GREENHOUSE GAS OFFSETS: AN INTRODUCTION TO CORE ELEMENTS OF AN OFFSET RULE

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EXECUTIVE SUMMARY

To support the greenhouse gas mitigation obligations of two recently permitted coal-fired power plant expansions, the Alberta government has committed to the development of a greenhouse gas (GHG) offset rule. It is also currently examining the feasibility of emissions trading for various substances, including GHGs.

This report provides a brief and concise introduction to the various dimensions of offset history, theory and current practice with some special consideration of the challenges that are unique to GHGs. These challenges can be attributed to a variety of factors, including the global nature of GHGs, the wide variety of projects and activities that can create reductions, the varying degrees of measurement accuracy from project to project and gas to gas, the relative newness of GHG accounting and reporting, the lack of consistency among jurisdictions in their early approaches to GHG mitigation, and so on.

Despite the very real scarcity of "on the ground" experience in North America with regulated GHG mitigation and offset requirements, there is sufficient theory and practice to bring together a coherent overview of the broad aspects and elements of an offset rule. This report recognizes that there are three general models that can be adapted for Alberta companies to meet their GHG offset obligations and provides a brief glimpse of each.

For a credible offsets rule, there are five key areas that must be addressed regardless of the model ultimately adopted. These are quantification, ownership, verification, indirect emission reductions, and vintage/banking issues. Since this is an overview report it will not provide the level of discussion and detail that some may desire. As a result, readers are directed to supplementary information sources throughout the report and are provided with a list of recommended reading and references at the end of the report.

1.0 Introduction

In 2002, Alberta's Energy and Utility Board approved the expansion of two coal-fired generating plants and required the respective proponent companies, EPCOR and TransAlta, to offset the new carbon dioxide emissions to the equivalent of an efficient natural gas facility.[1] Following on these decisions, Alberta has committed to establishing rules to determine eligibility for emission credits to meet the offset requirement.

In spring 2002 the Alberta government tabled *Albertans & Climate Change: A Plan for Action* ("the Plan"), a discussion document that outlines details on goals, timelines and actions Albertans can take to address the possible effects of climate change. A component of the proposed Plan is the development of an approach to emissions trading "that reflects Alberta's unique needs and circumstances, complements negotiated sectoral agreements, and works with national, continental and international systems."

The Plan proposes to examine and consult on:

a) linking our approach to a continental trading system (possibly linked to NAFTA) that allows for U.S.-based credits
b) the range of activities and initiatives from within the province that would be eligible for credit creation
c) the viability of developing a joint industry/government mutual carbon fund approach to purchase international offsets/credits.

The Plan also proposes the establishment of an Emission Reduction Registry, a key support mechanism for any offsets program, and the development of specific criteria for application of sink credits to current offset obligations for new thermal power plants.

Given Alberta's commitment to the development of an offset rule, this report attempts to set a foundation for discussion of the content of such a rule, providing a high level framework introducing the "A to Z" of offsets and key issues to be resolved in the rule design process.

2.0 A Brief History of Offsets

The concept of emissions offsets originated with the U.S. Clean Air Act of 1977 and the corresponding evolution of the New Source Review ("NSR") program to address permitting of facilities in non-attainment areas (areas out of compliance with the National Ambient Air Quality Standards). Under the NSR program, a new major source or major modification must offset its emissions increases, generally at a ratio of 1:1. However, for certain ozone non-attainment areas, the ratio can reach 1.5:1. A source can do this in one of two ways. It may meet NSR requirements through "netting" if it generates enough emission decreases as a consequence of the project to offset its emission increases, or it can obtain offsets originating from other sources that have made emission reductions.

Under NSR, an emission offset is a permanent reduction in a source's emission rate, created by an action taken above and beyond that required of the source. Offsets can be created by installing advanced technology controls beyond regulatory requirements or

[1] See AENV Approval No.773-01-05 for definitions and requirements for these offsets. This document is publicly available via the AENV website at www.gov.ab.ca/env/water/approvalviewer.html.

from the permanent shutdown of an air pollution source (the latter being the most common). Offset trading also incorporates the transfer of current emission rates between sources that extend indefinitely into the future.

Many U.S. states faced with non-attainment areas have responded to the NSR program by instituting schemes that enable some level of trading of offsets. Many companies and political jurisdictions in the U.S. currently hold offsets. These offsets are available for sale, or in certain instances, are offered to applicable sources free of charge. In New Jersey, offsets can be used only to meet NSR requirements. However, in Massachusetts, Michigan, and Texas, such offsets can be converted in certain instances to discrete emission credits for compliance use under an open market trading system.

The concept of using greenhouse gas offsets and emission trading as a formal response to global climate change has been discussed since the early 1990s. A decade later it is not a question of if but when. Greenhouse gas mitigation actions already come in a variety of forms, ranging from actual emission reductions, carbon sequestration projects or emissions avoided. All of these could potentially become offsets under a GHG mitigation and reduction framework.

