or not emissions are being reduced, and the quantity of emissions being reduced, is a challenging task.

A ‘real’ emission reduction requires that the actual, post-project emissions are lower than the emissions baseline, defined as what emissions would have been under ‘business-as-usual’ circumstances if the project had not been undertaken.

There are several methods for estimating the emissions baseline, also referred to as the reference case or ‘business as usual’ forecast. A baseline forecast involves two essential elements, an emissions factor for a facility, process or activity, and a forecast of “activity levels”. The emissions factor is the level of emissions per unit of production, throughput, or activity. Emissions factors can be based on historical emissions levels, or developed through a quantitative model or forecast of future emissions levels. They can apply to individual facilities (e.g., electricity stations) or entire systems (e.g., electricity market for a province). The forecast of activity levels is equivalent to the expected utilization of technologies that produce emissions – industrial throughput, amount of energy production, distance traveled in motor vehicles, etc. The units of the activity levels should be equivalent to the denominator of the emissions factor.

Determining what either an “emissions factor” or “activity level” would have been requires that assumptions be made. In some programs (e.g., lead trading program in the U.S.), the assumptions are enshrined in the regulatory process because the regulation establishes the baseline to be used to determine the level of emissions reduction credit. In such programs, the baseline is not really a representation of what would have happened without the action, but rather provides a standard baseline against which the level of emission reduction credits can be determined.

In other credit trading programs, it is necessary to determine the baseline on a project by project basis. The wide variety of potential greenhouse gas emission reduction projects means that it is very unlikely that standard baselines, or even standard baseline methodologies, can be created to address all possible emission reductions. As a result, assumptions will have to be made in these programs about future “emissions factors” and “activity levels”. These assumptions will require judgement and there will be no “right” answer. This has been recognized, for example, in the GERT Pilot, which encourage project proponents to present several baselines that the program can consider when determining what level of RER to award.

If baselines truly represented “what would have happened anyway”, there would be no need for a criterion on “additionality”. Unfortunately, however, any baseline, like any projection of greenhouse gas emissions, is certain to be wrong. While programs like GERT make an effort to determine “what would have happened anyway”, the uncertainty inherent in virtually all key assumptions means that many different scenarios are possible. As a result, efforts have made to

develop methodologies to determine “additionality” that may be more rigorous and demanding than what may be required to establish a baseline.

Even if emission baselines could be determined with certainty at one point in time, however, decisions need to be made on how a credit trading program should treat baselines over time. For example, a baseline could be considered permanent, providing certainty to investors by essentially guaranteeing an emission reduction into the future. On the other hand, a credit trading program could require baselines to be adjusted over time to reflect changing circumstances. The former method (is called *ex ante*, the latter is called *ex post* or dynamic. The method of determining the baseline will also depend on the program under which emission reduction credits are traded. For example, under the GERT Pilot, baselines are defined *ex ante*, but RERs are only awarded on an annual basis, with the baseline being adjusted *ex post*.

U.S. electric utility Demand-Side Management programs faced the same challenge of demonstrating reductions from what the consumption of electricity would have been in absence of energy efficiency programs. Baselines were revised *ex post*. The utility was typically required to retain an independent consultant to evaluate the results achieved. The evaluation could be challenged by parties and the Public Utilities Commission ultimately decided what the energy savings were and what costs could be recovered by the utility or what incentives had been earned.

For an example of determining ‘real’ emission reductions, consider the development of a natural gas-fired cogeneration facility in Alberta with a net emissions output of about 200 tonnes CO₂/GWh⁷. The current emission intensity of the Alberta electricity market is about 1000 tonnes CO₂/GWh. Under a baseline emission forecast that assumes continued operation of the existing generating facilities with coal meeting new electricity demands, the emission reduction credit from the operation of the new facility is 800 tonnes CO₂/GWh. However, with a baseline that assumes full market penetration of natural gas fired cogeneration technologies for 100% of the growth in supply, the baseline will start at the current level of 1000 tonnes CO₂/GWh, and gradually decline to 200-400 tonnes CO₂/GWh as existing coal plants are retired and cogeneration facilities are developed. In that case, the actual credit being created is much smaller, and declines to zero over time.

Concern about whether or not an emission reduction is real, however, extends beyond the boundaries of the project. From an environmental perspective, an emission reduction is not real if it simply results in an increase in greenhouse gas emissions in another location. This is known as ‘leakage’.

