



Climate Change Central

Lessons Learned in Alberta's Carbon Market

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Introduction

Alberta has been admiring Environmental Goods and Services related Market Based Instruments (EGS related-MBI) as a way to enhance stewardship on Alberta landscapes for some time¹. After Ag Summit 2000's initial reports, both the Agriculture and Food Council's Environmental Policy Initiative's Project and the Department of Agriculture and Rural Development conducted additional studies identifying whether EGS related-MBI can be implemented in Alberta². Later, the Department of Environment's Environmental Tools and Economic Instruments Team undertook an MBI initiative, engaging the Pembina Institute, Alberta Research Council and other Ministries within the Government of Alberta. Some capacity and ways forward for likely EGS and MBIs were developed through these processes.

With the election of Premier Stelmach in late 2006, talk of greening Alberta's economy was a major rural campaign platform. Premier Stelmach wasted no time in directing his Environment Minister, Rob Renner, to establish a Greenhouse Gas (GHG) regulatory framework, which paved the way for Alberta's first large-scale MBI and the resulting carbon market we have in place today. In addition, Premier Stelmach gave Agriculture and Rural Development Minister George Groenfeld, the task of establishing the Institute for Agriculture, Forestry and the Environment (referred to as the "Institute") – the time for admiring EGS related-MBI seems over and there is a desire to implement market-based policies and processes to encourage environmentally-sound practices in the nexus of Alberta's agriculture, forestry, energy and waste management sectors.

At the Institute's International Think Tank forum held in Banff, Alberta, it was identified that a framework to enable MBIs can be a strategic component in the long term sustainability and competitiveness of Alberta's resource-based economies. Advice from practitioners varied widely, and often times confused 'solving environmental problems' with finding 'environmental opportunities' – internalizing EGS with the proper MBI can be both about minimizing the negative externalities and providing more of the positive externalities. The bottom line of the forum was to "learn from others" and "learn by doing" – and get on with it. This paper provides some insights from the regulatory-based Carbon Market in Alberta, which was based on the same principle – a policy framework implementation strategy based on adaptive management. At the time of writing the Carbon Market was 18 months old, with much learnings to provide to IAFE, both good and bad.

Purpose and Objectives of this Paper

This paper will provide the Institute with key insights into how an adaptive management framework to an EGS related MBI, known as the Carbon Market MBI in Alberta has played out over the last 18 months and what improvements are planned in the next couple of years based

¹ Ag Summit, Environmental Stewardship Action Team, Report and Land Use Framework Report 2000.

² EGS Feasibility Study, 2005, Agriculture and Rural Development; EPIP Initiative, Ag and Food Council. AENV Market-Based Instrument Initiative; Alberta Land Use Framework.

on early learnings. The GHG Regulatory Framework in Alberta is the first of its kind in North America at the time of writing, and considered a pilot for many other carbon trading initiatives across the continent.

In this case study, the paper will show that the process is as important as the design and implementation, and very appropriate to where the Institute's current work is focused. The lessons learned to date can be applied to establishing other markets for EGS in the province, since the ability to 'stack' these benefits can enhance the value of EGS to land managers, and drive more stewardship for Albertans in the years to come. The comparative analysis includes a consideration of the role of government in MBIs, distinguishing between compliance-based and voluntary MBIs, financial sustainability of the programs and recommends, based on the experience in Alberta of the last 10 years, where feasible EGS-related MBI's can move forward³.

"These markets would already have evolved on their own if they could...they need help".

-Professor Andre Plourdes, Chair of the Business Faculty, U of Alberta
AESAs Conference 2004, "Who's Rewarding Stewardship"

The Alberta Context for EGS related-MBI

It was recognized at the Think Tank that the traditional products of agricultural production such as food, fiber and energy are incited by price signals in formally recognized marketplaces – therefore they have financial value which can drive their production. Environmental Goods and Services, for a variety of reasons, are currently not recognized in formal marketplaces. This inconsistency in markets and lack of price signals for EGS, can lead to a discrepancy in the amount of benefits or stewardship that is critical to healthy, functioning ecosystems and society's well being. In other words, the policy and informational context needs to be established in order to make EGS markets work.

In Alberta today, we are seeing some important policy signals that can help establish markets for EGS. For example, the endorsement of cumulative effects management of industrial pollutants through the Industrial Heartland and Oilsands regions is a key signal that the market imperative is beginning to emerge, as scarcity of environmental resources, whether its clean air, rivers and streams or available water, is being internalized in government policy. As government sets these thresholds or caps, it creates demand and sets the basis for a market – which is a cue to begin to assess how these markets can and/or should be fostered with further action.

Currently, a number of Market-Based Instruments are being studied by various government departments, agencies and councils in Alberta for application to environmental issues facing specific regions of the province:

- Water quantity – pricing and trading;

³ NOTE – this paper focused on the so-called 'Strategic EGS' according to the Think Tank's terminology, as opposed to the Opportunistic EGS, which are more of a 'branding' or 'green certification' of traditional agricultural commodities and products.

- Water Quality – trading, effluent management schemes;
- Air Quality – emissions trading system for NOx and SOx;
- Land Use – transfer of development rights; conservation easements; incentives for practice adoption; tax increment financing;
- Biodiversity conservation – tradable land use rights; conservation easements; biodiversity banking;
- Wetlands Preservation and Restoration – mitigation banking.