2.1 Where and how have offsets been used

Given the history behind offsets, it should not be surprising that most of the experience has been with U.S. state level permitting mechanisms for New Source Review and related trading programs for criteria air contaminants like NOx, PM, VOCs and CO. The "more established" trading programs include RECLAIM in southern California, as well as programs in Texas and Michigan. Although these programs provide significant lessons for the design of offset rules, one must also bear in mind that there is potential for much more complexity in the design of offset rules for GHGs. Reasons for this include the evolving federal and global frameworks for GHG offsets and trading and how these will link together, the variety of projects that could potentially constitute viable offsets and the widespread lack of experience with measuring, managing and accounting for GHG emissions and emission reductions.

The leading jurisdiction for "on-the-ground" GHG offset experience may well be Oregon state. Oregon passed legislation in 1997 requiring new energy facilities to offset their carbon dioxide emissions to prescribed levels. To achieve this, legislators provided two main avenues for affected facilities to acquire offsets. The "monetary path" allows proponents to pay a specified amount per ton required to a qualified organization, the Climate Trust, which in turn obtains offsets. The other path allows proponents to implement offset projects directly or through a third party. There is no other North American jurisdiction that has created an offset regime for greenhouse gas mitigation, although Washington has required greenhouse gas mitigation efforts from three of its most recently permitted energy facilities. Washington, New Hampshire and Massachusetts are working on GHG offset rules[2] and expect to release draft rules late in 2002 or early in 2003. Other states such as California and Montana do not have any offset related initiatives on the books at this time. Environment Canada is expecting to

[2] Both New Hampshire and Massachusetts have legislated requirements for CO2 emissions for electric power plants.

launch its Pilot Emission Removals, Reductions and Learnings Initiative (PERRL) in October 2002.

Two examples of "on-the-ground" activity by other countries include initiatives by the Netherlands and the U.K. In anticipation of the Joint Implementation mechanism under the Kyoto Protocol, the Netherlands government has been active in seeking Emission Reduction Units from eastern European countries. It is also in the process of obtaining Certified Emission Reductions that would fall under Kyoto's Clean Development Mechanism. The U.K. is currently exploring rule-making that would allow offsets – in the form of credits – into its pilot emission trading program.

2.2 Offsets v. Credits: What's the difference?

As can be expected with any emerging policy or rule making discussion, terminology can and will be used loosely until clear definitions have been established. In fact, one frequently encounters the terms "offsets" and "credits" being used interchangeably in policy related discussions. There is an important distinction between the two, however. In the GHG world, "offsets" is a broad term for emissions reduced, avoided or removed. Offsets become credits when they meet the requirements for transaction and use in a formal emissions trading program. This distinction will be used throughout this report.

3.0 Three Models for an Offset Rule

There are three models that could be used to enable Alberta's current and future regulatory requirements for GHG offsets. The first is the "private model", which simply requires a facility owner with CO2 limits to find offsets that meet the criteria set out by the government. The second is the "trust" model, which enables a facility owner to pay a set amount per ton of carbon required to meet its offset requirements to an organization or agency that sponsors offset projects. The third model is an "emissions trading" model, where the government creates a GHG emission trading system that enables participants to buy and sell GHG credits. See Appendix A for additional information on these models.

4.0 Core Elements of an offset

For regulatory purposes, the key elements of an offset can be distilled down to the following considerations: is it real, surplus, quantifiable, verifiable and enforceable? Although these considerations are treated separately in the report, it will quickly become apparent that these elements often overlap with one another and that the distinctions are at times arbitrary. For example the question of whether an offset is real can be informed in part by whether it is surplus and quantifiable.

4.1 Is it Real

The starting point is that the offset claimed should represent a real, identifiable reduction, removal or displacement/avoidance of greenhouse gases. There are a number of considerations a jurisdiction may want to factor into its determination of what kind of

offsets it wishes to accept as "real" for the purposes of a GHG mitigation program. They are as follows:

4.1.1 *Types of offsets*

There are three broad classes of offsets: emissions reduced, emissions displaced/avoided or emissions removed (eg. sinks & sequestration projects). Emissions reductions occurring at an existing point source are normally the clearest and most straightforward form of offset. Emissions displaced, for example, by replacing electricity from a coal-dominated grid with onsite gas cogeneration can also result in real reductions, although these projects will often have challenges in establishing ownership because the displacement occurs in terms of indirect emissions. Carbon sequestration projects based on reforestation and no-till agriculture are perhaps the most problematic because measurement and quantification techniques are not yet robust. A further consideration is whether to include offsets for all categories of GHGs. This is a valid concern because measurement and monitoring techniques for GHG's other that CO2 are currently not as accurate or reliable.

4.1.2 Ownership

Ownership in theory is simple: can the claimant demonstrate clear and indisputable ownership of the offsets. Ownership in practice can be challenging when multiple parties are involved in creating the offset. There are two theories of ownership, one based on who owns the actual emissions and one based on who caused the reduction. The former is clear and straightforward – the entity owning the emissions always owns the emission reductions. The latter, because it deals indirectly with emissions, can result in competing claims for ownership based on who actually "caused" the reductions. An offset rule will want to assure, at minimum, that ownership is clear.