An example of leakage can be illustrated with reference to the construction of the natural gas cogeneration plant discussed earlier. If the plant results in a reduction in the production of coal-fired electricity for supplying power within the local jurisdiction, but that coal-fired production is simply shifted to supply increased electricity exports, actual reductions in atmospheric greenhouse gas emissions have not occurred.

It is also important to consider life-cycle emissions of products when considering the issue of ‘leakage’. For example, if an action is taken that reduces the energy required to produce a product, but at the same time modifies the product so that more energy is required to operate it, there may not be any benefit in atmospheric greenhouse gas emissions.

While all credit trading programs require that emission reductions credited represent real emission reductions, differences can exist in how different programs assess what a real emission reduction is. For example, with regard to leakage, the definition of project boundaries against which an assessment of leakage is made will be linked to the goals of the credit trading

⁷ Tonnes of greenhouse gases in CO₂ equivalents per Gigawatt-hour of electricity generated.

infrastructure. In some cases, an assessment of leakage may apply only to those activities in the immediate control of the party/parties undertaking the emission reduction project. In other cases, the boundary may include all activities within the national or international economy.

2. Emission Reductions Must Be Permanent

Once again, this seems relatively straightforward. It usually will not make sense to provide credit for emission reductions that are only temporary. This is particularly true in the context of climate change, because greenhouse gases like carbon dioxide have atmospheric lifetimes of several hundred years. The permanence criterion is similar to the concept of 'leakage' described above except that it takes on a time dimension instead of a geographic dimension.

Difficulties can arise, however, in defining the word 'permanent'. In the area of climate change, particular difficulties exist with respect to carbon sequestration. After all, all carbon sequestered in trees will eventually be released into the atmosphere. Should a project that makes a commitment to sequester carbon for 10 years through tree planting be credited? Should a 50 year commitment be required? It is necessary for a credit trading program to define a minimum time period over which an emission reduction must occur to be considered permanent and therefore credited.⁸ Many credit trading programs apply a 'long-term' criterion to sequestration offsets rather than 'permanent' to reflect the fact that no sequestration action can be truly permanent.

The 'permanence' criterion is really only relevant, however, for credit trading programs that specify credits in terms of "tonnes per year" instead of "tonnes" – in other words, programs which provide credits for multiple-year blocks of emission reductions rather than re-evaluating them on an annual basis. If evaluated on an annual basis, the permanence criterion is not required because it must be demonstrated on an annual basis that a credit exists that meets all of the other criteria in the program. If the case cannot be made, no credit is awarded.

In some credit trading programs, credit is granted for plant shutdowns. This is relatively common in non-attainment areas under the U.S. Emissions Credit Trading programs. Shutting down a plant or process is obviously a convincing way to demonstrate the reduction will be permanent. The credits are used to leverage economic growth in the form of new and expanding sources, so shutdown credits are consistent with both environmental and economic objectives. However, the equity aspects of paying plants that shut down while requiring new and growing plants to purchase credits can be contentious.

3. Emission Reductions Must Be Surplus to Laws and Regulations

In some forms of emission reduction credit trading (e.g., NRTEE Option 8), regulations are promulgated that establish the baseline against which emission reductions are measured. In this case, emission reductions clearly must be surplus to regulation to be credited.

The situation is somewhat less clear in voluntary credit trading (NRTEE Option 1) or when the regulation has been established for reasons other than greenhouse gas emissions reduction (e.g., a building code). Nonetheless, most credit trading programs include a criterion that emission reductions must be generated by projects that would not have been required by government regulations or laws. This helps to ensure that credits are awarded for new actions that actually contribute towards meeting the environmental objective and not actions that actually are already included in the baseline (because they would have happened as a result of the regulation) and therefore do not in and of themselves contribute to the achievement of the environmental objective.

⁸ One example of such a timeline is the fact that the Intergovernmental Panel on Climate Change's guidelines for the preparation of greenhouse gas inventories exclude carbon that is sequestered in petrochemical products for more than 20 years.

As usual, however, things can be more complicated. For example, what happens if a regulation on another air pollution issue is not prescriptive and more than one response can be taken to meet the regulation, each with a different impact on greenhouse gas emissions? How does a credit trading system deal with a situation where a project is implemented in a jurisdiction like some developing countries where regulations are routinely not enforced or followed?