What has been lacking is the policy framework that would coordinate these initiatives and set the environmental targets and ensure desired ecosystem outcomes, as well as conducting the market based and policy-based research, and identify the proper mechanisms to approach their use.

The context is timely in Alberta today, since the Alberta Land Use Framework will result in regional outcome/target setting and the Institute can identify the appropriate mechanisms with which to best achieve the targets.

Learnings from Past Efforts in Alberta

The argument of whether an EGS from the agriculture and forestry sectors should be incented through a voluntary or regulatory backstop is an important consideration. Alberta has had a history of small, localized EGS related MBI programs (see Appendix A). Like most early stewardship programs in North America and Europe in the late 1990's and early 2000's these programs were based on 'payments for practice' and not necessarily for improved practices or a set level of performance -they may have been for existing practices or land use.

With the advent of the Agriculture Policy Framework (2003-2008), the national BMP Stewardship Program (predicated on cross compliance of a completed Environmental Farm Plan) was the first large scale MBI based on a cost-sharing payment mechanism, in Alberta and across the country. However, the lack of targeted and focused programming to make concerted efforts at a landscape level, and influence ecosystem level outcomes, led the federal-provincial and territorial governments to initiate an EGS Pilot program, with the desire to move away from 'payment for practice' type programming to payment for performance type MBIs. The results of these pilots will be shared near the end of April 2009 in Ottawa, Ontario. Despite the efforts, many of these pilots are still based on 'payments for sporadic practice uptake', as in European and past American programming to date.

In 2003, the Economics Task Force of the Alberta Environmentally Sustainable Agriculture (AESA) Council commissioned an expert review of all EGS programming at that time⁴ and concluded that EGS programs offered to date have not benefited from full and meaningful participation and co-ordination of all affected Ministries, Industries and NGO's. In general the study found that programs lacked broad-based support and in many cases, the efforts have

⁴ This review included Dr. Peter Boxall, Dr. Lee Foote, Dr. Les Fuller, University of Alberta; Brian Heidecker, Agriculture & Food Council; Kim Schmitt, Ducks Unlimited (Co-chair); Marilyn Sharp, Agriculture & Food Council (Co-chair); Dr. Jim Sheik, Alberta Research Council and Jim Smith, Mancroft Resource Group Ltd.

been pilot programs. Mandates for wide spread adoption or follow up trials have not been established. General recommendations from the expert review concluded that the creation of a multi-disciplinary steering committee empowered to direct the development and implementation of EGSs (similar to the Institute's mandate today) would be beneficial to the public.

In 2005, the Department of Agriculture and Rural Development commissioned a Feasibility Study on a more coordinated EGS implementation, to better assess the policy context for whether Alberta should proceed on EGS. Ahead of its time, but taking the direction from the strategic direction identified through the Ag Summit 2000 process, the Study was designed to conduct the market research to address EGS related-MBI through the Elements for Sound Policy Decisions identified at the International Think Tank:

- Understanding Market Requirements – who are the providers, and the possible buyers, needed mechanisms of transactions; what's needed in terms of quantification standards, market confidence and validity, needed institutional support, market oversight;
- Defining Benefits, Identifying Outcomes and Setting Targets – what are the priority EGS in Alberta (from a market point of view, not government identified priorities); what are the causes of market failures; key role for governments and needed information.

The context was positioned in a way of finding sustainable funding mechanisms for these EGS, through partnerships or markets that would use private dollars to purchase EGS.

The study addressed these questions through a variety of policy and market research and analytical approaches:

- A global scan of what other countries are doing in this area;
- Review of relevant consumer environmental polling in Alberta;
- Public consultation involving producer and land manager surveys; focus groups, consumer/stakeholder interviews and expert interviews;

The Study found a match between what producers were willing and capable of supplying and what consumers are willing to support – indicating support and interest in proceeding to develop markets for these priority EGS. The priority EGS were classified into (1) **Water quality** - through practices that reduce the impact of manure, chemicals, pesticides and nutrients entering water courses; and, (2) **Habitat and Wildlife** – through practices that increase wildlife habitat on farms, e.g. shelterbelts, wetland protection, riparian habitat. These are similar to the advice given by experts at the International Think Tank session.

Further, the study also found transaction costs to be the biggest cause of the current undersupply of the matched or priority EGS. These include things like private good-public benefit issues for EGS (i.e. the value cannot be captured by the individual creating them since they are enjoyed by all); lack of standardized quantification/confidence about the value of the EGS; inadequate demand exists for EGS (search costs and lack of market structure are the main barriers – how do people connect in the marketplace); and uninformed purchasing decisions (a lack of information to the market of the benefits derived through producing and supporting EGS). All of these imply the need for establishing MBIs to bring structure to the market.

The study concluded *the primary role for the Alberta government is to enhance private markets* to increase the supply of these priority EGS; there is no evidence to date that the Alberta government should be directly purchasing these products from private resource managers, as was recommended by the more vocal proponents of EGS programs at that time⁵.