4.1.3 Indirect emissions

Indirect emission reductions occur when a project reduces electricity use or causes the installation of cleaner sources of electricity than the grid average. In both cases, actual emissions from a thermal electric generating station may be reduced, however, because this occurs as a result of activities that are not directly related to the emitting facility, the emission reductions are described as indirect. Because emission reductions are not occurring as a result of activities undertaken at or by the point source, and more than one party is involved, establishing clear ownership of the reductions can be a challenge.

Indirect emission reductions that occur as a result of installing cleaner sources of electricity (renewables, combined heat and power projects) have been accepted as offsets by Oregon's Climate Trust[3], Washington state's Energy Facility Siting Evaluation

[3] For example, the Climate Trust has invested into offsets created by a wind farm. See www.climatetrust.org/BEFwind.html for more information.

Council[4] and the Greenhouse Gas Emission Reduction Trading (GERT) pilot[5] in Canada and are viewed as a viable GHG offset by most emission brokers.

Demand side reductions in electricity use are more challenging because of double counting and baseline issues. As a result, Natsource and other emission brokers are unwilling to trade in offsets that are based on reductions of customers electricity demand or increased efficiency in demand side energy use.[6] This has not deterred Oregon's Climate Trust or Seattle City Light from funding demand side energy efficiency projects, which is arguably more easily justified under the trust model versus the private or emission trading models where transaction risks are much higher for offset buyers.

4.1.4 Leakage

Off-site effects in GHG flows that result from the project's implementation may partially or completely negate the positive GHG benefits from the on-site project or intervention. Four separate forms of potential off-site effects have been identified: a) Activity Shifting, b) Outsourcing, c) Market Effects, and d) Life Cycle Emission Reductions. Activity shifting and outsourcing occur when emissions are simply relocated to another area, entity or operation. Market effects occur when emissions reductions are countered by higher emissions due to shifts in residual demand. For example, a reforestation project may result in over-supply of timber in a region, causing an increase in wood consumption and associated waste. Changes in life cycle emission profiles arise when a project's implementation leads to changes in upstream or downstream processing that reduce the project's offset benefit. Oregon's Climate Trust and many GHG offset RFPs require offset proponents to describe how leakage is addressed by the project, both in terms of project activities to minimize leakage and in terms of adjustments to the project's CO2 benefit calculations to reflect leakage.

4.1.5 Double Counting

This occurs when an offset is claimed for use by multiple parties, or by the same party in another jurisdiction. Double counting often relates back to the question of ownership and the tracking of registration of offsets in different jurisdictions. A more complex form of double counting can occur when a project results in multiple emission reductions that can all be traded. For a more detailed discussion of double counting, see the report *Linking Domestic and Industry Greenhouse Gas Emission Trading Systems*.[7] An offset rule

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[4] Although Washington has no formal greenhouse gas mitigation requirements for energy facilities, EFSEC has agreed to allow the Sumas 2 gas cogeneration project to mitigate greenhouse gases by paying into Oregon's Climate Trust and has accepted the Wallula cogeneration facility's commitment to fund renewable energy projects. See www.efsec.wa.gov and follow links to the Wallula, Sumas 2 and Chehalis projects for more information.

[5] The GERT technical review committee approved offsets from wind power generation. See www.gert.org/listings/reviewed.htm and follow the links for the Government of Canada – Enmax transaction.

[6] For more discussion on this see www.nescaum.org/Greenhouse and follow the links for the *Energy Efficiency Offsets Discussion Paper*.

[7] By Erik Haires, Margaree Consultants, October 2001, p.65.

should require participants to disclose whether they are active with other trading systems and/or emission reduction registries.

4.1.6 Vintage, Timing & Lifespan

Vintage refers to the date an offset was created. Questions to consider with respect to vintage are, for example, whether an offset created in 1999 can be used against emissions in 2005 (retroactive use) or can an offset planned to be created in 2007 be used in 2005 (prospective use). How these questions are addressed will have implications for banking and borrowing of offsets. They will also have implications for how future costs and benefits of offsets are discounted. The first example also raises the question of what the lifespan of an offset should be and whether it should vary with the type of offset. A further consideration is at what intervals an entity with offset requirements would need to demonstrate compliance, eg. annually, every two years, etc.[8]

4.1.7 Permanence

The question here is whether an offset removes the claimed GHG permanently or is there a reasonable risk that it will be re-emitted to the atmosphere. The latter is more likely to occur with projects that may only temporarily sequester carbon, eg forestry or agricultural sinks. Although permanent GHG reductions are most desirable, other policy considerations such as geographical boundaries and portfolio guidelines could drive the inclusion of more temporary sequestration projects at a local or regional level.