Finally, there is also some controversy as to whether future regulations not anticipated when actions are taken to reduce greenhouse gas emissions should be applied to those projects already engaged upon when they come into place. The implementation of such a regulation would reduce previously forecasted project baselines and reduce the quantity of credits produced by the project. Clearly, if such an adjustment is made to the baseline, it should only be made in the year when the new regulation is brought into place. This ensures that those firms that undertook measures to reduce emissions which are later required under regulation, will receive credit for those early actions.

This issue can be addressed within trading systems which adjust the emission baseline *ex post*. This leads to a more accurate estimate of the emission reduction, but creates more uncertainty for investors. Alternatively, it may be possible to establish a reasonable basis for deciding when the baseline should be adjusted for new regulations. For example, if the new regulations apply only to new sources the baseline does not change but if the new regulations require existing sources to retrofit their operations then the baseline should be adjusted.

4. Emission Reductions Must be Measurable, Quantifiable, Reportable and Verifiable

It is clearly necessary for all emission reductions credited under a credit trading program to be measurable, quantifiable, reportable, and verifiable to ensure their environmental effectiveness.

Greenhouse gas emission reductions are measurable if actual emissions levels can be accurately determined with within a reasonable threshold of uncertainty. Emissions can be measured through indirect means as well. For example, energy related greenhouse gas emissions can be measured by monitoring the actual consumption of specific energy resources and using standardized emissions factors to convert this into greenhouse gas emissions.

Greenhouse gas emission reductions are quantifiable if there is an inventory or a baseline forecast of emissions from the source/sink in absence of the emission reduction project and it is possible to measure actual emissions after the project has been undertaken. If actual post-project emissions are not measurable, or if the uncertainty around the baseline forecast is too high, the emission reductions are not quantifiable.

Reportable implies that the emission reductions in question can be, and are, reported to the relevant regulatory body. If project characteristics are highly confidential, it may not be possible to analyze the project so as to award it emission reduction credits.

Finally, emission reductions are verifiable if their quantification can be reproduced and if a third party that is not financially involved in the offset trade concurs with the quantification. Whether or not such third party verification should actually be undertaken is a design issue discussed in NRTEE Issue Paper 8.

5. Ownership of Emission Reductions Must be Clearly Demonstrated

What does ownership of greenhouse gas emission reductions have to do with environmental effectiveness? If the ownership of a greenhouse gas emissions reduction is not clear, and more than one party receives credit for the emission reduction, environmental effectiveness is compromised. Double counting of emission reduction gives a false sense of progress toward the achievement of environmental goals.

As a result, credit trading programs should require that ownership of greenhouse gas emission reductions be clearly demonstrated. This can be a contentious criterion because some emission reductions may be legitimately claimed by several parties. For example, demand-side management initiatives of electric or gas utilities can be perceived as being made possible through utility financing, or through the permission of the utility customer who is ultimately consuming the energy resource which has been reduced. If financial considerations dictate ownership, then the investor (i.e., the utility) would own the emission reduction credit described above. If physical considerations prevail, then it is the customer that owns the credit.

Clear definitions and precedence within the credit trading infrastructure can help to solve this challenge. To begin with, a credit trading program can define who owns emission reduction credits. For example, the lead credit trading program in the United States restricted credit creation to the firms facing regulated standards under the program. It may also be the case, however, that complementary policies play a role in determining who is eligible to create and own credits. For example, sources participating in a cap and allowance trading program are unlikely to be allowed to create emission reduction credits (although they may well be able to own such credits and apply them against their cap). When little guidance is provided by the credit trading infrastructure, the determination of the ownership of credits can be left to the market and stakeholders can agree to a credit sharing arrangement for actions that reduce greenhouse gas emissions.

THE PROJECT ADDITIONALITY CRITERION

Perhaps the most controversial criterion related to the creation of emission reduction credits is the project additionality criterion. Simply defined, this criterion states that if an emission reduction project is to be creditable under a credit trading system, the emission reductions produced could not have occurred under 'business as usual' without the credit trading system. It is similar to the 'surplus' criterion discussed earlier but is much more demanding.

The main rationale for applying a project additionality criterion is to guarantee new and incremental environmental benefits from a greenhouse gas emission reduction activity. Non-additional projects do not provide a net environmental benefit, as the emission reduction / sequestration activity would have been undertaken "anyways". Therefore, it can be argued that the emission reductions generated by such a project should not be creditable against present or future regulatory requirements, even if the project passes the other criteria discussed earlier.