The study recommended that in order to enhance private markets for these EGS, the government of Alberta should, within pilot projects for the priority EGS:

- Collaboratively identify environmental objectives⁶ (set the rules of the game) for the pilot regions around the matched EGS;
- Provide some kind of Institutional support to help bring buyers and sellers together and facilitate transactions through quantifying environmental benefits for BMPs that deliver the matched EGS;
- Partner in providing information and awareness of EGS to stakeholders in the pilot region;
- Catalyze private-public-nongovernmental organization partnerships; and
- Test MBIs for measuring environmental performance in the pilot region to see how a market-based approach can enhance environmental stewardship.

These findings coincide very well with expert input at the International Think Tank, where it was identified that key roles for government are:

- Establish the policy and regulatory frameworks that can create demand for EGS products (i.e. internalize the negative and positive environmental externalities of the forestry and agriculture sectors);
- Develop EGS-based MBIs that deal with the problem of supplying a 'public good' on private land (i.e. difficulties for providers of the EGS to capture value from the marketplace when they're enjoyed by all – major cause of market failure); and,
- Provide information and institutional support to the market by standardizing quantification of EGS, verification, monitoring and reporting –essentially defining the supply for EGS products (transaction costs are also a major cause of market failure).

Alberta has probably conducted more research and discussions on EGS related-MBI than any other province to date. And, has the only functioning regulatory framework that enables a carbon market, in North America. Putting these pieces together, along with the implementation advice from the Think Tank should point to a clear picture of how Alberta can maintain this leadership position through the Institute's Mandate. In the last two sections of this report, suggestions for moving forward will be made, based on this experience.

⁵ Proponents of the Alternate Land Use Services (ALUS) program; Keystone Ag Producers and Delta Waterfowl who concluded that \$800 million nationally would be needed for this.

⁶ The objectives should integrate with other public policy initiatives in Alberta, i.e. the land strategy, the Environmental Farm Plans, Sustainable Resource and Environmental Management and others.

EGS Related Market-Based Instruments - Policy Process and Key Elements

In designing EGS related-MBIs and programs, governments should focus on *incremental* resource enhancement/pollution reduction over time. Other OECD countries are recognizing that effective conservation programming needs to shift from patchwork BMP support, or 'payment for practices' to more performance-based policies, coordinated at the ecosystem level to be effective and efficient⁷. Key concepts of setting minimum reference levels of environmental performance (baselines), above which actions are recognized and rewarded, and building the necessary analytical tools to measure incremental performance gains, has been identified for establishing effective, efficient and equitable market-based policy.

In setting priorities for regional EGS and possible MBIs to incent them, many assume that current regulatory measures are adequate. The truth is that most regulatory bodies grant operating permits on a facility or end of pipe or end of stack basis; not on a cumulative impact basis. Further, non-point impacts on these systems are not accounted for. As a result, development pressures on many ecosystems are beyond sustainable limits. This has led to recognition that Cumulative Effects policies, or regional planning initiatives are needed.⁸ Therefore, traditional facility-based permitting systems are often inadequate to protect the environment where development pressures are high – especially in the case of water quality loading.

The response by many jurisdictions has been to explore ways to cap the load collectively for point sources, and allow non-point sources (like the agriculture and forestry sectors) to generate offsets through improved management that would reduce land based contributions on river systems. Traditional command and control tools have served us well in managing 'end of pipe' or 'end of stack' kind of pollution, but don't work so well when dealing with non-point sources of emissions or landscape-based EGS. This is similar to the Greenhouse Gas regulatory framework operating in Alberta currently.

Ultimately, implementing EGS related-MBIs will involve an adaptive, science-based approach and utilize a systematic process of planning, objective setting, market-based instrument⁹ testing and evaluation to facilitate policy development and management over time.

⁷ USDA Conservation Effects Assessment Program; <ftp://ftp-fc.sc.egov.usda.gov/NHO/nri/ceap/FirstFiveYears.pdf>; OECD Environmental Performance Reviews: Canada 2004;

⁸ ⁸ http://www.policyresearch.gc.ca/page.asp?pagenm=sd_waterworkshop_pres

⁹ MBIs – policy tools that change management practices and market behavior through taxes or charges on processes or products, or by creating property rights and a market for the use of environmental services.

The policy process and key elements required to devise EGS related MBI's have been identified in Europe, the US and Canada and are quite similar in approach¹⁰:

1. Strategic-priority-setting for EGS –at risk EGS or EGS that can be enhanced
2. Market requirements for the EGS – process and design related issues
3. Supporting Information/institutional structures - enhancing market function
4. Evaluating and monitoring effectiveness
5. Adapting and continuous improvement

Please see Appendix B for more information on the criteria for EGS-related MBI Policy Process and Key Elements since these criteria will be used in the following section to assess the lessons learned in the Carbon Market. It will be necessary to read the contextual background within the assessment criteria to understand the nature of the comments.

Alberta's Carbon Offset Market – Policy Process and Key Elements

In 1999, the Alberta government conducted a risk assessment on how and if Alberta should deal with its Greenhouse Gas situation. It was decided in 2002 that a GHG Regulatory Framework needed to be implemented and that it would involve some form of emissions trading. Alberta has the highest greenhouse gas (GHG) emissions of any province in Canada (235 Mt CO₂e in 2006) and it is projected to increase to 305 CO₂e Mt by 2020¹¹. Alberta has 10% of the national population but a vibrant resource extraction industry and coal combustion electrical generation result in the province comprising 33% of the total national inventory of GHGs¹².