4.2 Is it Surplus (Additionality)

The simplest and most commonly supported test for determining whether an offset is surplus is the test of regulatory additionality. The concept of regulatory additionality is straightforward: is the offset over and above what is required by current law. Said another way, an emission reduction or offset is real if it is not otherwise required of a source by current regulations or other legal obligations.

Some stakeholders have argued that financial and environmental additionality should also be factors in the determination of what is surplus. While notionally attractive, these tests are more challenging to implement fairly and consistently because of the discretionary factors involved. For example, the City of Seattle will only fund offset projects where GHG mitigation measures would not occur in the absence of offset funding.[9] With this kind of a test, a decision will occur on the balance of the information and evidence presented by the proponent. The soundness of the decision will depend on two factors: the care taken by the proponent to represent the situation clearly and

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[8] Oregon's Climate Trust program offers some latitude on this in an effort to reduce transaction costs associated with annual monitoring and verification and to reflect the fact that some offset projects may not offer a steady stream of offsets.

[9] See City of Seattle Resolution No. 30359, adopted July 23, 2001, "A Resolution outlining Seattle City Light's strategy for meeting the goal of zero net greenhouse gas emissions and establishing specific greenhouse gas mitigation targets and timelines."

accurately, and the level of scrutiny the decision maker can afford to apply to the information provided.

The same concern goes to the issue of showing environmental additionality. To demonstrate environmental additionality, proponents would need to demonstrate that their actions were beyond standard practice in their industry. Defining "standard practice" for each industry is a moving target and would require considerable resources to maintain in practice. There is also significant latitude for discretion in decision making on this subject, which can lead to perceptions of inconsistent decision making.

4.3 Is it Quantifiable

The credibility of an offset system rests in part on whether the claimed offsets can be effectively quantified, and takes into account any proposed measurement, monitoring and evaluation of the GHG mitigation activity. An offset is quantifiable if the total amount of the reduction can be determined, and the reduction, removal or displacement can be calculated in a reliable and replicable manner.[10] Several aspects of quantifiability come into play with an offset rule:

4.3.1 Metrics of quantification and reporting

Metrics can be distilled into two areas. The first is whether greenhouse gases should be quantified, transacted and reported in CO2 equivalents (CO2e) based on their respective Global Warming Potential (GWP), as determined by the International Panel on Climate Change (IPCC), or is each gas to be treated separately. The second is whether quantification of reductions or offsets should reflect absolute tons, an intensity or rate based achievement, or both. Clearly, for ease of accounting, reporting and transaction, dealing with CO2e and absolute volumes is the simplest approach. Current policy debates also indicate that many stakeholders favour this approach. Those who challenge the use of CO2e are often concerned about future changes to GWPs for non-CO2 gases and how this may affect projects that were originally quantified in CO2e.

The arguments for a rate-based metric are based on the promotion of energy efficiency[11]. Two of the major downsides to using a rate-based metric for offsets are that many offset projects cannot be effectively expressed in this form, eg. forest sequestration and, secondly, improvements in energy efficiency do not necessarily translate into absolute reductions in GHGs, which is the desired objective. As a result, the metric (or currency) of absolute tons expressed in CO2e is likely to prevail in the long run.

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[10] This definition comes from Oregon's Climate Trust, 2001 *Request for Carbon Offset Project Proposals*, p.3.

[11] For example, the U.K.'s pilot emission trading program incorporates both absolute and rate based trading. A trading "gateway" has been established between these two forms of "currency" that can be closed should the overall environmental integrity of the program be threatened because absolute levels of carbon are not declining.

4.3.2 Baselines

Baselines are relevant to an offset rule for two purposes. The first is setting the starting point for quantification of a project's GHG mitigation.[12] The second corresponds to the starting point for assessing an entity's GHG reductions over a set period of time. This latter number is of critical importance to those entities that have a regulatory requirement to mitigate their GHG emissions and who are seeking to acquire offsets. In both cases, the goal of quantification is to identify a GHG number that represents a moment in time from which, going forward, any GHG mitigation is quantified. The method for establishing baselines can be the subject of heated debate because it directly affects the amount of GHG mitigation that is deemed to occur either as a result of an offset or as a result of an entity acquiring offsets.

4.3.3 Measurement and Monitoring

For reliable quantification to occur, accurate measurement and monitoring techniques must be employed. There are many ways of measuring GHGs ranging from simple fuel burn or mass balance calculations to actual metering of landfill methane, or sophisticated analyses and monitoring programs for some types of carbon sequestration projects that are also characterized by significant levels of uncertainty. There are a myriad of tools and protocols currently available to assist proponents in GHG measurement and monitoring and more are in development.[13] However, existing protocols and measurement techniques vary in terms of accuracy and can result in a significant range of numbers being presented. For a credible offset program to occur, allowable GHG mitigation activities should be measurable with reasonable accuracy and the range of uncertainty should be specified.