In reality, the strength of the argument depends on the policy context. Under the proposed Clean Development Mechanism of the Kyoto Protocol, for example, Canada can undertake emission reduction projects in developing countries that do not face a cap on greenhouse gas emissions. Under these conditions, the project additionality criterion becomes extremely important. After all, if Canada receives credit for an investment that reduces emissions in Senegal, it will be allowed to increase its emissions by a similar amount. If that investment was non-additional, there is no guarantee that any action will actually be taken in Senegal that goes beyond 'business as usual'. As a result, the environment loses. First, no real emission reduction will have occurred in Senegal. Second, Canada's emissions will actually be allowed to increase.

A similar situation will exist in Canada for any domestic credit trading system that is not operating within the context of a national emissions cap such as that set out in the Kyoto Protocol. The situation is different, however, if such a cap is in place. Under such a scenario, environmental effectiveness will not be compromised by the crediting of non-additional projects because there is a commitment that additional actions will be taken to ensure that the emission cap is met.

While environmental effectiveness would not be compromised in this situation, there are other reasons why it is necessary to make use of the project additionality criterion in this case. Those

reasons relate to the equity implications associated with the crediting of non-additional emission reductions. Assuming that companies can make use of credits to meet regulatory objectives (caps or standards), a company that invests in non-additional emission reduction projects will be allowed to increase its emissions without having generated emission reductions that help Canada meet its cap. Other actions will be taken to ensure the cap is met, but in essence the company has become a free rider, shifting the burden of investing in new emission reductions that will allow Canada to meet its cap to other companies or Canadians in general. In other words, crediting of non-additional offset projects can have an impact on the distribution of costs associated with greenhouse gas emissions reduction.

While project additionality is a very important criterion, it is notoriously difficult to assess and operationalize. Indeed, the US Initiative on Joint Implementation (USIJI) has a project additionality criterion but has found it challenging to apply to projects under the program. How does one demonstrate that a project “would not have happened anyway”?

A subjective assessment of each project, made by experts in disciplines related to the components of the project, could be used to assess project additionality. This type of approach is similar to that of the USIJI in assessing program additionality. Another approach would be to develop a scorecard around a set of very specific criteria that could be used to assess project additionality. Hybrid approaches that mix elements of both could also be used.

The Pembina Institute for Appropriate Development has developed and applied a methodology for assessing the project additionality of greenhouse gas emission reduction projects.⁹ This methodology examines different forms of additionality to determine whether or not an emission reduction project is project additional. The types of additionality examined are:

- “emissions additionality” – This is essentially the criteria that emission reductions must be real and net of any ‘leakage’.
- “regulatory additionality” – This is essentially the criteria that emission reductions must be surplus.
- “investment additionality” – This requires that the company or organization investing in a greenhouse gas emission reduction project would not have done so under their business-as-usual investment patterns and normal rate-of-return requirements. This means that the offset investment only makes sense if additional value is returned for the greenhouse gas emission reductions and/or accelerated action on climate change that is associated with the project. It is reasonable in assessing investment additionality to include project development expenses, regulatory costs, research and analysis, pre-authorization and verification costs and other transaction costs.
- “technology additionality” – This requires that the technology, resource, or practice responsible for the emission reduction is clearly beyond prevailing technologies or management practices for that industry or sector.

⁹ The paper entitled “Greenhouse Gas Offsets and Emission Reduction Credits: Eligibility and Selection Criteria” will be released in September 1998 and will be made available to the NRTEE’s Multistakeholder Group on Domestic Emissions Trading at their meeting on September 18-19, 1998.

- “business strategy additionality” – This implies that the greenhouse gas emission reduction activity goes beyond, or differs from the current business/management strategy of the business or organization investing the project, based on pure business development interests.

In addition, it must be recognized that there are often non-financial barriers to the advancement of technologies and practices that reduce or sequester greenhouse gas emissions. An assessment of these barriers may help demonstrate the “additionality” of an otherwise marginal project. For example, electric, gas and water demand-side management (DSM) technologies and processes are proven, cost-effective and widely beneficial, yet few successful programs prevail. A variety of non-financial barriers exist which prevent the advancement of DSM – including split responsibilities between landlords and tenants, lack of information, lack of interest in energy issues, limited access to capital, and lack of technological literacy.

The Pembina Institute’s methodology for determining project additionality examines each of these factors and makes a judgement based on overall performance against these factors. Not all of the criteria need to be met for a project to be considered additional, although some criteria are clearly more important than others.