Regulatory targets – Climate Change and Emissions Management Act and Specified Gas Emitters Regulation

In early 2007 the Climate Change Emissions Management Act was amended to require companies with an emission intensity of more than 100 kt CO₂e per year to reduce GHG emissions 12% from their baseline (an average of 2003-2005 emissions) – the environmental objective for the Program. Due to the nature of greenhouse gases, the objective was applied at the provincial level (GHGs have no localized effect; it's a global problem). This covers just over 100 large facilities and sets out a demand for GHG reductions in the order of 10 to 12 Million tonnes of CO₂e every year.

¹⁰ European Environment Agency (2006) – principles for effective MBI Implementation; <http://www.eea.europa.eu/highlights/Ann1138194370>;
Agriculture and Agri-Food Canada; EGS Policy Development; http://www.agr.gc.ca/pol/egs-bse/index_e.php?page=process
USDA Environmental Service Board Mandate and Office of Ecosystem Services and Markets;
http://www.usda.gov/wps/portal/!ut/p/_s.7_0_A/7_0_IOB?contentidonly=true&contentid=2008/12/0307.xml:

¹¹ Alberta Environment 2007b)

¹² Environment Canada 2008

The MBI chosen to facilitate the environmental objective was a 'Baseline-Credit' emission trading system – different from a cap and trade system¹³. Credits for compliance can be generated in 3 ways:

- **Emission Performance Credit** – if the regulated facilitates reduce more than their target; they have credits to sell; or if they can't afford to reduce, they can buy these credits from others;
- **Technology Fund Credits** – regulated facilities pay into the Climate Change and Emissions Management Fund at a set price of C\$15/tonne CO₂e. These are not tradable;
- **Carbon Offsets** – unregulated companies undertake Offset Projects to reduce GHG emissions and sell them to the regulated facilities for compliance. – this is the EGS opportunity for land resource managers.

The choice of the MBI was driven by international, national and local policy analysis on the most flexible option to reduce GHGs. The Alberta government, along with the International policy community, recognized that the environmental problem of climate change and rising GHG emissions affects every economy in the world. Climate change is essentially an energy problem and the world's growing demand for energy, whose access and supply is tightly linked to most developed economies' GDP, as well as emerging economies of China and India, affects every sector of the economy like no other environmental challenge of the past. The capacity to respond is constrained and so market-based mechanisms that effectively put a price on carbon¹⁴, to signal capital allocation to lower carbon intensity energy sources and technologies across the entire economy is needed.

Thus, emissions trading, with flexibility in compliance and opportunity to control costs was the instrument of choice. The SOx market in the US with its successful outcomes was the rationale for moving in this direction. The ability to use Carbon Offsets for compliance further reduces costs for companies as they will strive to find lower cost offsets in the marketplace. Carbon offsets enable the price signal for carbon to extend across a greater sector of the economy (not just the regulated sectors) and bring about practice change, revenue streams and improved environmental performance in all sectors. Further, Carbon Offsets give regulatory flexibility for the government – by controlling the volume of offsets, the government can control the price¹⁵.

Controversy has emerged regarding the manner in which targets are set in the Alberta and Canadian context for GHG reductions, particularly based on the price volatility seen in the European Union Emissions Trading System over the last several years. Concerns on the part of the Canadian Association of Petroleum Producers about price certainty in Carbon policy has changed the dialogue to two ways of setting targets – either by setting the price (through a tax), or by setting the quantity of a target (Megatonnes of reduction). Emissions trading systems around the world are based on a quantity target; the regulated sector is becoming nervous

¹³ In a cap and trade system, the government allocates targets to sectors, and companies within sectors and 'caps' emissions. Permits or allowances are either auctioned or given to these companies equivalent to their targets to use for compliance.

¹⁴ Carbon – the market term for carbon dioxide equivalents – the common metric for Greenhouse Gas trading units in carbon markets around the world;

¹⁵ Most US designs (ie Bills before Congress and Senate; or in collaborative state/provincial efforts like the Western Climate Initiative) propose restrictions on the amount of Offsets used in emissions trading systems, because of the concern that

about the price volatility that may emerge as North America moves towards harmonizing systems. Indeed, even in the EU Emissions Trading System, they are discussing a price ceiling or floor to stabilize prices. It's important to note that Offsets and their volumes can be used to control price in an emissions trading system where they exist (a so called safety valve provided there's enough liquidity in the market)..

Consistent, Science Based Quantification Protocols for the Offset System

In the Alberta Offset System, only government –approved protocols can be used to generate carbon offsets for use in the compliance system. The Specified Gas Emitters Regulation lays out the general eligibility criteria for Offsets, and the Quantification Protocols are the '**consistent EGS performance standards**' that scientifically link management practice or technology change to the amount of greenhouse gases reduced or removed (sequestered) from the activity, relative to a baseline or business as usual activity.

In the Carbon Offset Market, Offset Quantification Protocols have several important features:

- They ensure implemented projects follow the best science-based information, resulting in real, measurable emission reductions;
- They are based on emission factors and calculations, requiring only the tracking of practice change to calculate reductions; reducing costs for project developers;
- They set out the monitoring and verification requirements to ensure 3rd party verification can take place;
- They are based on an international ISO 14064-2 standard framework so that carbon offsets generated in Alberta will have market compatibility elsewhere
- They provide transparency, consistency and certainty for investors and the marketplace;
- They provide regulatory assurance for government.