4.3.4 Protocols

As stakeholders and jurisdictions gain experience with pilot emission trading projects and greenhouse gas registries, some players have identified a need for detailed and specific GHG measurement protocols to ensure accurate reporting and to prevent "protocol shopping" (ie. picking a particular protocol because it is the easiest to meet). To this end, California has embarked on a significant measurement protocol initiative as part of its Climate Registry. In September 2002 it issued its *General Reporting Protocol*, which sets out the principles, concepts and calculation methodologies for entities wishing to participate in the Registry.[14] A number of industry specific measurement protocols are

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[12] For example, the NESCAUM GHG Trading Demonstration Project used the following approach: "describe the baseline activity level and associated emissions during the baseline period for the applicable equipment/process as a rate per: hour of operation, capacity factor, production output, fuel consumption (type, amount), etc. The lower of the historical or allowable emission rate for a time period that corresponds to the generating period should be used to establish baseline emissions. A quantitative analysis, or – at minimum – a qualitative discussion, of baseline uncertainty should be included." See Phase 1 Report, p. 12.

[13] For example, Wisconsin's Emission Reduction Registry allows use of 10 different measurement protocols.

[14] California Climate Action Registry, *General Reporting Protocol*, October 2002.

slated to be complete over the next 12 months. California's initiative points to an emerging recognition that "one size fits all" protocols such as the WRI GHG Reporting Protocol[15] may not provide a suitable level of measurement standards for all types of GHG mitigation and that more specialized tools are necessary. This is also recognized by WRI, which is now working on an accounting protocol for GHG mitigation projects. This protocol is expected to be completed in 2003[16]. Another protocol development initiative to watch for is an ISO standard for GHG measurement and reporting: The Canadian Standards Association (CSA) has been quite active in the development of this standard.

4.4 Is it Verifiable

4.4.1 *Who Verifies*

There are three general approaches to verification: self verification, third party verification and government verification. Self verification was initially adopted by a number of voluntary GHG emission and emission reduction reporting initiatives because it is low cost for participants and facilitates learning and participation in a GHG reporting program. With the emergence of GHG offset transactions, stakeholders have had an increasing stake in the accuracy and reliability of numbers presented by proponents of offset projects. This has resulted in a general trend towards third party verification, relying on the engineering and accounting profession to scrutinize numbers associated with offset projects. To prevent any perception of bias, some jurisdictions are developing conflict of interest rules for third party verifiers to prevent "double dipping". Given the risks and liabilities potentially faced by third party verifiers, offset rule making should ensure consultation with these parties to ensure rules that don't discourage involvement of third party verifiers. Government verification has not occurred to date, although government certification (see below) has been used to establish emission reduction credits for emission trading. Ensuring reliable and efficient verification is a key consideration for an offset verification framework: a system that takes months to verify a project will lead to many dissatisfied stakeholders.

4.4.2 Protocols

Protocols used for verification will normally be the same as those used for quantification and verifiers will "audit" a proponent's quantification of offsets to determine whether it is real and accurate. Notably, California's Climate Registry has recently released a *Certification Protocol*[17] to communicate clear standards of verification and minimize conflicts of interest as between third party verifiers and other parties. This is the only document of its kind, complete or in development.[18] The Certification Protocol provides

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[15] The WRI's *GHG Reporting Protocol* is an attempt to set global reporting and accounting standards for GHGs emissions. See www.ghgprotocol.org.

[16] A draft framework for project reporting was released in July 2002. See www.ghgprotocol.org/projectmodule.htm and follow the link to the Project Module Draft Framework.

[17] California Climate Action Registry, *Certification Protocol*, October 2002.

[18] Environment Resources Trust has recently been granted funds to prepare a verification standard for corporate GHG inventories.

Registry-approved certifiers (3rd party verifiers) with a standardized approach to the independent verification of GHG emissions baselines and annual emissions reported by Registry participants. This standardized approach promotes the credibility, accuracy, transparency, and usefulness of emissions data reported to the Registry. The Protocol outlines the core certification activities, and explains the steps that certifiers need to complete in order to certify a participant's GHG Emission Report.

4.4.3 Certification

Certification is when a jurisdiction gives its official "stamp of approval" to an offset, thus turning it into a "credit". No North American jurisdiction has yet to step into this portion of the GHG offsets arena. In fact, Massachusetts looked at this area during discussions for a proposed CO2 banking & trading rule and determined that it did not want to be "certifying the world" for offset credits – a potential consequence of being one of the only governments in the world that provides certification. Given recent budget cutbacks, this is a very real concern for Massachusetts, so it is looking for ways to keep its future GHG offset certification load to a minimum. Certification of an offset by a jurisdiction would, under most circumstances, enhance its desirability as a tradeable commodity by reducing risk and liability for buyers and sellers alike. However, it is debatable whether this added step is necessary for a credible offsets rule, unless there is a corresponding plan to create a GHG emissions trading system. If pilots like PERT[19], GERT and Ontario's new emission trading system are any indication, the process for certifying offsets into credits can be a long, drawn out affair.

4.4.4 Compliance Auditing

Given that the current offset requirements for the Genesee and Keephills coal-fired expansions are set out in the plant approvals, consideration should be given to how compliance with these requirements will be evaluated. This program element was neglected by New Jersey in its open market trading program and has been viewed as a significant contributing factor to the registration of spurious emission reduction credits and subsequent lawsuits.