ADDITIONAL CRITERIA FOR CREDIT CREATION THAT CAN ENHANCE THE QUALITY OF GREENHOUSE GAS EMISSION REDUCTION CREDITS

As noted earlier, the designers of a credit trading system may have objectives in addition to effectiveness in meeting a specific environmental goal. Some of these objectives might include: maximizing overall benefits for the environment, encouraging the implementation of new and innovative technologies, and generating public support. Some potential criteria that could be used to ensure that emission reductions meet these and other objectives are outlined below.

Multiple Environmental Benefits

Criteria could be established that would require projects to demonstrate and quantify multiple environmental benefits associated with the project. For example, projects that reduce greenhouse gas emissions could also report on impacts on local air quality, greenspace expansion, improved water quality, protection of biodiversity, and/or other benefits.

No Environmental Burden Shifting

A project could be required to demonstrate that its implementation will not result in the worsening or aggravation of other environmental problems. For example, projects that reduce greenhouse gas emissions but raise the possibility of other major environmental problems (e.g., nuclear power) might not be permitted to proceed under such a criterion.

Advancing Market for Eco-Efficient Technologies

High-quality greenhouse gas emission reduction projects would enhance the market for eco-efficient technologies (e.g., renewable energy technologies) that are technically mature, but have not achieved widespread market penetration. Criteria could be established to favor such technologies, encouraging project proponents to become familiar with innovative greenhouse gas emission reduction, avoidance, storage, or sequestration technologies that are likely to see their demand increase as the Kyoto Protocol is implemented and subsequent commitments are made to reduce greenhouse gas emissions.

Minimizes Uncertainty

High-quality greenhouse gas emission reduction projects would minimize statistical and methodological uncertainties. Criteria could be established to favor projects that meet this objective.

Creation of Local Economic Development Opportunities

Criteria could be established that would favor projects that create jobs and economic opportunities in local communities.

APPLYING CRITERIA FOR CREDIT CREATION IN THE REAL WORLD

Credit trading programs should apply a variety of mandatory and recommended criteria for determining the amount of credit that is awarded to the proponents of an emission reduction project. This is meant to help guarantee that projects have environmental benefits and to maintain the credibility of individual projects and the program as a whole in the eyes of regulators, the public, environmental groups and other interested parties.

Specific definitions of these criteria can help to guide proponents through the credit creation process, hopefully keeping transaction costs low, but there will always be some subjective elements to applying those criteria to individual projects. Judgement will be required. The regulators, proponents and other stakeholders may have different views as to which emission reduction actions conform with these criteria, so a process for resolving such disputes must be available.

As an example of some of these issues, consider a program to retire old, high-emission vehicles. The actual emissions of these vehicles can be measured. But what are the emissions avoided by scrapping them? That depends on the remaining life of the vehicle and the emissions of the replacement vehicles. Reasonably good data are available on vehicle lifetimes, measured in terms of years and total distance. However, many of these vehicles are likely to have already exceeded the average and/or total lifetime distance. If the remaining life for those vehicles is taken to be zero, they will not be retired. But removing them from the road would clearly reduce emissions. In short, some judgement as to a reasonable remaining life is needed.

The emissions of the replacement vehicles also involves judgement. It becomes impractical to track the vehicle purchase decisions triggered by the retirement of the old vehicles. The former owners may purchase another vehicle. If they do, it is generally a used vehicle which means that the owner of that vehicle may purchase another vehicle, etc. Tracking all of those changes for hundreds of vehicles with the time lags involved and changes in jurisdiction is impractical.

Thus a more practical approach to setting the baseline is needed. The replacement vehicles can be assumed to be similar old vehicles, new vehicles, or fleet average vehicles. Assuming they are old vehicles means virtually no credits are created because the replacement vehicles have the same emissions as the retired vehicles. This defies common sense and would mean that no vehicles will be retired. Assuming that the replacement vehicles are new vehicles means a large number of credits are created. But the evidence suggests that the owners of the retired vehicles usually buy used rather than new vehicles. Using the fleet average emissions is often a reasonable compromise. It gives rise to some credits and so encourages vehicle retirement programs but the number of credits is not so large as to be unreasonable.

While it will be challenging for any credit trading program to agree on the criteria for credit creation, this example helps to illustrate that this is the easy part of the job. Implementing the criteria and finding commonly accepted and understood ways to apply the criteria is even more challenging.