In the world of Greenhouse Gas quantification, the availability of scientific and technical information is greatly enabled by the United Nations Intergovernmental Panel on Climate Change (IPCC) which lays out quantification procedures to assist countries in accounting and reporting on their national-level emissions to the United Nations Framework Convention on Climate Change every year. Canada has customized this work into country specific quantification approaches by sector, and this information is used in the Alberta quantification protocols for agriculture and forestry (see Appendix C for a listing of all protocols).

The protocol development process in Alberta is based on the ISO 14064-2:2006 standard that includes expert engagement, defensible scientific methodologies, a rigorous peer review process, and documented transparency to ensure a robust offset system that delivers real greenhouse gas reductions and net environmental benefits (see Appendix C for a full description of the Alberta Quantification Protocol Development Process).

Standards, such as ISO, can be used to provide a consistent framework for quantifying project-based GHG offsets. They provide a policy-neutral, non-sectoral, verifiable template or specifications upon which a protocol can be customized to the regulatory requirements of the

jurisdiction at hand. The ISO 14064-2 is designed for GHGs but can be adapted for any EGS benefit – it provides a systematic way of identifying the ‘before Project’ and ‘after Project’ comparison of the impact. The process is based on a streamlined life cycle assessment for project and baseline conditions. Using a standard promotes consistency and transparency in EGS quantification, monitoring, reporting and verification.

Finally, the costs to develop these types of EGS Performance Standards are not insignificant. On average, these quantification protocols cost between \$75 and \$150K to develop. As of January 1, 2008, the Government of Alberta opened protocol development to the private sector to share in the development costs of protocols.

Supporting Guidance Documents

A number of regulatory guidance documents have been developed to provide more rules around the Carbon Offset System. These have been necessary to develop in order to educate and raise awareness of system requirements, and the processes required to generate carbon offsets. The three documents developed to date are:

- **Offset Project Guidance Document** – lays out rules on clearly defined ownership, project start dates, verification, project documentation, protocol crediting periods, and verification;
- **Verification Guidance Document** – lays out the step to verification and how a project developer needs to prepare; sets the required verification standards (e.g. ISO 14064-3);
- **Protocol Development Guidance Document** – still in a draft stage; lays out the steps required in protocol development (see Appendix A for more information).

The general process to create Carbon Offsets in Alberta is shown in Figure 1.