4.5 Is it Enforceable

Legal enforceability of offsets can be a significant consideration in delineating the geographical scope of an emission trading system, especially if the system relies upon the principle of sellers liability[20] in the transaction of offsets (under a private or trust model for offsets, enforceability is normally a civil contractual matter). The overriding challenge for a provincial jurisdiction in this situation is enforceability of offsets that originate outside of the country, especially, but not limited to, projects in developing

[19] This refers to the now defunct Pilot Emission Reductions Trading program in Ontario.

[20] Offset transactions can work on the basis of sellers liability, buyers liability or some hybrid. Under a seller liability framework, any offsets acquired by the buyer are valid regardless of whether the seller is in compliance and providing offsets of specified quality. Some argue that invoking sellers liability is critical to stimulating the carbon market because it removes risk from the buyer.

countries. Where a private or monetary path model has been chosen, enforceability only becomes an issue in terms of the subject facility meeting its offset requirements.

5.0 Other Issues and Elements

5.1 Geographical Boundaries

As discussed above, Alberta will have to consider whether to put any geographic restrictions on the point of origin of offsets that are used to meet offset requirements in Alberta. The need for geographic restrictions will depend to some degree on the offset model that is chosen. For example, if Alberta were to establish an emissions trading system based on the principle of sellers liability, then there is a genuine issue at play about the enforceability of offshore offsets. Alternatively, if Alberta were to adopt a private model, then originating jurisdiction would not be material unless the province had objectives in place around local and regional development.

5.2 Portfolio Requirements

Establishing "portfolio requirements" is likely to be a contentious issue, pitting free market proponents on one side of the fence and proponents of local and regional economic development and renewable/alternative energy on the other. Oregon and Washington have had some experience with this debate, but neither have established rules in this area or is likely to. That said, both states have developed their offset program frameworks to encourage local and regional offset projects as well as renewable energy, energy efficiency and conservation projects, recognizing that local projects may not be as cost effective but reflect other key values for the state.

5.3 Tracking & Registration

A transparent and credible system for offsets entails having a means of tracking and registering the creation, transaction and use of offsets. There has been some good experience and policy discussion in this area, especially if one includes the experience in offset/credit tracking and registration that has occurred with U.S. state emissions trading systems for criteria air contaminants. At minimum, tracking and registration mechanisms should record the offsets held by each participant, any transfers of those offsets, the use and retirement of offsets, and allows anyone to view publicly accessible information such as offset holdings. This is an area where coordination of rules with other jurisdictions can be of benefit, in addition to following the international discussions on registry provisions.

5.4 Banking

Provisions for banking offsets can create additional flexibility for participants to optimize their compliance strategies over longer time periods. Design of banking provisions must be balanced against desired rules around vintage, timing and use of offsets to avoid the experience of Michigan's emission trading system where companies have been able to

bank an enormous number of credits, thus forestalling further emission reductions for many years. Also, if a cap and trade allowance-based emission trading system is introduced, excessive banking of allowances could keep out new participants if there is no other way for them to obtain allowances, eg. via auction or set-aside. Nonetheless, it has been argued that greenhouse gas banking poses no environmental risks provided the banked offsets are real.[21]

5.5 Access to Information/Transparency Provisions

As noted above, the perceived integrity and credibility of an offset rule will depend on the scope, quality and timeliness of information available to stakeholders. The establishment of a registry can address many of these concerns. Of course, public access to information will have to be balanced against business confidentiality provisions normally associated with offset projects and transactions. These provisions generally cover proprietary information regarding offset creation, as well as price.

5.6 Change Provisions

Given that climate change policy making and rule development are still at very formative stages, any provincial rule-making on offsets would be well served by having clear and transparent provisions for changes and amendments. At minimum, consideration should be given to reviewing the rule's effectiveness between three to five years after filing.

5.7 Relief Mechanisms

The inclusion of a "relief mechanism" or "safety valve" within an offset rule is an important consideration, especially if relying on the private or emissions trading model. After seeing the prices for NOx credits in the RECLAIM program approach six-digit figures, many companies are now anxious to ensure that a credit price ceiling be negotiated into an offset and trading system. Should credit prices ever reach or surpass the ceiling price, companies would have the option of paying into a GHG investment fund as an alternative. The key challenges associated with inclusion of a safety valve are the selection of an appropriate price ceiling and the process for reviewing and revising the price ceiling as required over time.

Another approach to relief mechanisms can be drawn from Oregon and Washington's Energy Facility Siting approvals for new gas plants. These approvals require a standard akin to best efforts, so that if proponents fall short of targets and are able to demonstrate good faith/best efforts, then there is no penalty.

5.8 Other Considerations

Several other factors that could be addressed in offset rule-making discussions are the inclusion of a dispute resolution mechanism, government resources available to support an offset rule, linkages with other emerging offset frameworks, the minimization of transaction costs, and allocation of risk and liability.