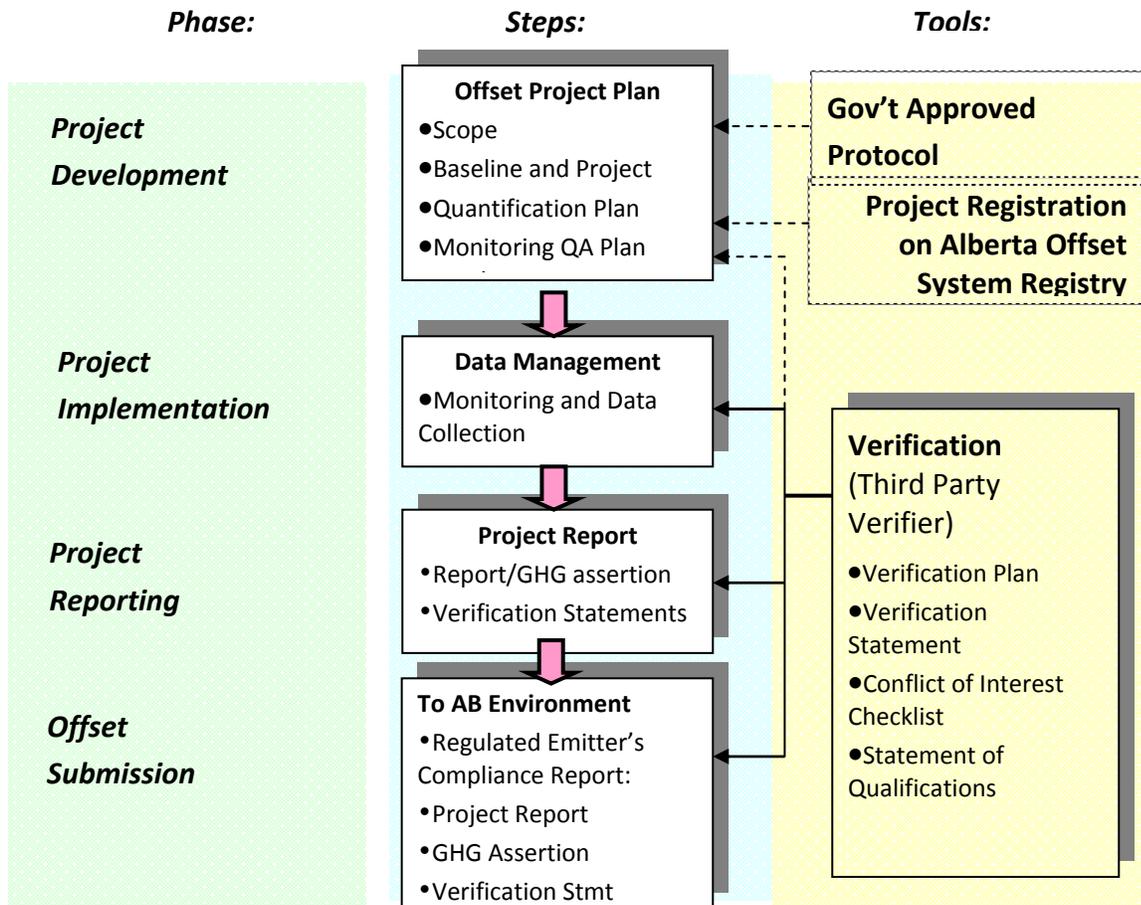


Figure 1. The Project-Based Offset Cycle in Alberta

Quality Assurance

Verification is the cornerstone to creating a compliance based offset in the Alberta Carbon Market and is completely done by the private sector. Verification costs run anywhere between \$5000 to \$15,000 depending on the complexity of the project and the rigor of the Project Developers' Data Collection and Management System.

There are a number of assurance services offered by the private sector in the Alberta Carbon Market. Validation is an assurance service that examines the potential of a project to legitimately result in the stated GHG emission reduction or removals according to the protocol and rules of the system. It is a forward looking analysis. This service is not required by the rules of the system and is a business risk management decision by the project developer. Many project developers have used this service.

Verification is the process where a qualified third party (the SGER states a Chartered Accountant or a Professional Engineer) conducts an independent, systematic review that objectively obtains and evaluates evidence regarding the Project Report and GHG reduction claim. The focus of this review is to determine the degree of correspondence between the Project Developers claims

and established verification criteria (protocol requirements), and then provide a statement to that effect. In the Alberta system, verification could not occur without the standardized protocols.

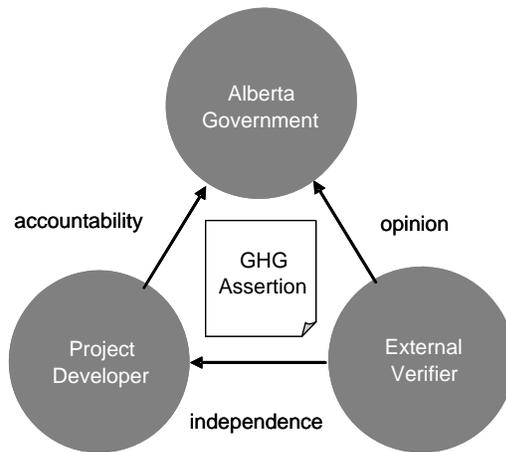


Figure 2: Parties Involved in Verification

As a consequence of the relationships, each party has responsibilities in the Carbon Market. The main responsibility of the Project Developer is to prepare the Project Report and GHG reduction assertion/claim, and to develop and maintain the data management systems and associated controls that generate the GHG assertion. The main responsibility of the government is to set the verification criteria (protocols), verification standards and communicating acceptable levels of assurance and materiality. The main responsibility of the Reviewer is to maintain independence from the Project Developer, conduct the verification in accordance to one of the required standards, and maintain confidentiality.

Table 1: Roles and Responsibilities in the Assurance of Offsets in Alberta’s Carbon Market

Role	Responsibilities
Project Developers* (accountable parties)	GHG assertion GHG data management systems and controls GHG Project Report
Government (user)	Verification criteria (Regulation, Protocols, Guidance) Level of assurance and materiality
Reviewer (assurer)	Independence Verification Confidentiality

*The role of the Buyers is to ensure due diligence on the responsibilities of the project developer.

Although quality assurance for this MBI was designed to have third party verification by qualified third parties as the ultimate check and balance on the legitimacy of a compliance based offset, in practice this has been problematic because the System is so new. Alberta Environment has had to conduct their own audits on the components of the system – baseline

intensity applications and compliance reports for regulated facilities as well as all Offset Projects. The learnings from these are all part of the Adaptive Management Approach to policy mechanisms and used to improve the system. The findings of these will be discussed in more detail in the next chapter. However, it's important to note that Alberta Environment has allocated \$1M for the next couple of years to conduct the audits to gain further learnings to improve the system.

Institutional Support

In Alberta, several key enablers have helped to enable the market to function. The first is Climate Change Central - a non-government organization (NGO) created in 2000 to enable climate change programming across all sectors in Alberta. The second is the various aggregator companies that group together tonnage created from offset projects on different farms and delivers the offsets to market. These latter entities are mentioned because of the large volume of land-based no till offsets that have been created in the system.

Climate Change Central (C3) is a partnering agency with the Alberta Government to develop the needed tools and infrastructure to help Albertans generate offsets. C3 provides a meeting ground for market regulators, protocol developers and project developers. The private sector is encouraged to develop draft protocols in Alberta, according to the ISO 14064-2 project based accounting standard, and C3 coordinates an open, transparent technical and stakeholder review process on behalf of the Alberta government. Further, C3 runs the project-based registry where project developers can register their projects, post their reports and verification statements and serialize their tonnes of carbon offsets – necessary steps in the creation of a compliance-based offsets¹⁶. C3 has also drafted the 3 Guidance Documents for the Government of Alberta based on their experience with carbon offset markets. Through web-based delivery, C3 helps reduce the transaction costs for buyers and sellers in the Carbon Market.

Aggregators are companies that create offset magnitudes of a size that interest the buyers. Individual farms do not have sufficient volumes of carbon offsets to interest the larger industrial buyers – the regulated companies are seeking offset packages of between 50,000 to 100,000 tonnes or more. Enabling characteristics of aggregators include:

- May have staff that can review protocols in the final stages of development.
- Create interest amongst the offset suppliers (farmers)
- Explain protocols and requirements to clients.
- Provide data support to clients.
- Create a quality aggregation business model that withstands third party verifications.
- Allows farms with small amounts of offsets to participate in the market.
- Provide entrepreneurial skills and innovations for the offset market to work smoothly.
- Provide feedback to protocol developers and market regulator.

¹⁶ See www.carbonoffsetsolutions.ca for the Alberta Emission Offset Registry, approved quantification protocols, and all other relevant information related to the Alberta Offset System.

These two important entities in the carbon offset market facilitate the development and operation of a market without a heavy burden upon government of additional staff and infrastructure. In addition, they play a pivotal role in reducing transaction costs so that individual farms can participate in the carbon market and generate revenues – thereby driving increased conservation practice uptake. C3 has facilitated a carbon offset suppliers association where aggregators can share information, develop common contract terms and ensure each other’s activities are adhering to collective business standards. These key enablers help identify and fill in the holes on the carbon market highway and make the market “real” for suppliers and buyers.

This Registry, funded in part by Alberta Agriculture and Rural Development, is an essential piece of infrastructure needed to facilitate the market. Almost all information about the Project is made public and displayed on the Registry¹⁷. The Registry is not an exchange, but does reduce search costs in the market, because sellers can display their Projects to the market, and interested buyers can access Project information to assess it’s ‘fit’ to their organization – all trades occur offline. More importantly, the Registry ensures transparency, no double accounting and confidence to buyers and the Alberta public that the proper oversight on the creation of the offsets has occurred. Each verified tonne is given a unique serial number so that it can be tracked as a compliance unit in the regulatory system. It also allows for the performance tracking of the Offset System.

Several project developers are using existing auction houses like World Green Energy exchange out of Boston Massachusetts to facilitate trades¹⁸. To date, there is no exchange in Alberta to register transactions and contracts.

Information Programs

It’s a significant challenge to make sure the market has symmetrical information so that suppliers and/or buyers are not taken advantage of in the early days of a new EGS commodity. C3, Alberta Environment and the Department of Agriculture have collaborated on a number of fronts to extend information to the agriculture sector and others:

- Developed and conducted over 12 Carbon Trading 101 trading workshops across the province;
- Developed extension materials of fact sheets on the protocols and presentations to over 3000 stakeholders;
- Developed the Carbon Offset Solutions website which houses information around events, market service providers, sample emissions purchase contracts, protocols, guidance documents and market information

In addition, the Call Centre and Dept and C3 staff provide ongoing support to stakeholders on a daily basis.

¹⁷ Legal land locations or land manager names are not displayed. The Registry runs a ‘behind the scenes’ cross comparison of contracts by quarter section against all other contracts in the database submitted by Aggregator companies. Any duplications are flagged and the companies and Regulator are notified.

¹⁸ <http://www.worldenergy.com/world-green-exchange/green-exchange.cfm>

Details of not only protocols and all the development information, but also calculators and Government guidance documents are available on the C3 Carbon Offset Solutions website specially set up for the Alberta offset market (www.carbonoffsetsolutions.ca). In addition the website contains many items such as the Registry, a listing of aggregator companies, verifiers and brokers operating in the Alberta market and their contact information. It's essentially the "one-stop shop" for all things related to the Alberta carbon market and designed to reduce transaction costs in the marketplace.

All of these measures are currently not enough however, and there still continues to be a challenge to get the right information out to offset suppliers about the system. This was pointed out at the Think Tank, where some of the experts noted that if the Government of Alberta wants to utilize markets to increase environmental stewardship, then timely and consistent information will need to be part of that equation – extension mechanisms in the province to land resource managers will need to be increased to support level playing fields in the markets that evolve.

Lessons Learned from Alberta's 18 month old Carbon Offset Market

During the first compliance period (6 months – July 1, 2007 to Dec 31, 2008) regulated facilities in Alberta used all the compliance mechanisms available to them. Collectively, two-thirds of compliance was met by accessing the technology fund (over \$40M came into the Fund); 25% of compliance was settled by purchasing carbon offsets from projects in Alberta; and the remainder by trading emission performance credits. Of the offsets purchased, just over half of them came from agriculture sources – all from the soil tillage management protocol. Sale prices ranged from C\$6 to C\$12 per tonne CO₂e. Transaction costs were in the 30-40% range.

In the second compliance cycle, (true-up period ends March 31, 2008) over 30 Projects have been created, 13 related to soil tillage management. Project Types have expanded from 4 in the first cycle (No-till, Wind, Landfill Gas and Biomass Combustion) to over 8 in the second cycle¹⁹. To date, over 1.3 million tonnes of reduced tillage carbon offsets have been verified and created – far and wide the most popular project in Alberta. This represents a \$13M infusion into the agriculture sector. It's expected that for the 2009 cycle, there will be an expansion to broader land-based project types, since there are over 10 protocols applicable to the agriculture and forestry sector available for project developers to use.