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[21] See Haites above, p.61.

6.0 Learning from Other Jurisdictions

The main learning from other jurisdictions is that there has been very little experience with GHG offset programs to date. Both New Hampshire and Massachusetts have imposed CO2 limits for certain power plants and both appear to be on track to release a draft rule in early 2003. Oregon and Washington appear to be headed down similar paths with respect to CO2 offset requirements for new energy facilities, with Oregon having the edge in terms of having established offset rules in 1997 and Washington currently engaged in rule making over the next 12-24 months. Montana has seen local environmental groups successfully bring legal pressure on proponents of new energy facilities to include offset commitments, although the state government has no interest in establishing any kind of CO2 requirements for these facilities. California is not actively pursuing CO2 requirements for energy facilities, either. Canada's experience with CO2 offset transactions is limited to the GERT pilot, private transactions made by a small group of companies like TransAlta, Suncor, EPCOR and Ontario Power Generation, and to a consortium of companies operating as GEMCO. The federal government's Pilot Emission Removals, Reductions and Learnings Initiative (PERRL) was just launched in October 2002 and should provide additional experience with offset projects and transactions.[22]

Of these jurisdictions, it appears that New Hampshire and Massachusetts are headed towards a CO2 banking and trading model, in contrast to the trust model that is used in Oregon and is being closely examined by Washington state. The trust model is attractive for many reasons: it minimizes risk and provides investment certainty for companies, focuses expertise on offset projects within one organization, and provides a "one-window" approach to a jurisdiction's CO2 objectives. What is not known about this model is how effective it is when much larger volumes of CO2 offset requirements and funds need to be managed. Another disadvantage of this model is that it does not guarantee delivery of the regulated level of offsets and there is as yet no obligation to do so. In essence, it allows owners of energy facilities to "buy out" of their CO2 requirements.

Key areas requiring focused attention in offset rule design are as follows: the type of model to be adopted (private, trust or emissions trading), quantification protocols, vintage and banking provisions (to avoid the Michigan experience as described in s.5.4), whether to include offsets based on indirect emissions reductions as discussed in s.4.1.3, penalties, and verification/certification procedures that are accurate, effective and efficient.

[22] For more information on PERRL, see www.ec.gc.ca/perrl/home_e.html .

7.0 References and Recommended Reading

Alberta Environment, *A Plan for Action: Draft for Discussion*, Spring 2002. See http://www3.gov.ab.ca/env/climate/actionplan/index.html

Alberta Environment, Approval No. 773-01-05, effective May 8, 2002 for construction, operation and reclamation of the Genesee thermal electric power plant.

California Climate Action Registry, *General Reporting Protocol*, October 2002. See www.climateregistry.org/index.php/protocols .

California Climate Action Registry, *Certification Protocol*, October 2002. See www.climateregistry.org/index.php/protocols .

City of Seattle, Resolution 30359, *A Resolution Outlining Seattle City Light's strategy for meeting the goal of zero net greenhouse gas emissions and establishing specific greenhouse gas mitigation targets and timelines*. See http://www.cityofseattle.net/light/climatechange and follow the links.

Domestic Emissions Trading Working Group, *Credit Trading Workshop Report*, March 18 2002 (based on February 1st, 2002 workshop in Calgary, Alberta). See www.nccp.ca/NCCP/pdf/ERT%20Workshop%20Report%20(Eng).pdf

Greenhouse gas Emission Reduction Trading pilot, see www.gert.org .

Erik Haites, Margaree Consultants, *Linking Domestic and Industry Greenhouse Gas Emission Trading Systems*, prepared for the Electric Power Research Institute, International Energy Agency and International Emissions Trading Association, October 2001. See www.ghgprotocol.org/docs/IETA.LinkingETSystems.trading.scheme.overview.pdf

ICF Consulting, *Exploring the Potential for an Air Emissions Trading System for Alberta: Lessons Learned from Existing Trading Regimes*, prepared for Alberta Ministry of the Environment, June 2002. See www3.gov.ab.ca/env/air/emissions_trading/pdf/tradingreview.pdf

NESCAUM's work on greenhouse gas – see http://www.nescaum.org/Greenhouse. The following documents are recommended:

- *Greenhouse Gas Case Studies*
- *Participant Checklist for Greenhouse Gas Case Studies*
- *Final Registry Issue Paper*
- *Energy Efficiency Offsets Discussion Paper*

Oregon Climate Trust and Seattle City Light, *2001 Request for Carbon Offset Project Proposals.* See www.climatetrust.org/2001rfp.pdf .
Oregon Climate Trust and Seattle City Light *Issues Raised During the Solicitation Period*, see www.climatetrust.org/qa2001.html

Environment Canada, Pilot Emission Removals, Reductions and Learnings Initiative, see www.ec.gc.ca/perrl/home_e.html

RECLAIM's *Emission Offsets Availability Issues Workshop Summary*, June 2001 See www.energy.ca.gov/siting/constraints/documents/2001-6-15_OFFSET_SUM.PDF

Washington Energy Facility Siting Evaluation Council, EFSEC Standards Development, *Krogh Leonard Report*, www.efsec.wa.gov/standards/kroghtoc.htm, see Exhibit C, rules proposed for Greenhouse Gas Mitigation.

WRI & WBCSD, *Greenhouse Gas Protocol: A common corporate reporting and accounting standard*, October 2001. See www.ghgprotocol.org.

APPENDIX A
Three Offset Models

A) PRIVATE MODEL

The "private model" simply requires a facility owner with CO2 limits to find offsets that meet the criteria set out by the government. The facility owner finds the offsets privately and bears all risk and liability for obtaining the appropriate volume of offsets and ensuring those offsets meet government criteria. Government criteria would, at minimum, describe requirements for allowable offsets sources, quantification, ownership, verification, vintage, additionality and timing and tracking of use.

The private model is simple, requires little public infrastructure and puts the onus on the parties with offset requirements to meet their obligations. Government's role is limited to developing and implementing the rules and ensuring they are followed or amended as required. Transparency is not normally a strong component of a private model, although this could be addressed with appropriate reporting requirements.

This approach requires a company to develop in-house expertise that is not associated with its core business and is likely to see facility owners requesting relief mechanisms as a way of lessening their risk. Washington and Oregon's experience to date suggests that if companies have a choice between the private model and the trust model, they will adopt the trust model in almost all instances.

B) TRUST MODEL

The "trust" model enables a facility owner to meet its GHG mitigation obligations by paying a set amount for each ton of carbon it is required to reduce to an organization or agency that sponsors offset projects. This is perhaps the simplest model for both government and facility owners in that a third party - an offset trust organization - is established to find and manage offset projects using the funds provided by facility owners. The facility owner thus "buys out" of their GHG mitigation obligations by paying into the trust. The government's role is not more extensive than in the private model in that it simply establishes framework criteria for offset quality. The offset trust organization will ideally be a public-private entity that is managed by a multi-stakeholder Board of Directors that includes representation from government, industry and environmental groups.

This is an attractive model for industry because it provides long-term price stability in terms of payments to the trust and does not require industry to develop in-house expertise on GHG mitigation.

C) EMISSION TRADING MODEL

The third model is an "emissions trading" model, where the government creates a GHG emission trading system that enables participants to buy and sell GHG credits in a transparent market. Given the magnitude of such an undertaking, the decision to pursue emissions trading requires considerable assessment and planning to determine how the

system should be designed.[23] This model can require considerable supporting infrastructure (rules, resources) as well as pre-conditions such as sufficient participants to create a viable market in emission reductions. Few parties are likely at this stage to favour a provincial emission trading approach. Key concerns include market viability, set up time/costs and linkage with evolving national and international emission trading systems.

[23] Alberta Environment is currently engaged in a major study of emissions trading and has engaged a consultant to do a "Major Feasibility Study." See www3.gov.ab.ca/env/air/emissions_trading/index.html for more information.

APPENDIX B
Genesee 3 Offset Requirements

Relevant excerpts from Approval No. 773-01-05, issued by AENV for the Genesee 3 expansion:

1.1.2 (gg) "offsets mean off site reductions of greenhouse gas emissions or removals of greenhouse gases from the atmosphere which are:

- i) real and demonstrable actions that constitute actual decreases in atmospheric greenhouse gas concentrations;
- ii) quantifiable and measurable, so amounts can be measured directly or estimated by accurate and replicable techniques;
- iii) from an action taken that is not otherwise required by law at the time the action is initiated; and
- iv) owned by the party claiming the offsets.

4.2.32 Until such time as Alberta Environment endorses province wide GHG monitoring and reporting requirements applicable to thermal electric power plants, the approval holder shall submit an annual "Greenhouse Gas Summary" to the Director by March 30 of each year following the year in which the information is collected.

4.2.33 The "Greenhouse Gas Summary" shall include, at minimum:

….

c) upon commencement of GP3 operation, a report detailing the offsets used to achieve the reported net annual GHG emissions from GP3, verified by an independent third-party auditor, including but not limited to:
    i. a summary of offsets total CO2 equivalents applied to the GP3 project;
    ii. percent of offsets achieved in Alberta and in Canada
    iii. information on the projects used to obtain offsets, including but not limited to:
        A. a brief description of the project, including type and location
        B. a summary of the calculation methods used to determine the GHG reductions or removals;
        C. total quantity of emission reductions or removals delivered by the offset project over the year, and the amount being applied to GP3 in the reporting year;
        D. confirmation that the offsets being claimed are being used only once and applied only to GP3 in the reporting year; and
        E. if registered, registration of the offsets.
    iv. The report by the independent third-party auditor including a statement on the ownership of the offsets being claimed.

4.2.34 The independent third party auditor referred to in 4.2.33(c) chosen by the approval holder must be a suitably qualified Professional Engineer or Certified Professional Accountant approved by the Director in writing

4.2.35 …