First Review of the Offset System

Since the Alberta GHG Regulatory Framework is based on an adaptive management policy or a 'learn by doing' principle, Climate Change Central held a consultation session on behalf of the Alberta government in July 2007 to review the performance of the 6 month start up period²⁰. The intention of this session was to identify areas for improvement or outstanding issues that need to be resolved. Prior to the workshop, a comparison study of well-established markets,

¹⁹ See www.carbonoffsetsolutions.ca/aeor

²⁰ See session presentations, discussion paper and facilitator's report at <http://www.carbonoffsetsolutions.ca/policyandregulation/2008Review.htm>

relative to the first cycle of the Offset System function was commissioned. Arising from this work, further identification of what worked and what needs to be improved in the Alberta offset market, was collected via a series of online surveys to verifiers, buyers, sellers and offset suppliers (see Appendix D for a summary of the survey results).

In general, two thirds of market respondents indicated they had enough information to participate in the Alberta Offset Market and create and sell offsets. However, a large majority of respondents (60%) did not find the offset transaction process straightforward. Mostly this was because they weren't sure how the transaction process would occur (36%). Most buyers surveyed (68%) did not purchase offsets for the first compliance period, because there simply weren't enough available. When asked what would considerations would make buying offsets easier, the 3 highest ranking answers were – if government would certify the offsets, if there were a set of standard terms on contracts and if aggregators were licensed. The lack of certification of offsets by the government was the main concern of most market participants – if government would 'stamp' the offsets and guarantee their quality and longevity, this would be a significant barrier that would be removed. In further questioning, buyers indicated they did not want to pay the full \$15 for an offset, because of the perceived quality of the offsets.

On the project developer side, most respondents found that the significant challenges to bringing a credit to market were establishing the internal data management systems and controls, the large amount of paperwork and documentation required by the system, and uncertainty about the system expressed by farmers and buyers.

The results of the consultation are summarized in Table 4. In general, most respondents were satisfied with the Offset System components, but had some suggestions for improvement going forward. Many of the areas of improvement are indicative of early market formation and many of the areas below are not part of a government function and speak to improving liquidity in the system. While liquidity is important, in the early days as people get used to the system, it will likely be lacking; protocols and tools to trade with are in place

Table 2. Offset System Consultation Session Results

Area of Improvement	Description
Arbitration Process	In general, participants agreed that buyers and sellers must have confidence in the integrity of the offset trading system and that an explicitly defined arbitration process is necessary to instill that; (the suggestion of a Trade Association was mentioned and well-received by some stakeholders at the meeting)
Guarantee on Offsets	From the perspective of those entities that are selling and buying offsets, this was viewed as a significant commercial risk that tends to devalue offsets as a compliance option and leads to decreased investment in Alberta offsets projects (lack of government guarantee).
Inserting a Validation Step	Participants expressed interest in pre-certification or validation of offsets as a means of providing more certainty in the offset system confidence.
Verification	Participants expressed concern regarding the qualifications of verifiers and stated that a more rigorous system of verifier training and certification should

Area of Improvement	Description
	be developed.
Harmonization	Participants stress that uncertainty with the Federal system results in depressing the price of offsets in the Alberta system. They indicated that there is a risk of Alberta offsets not been accepted within the Federal system and this is reflected in both market liquidity and pricing
Standard Contracts	Some participants suggested that the system should define standardized contracts. Others believe that contract language is best left to negotiation between the parties of bi-lateral agreements. However, all agreed that contract language is gradually converging and standardizing as the volume of trades increases.
Open Borders	There was broad consensus among the participants that restricting the offset system within Alberta is an impediment to market liquidity
Buyer/Seller Level of Sophistication	Participants agreed that greater attention should be paid to developing protocols and systems for managing the interactions between smaller producers and aggregators. Less attention should be focused on establishing strict market controls on the larger, more sophisticated, buyers and sellers. They argued that this would provide the necessary protection to the smaller market participants while allowing a more fluid and dynamic laissez-faire market for more sophisticated participants. It would also prevent more sophisticated players taking advantage of less sophisticated players. In essence, the approach would be designed to ensure fair play within the offset system.

The Role of Aggregators

In the fall of 2008, C3 synthesized the results of the Consultation session; conducted further analysis of the Offset system and undertook a SWOT analysis for the Carbon Offset Suppliers' Association, particularly as it applies to the agricultural marketplace (see Appendix E) The analysis identified many strengths of the System to support the agricultural marketplace, but there are also many weaknesses. Although the role of the aggregator companies is an important one to bring forward marketable packages of offsets to buyers, the actions of a few have created significant controversy in the system – this can be attributed to early market expectations of the size of the opportunity, against the reality of what it actually takes in terms of investment, resources and staff to bring forward a regulatory-based carbon offset. This in part is related to the comment above on the sophistication of buyers and sellers. When the system first started, there were over 12 aggregator companies rushing to contract farmers. The reconciliation and restructuring in the marketplace has left about 5 active groups, and many of these are struggling. By the end of 2009 compliance year, there may be a mere few remaining. We are seeing a more competitive marketplace this year, with the entrance of Viterra and other Aggregators who are competing on price – many are guaranteeing a 15% aggregator fee rather than the 35 to 40% deduction on carbon offset revenue return to the farmer.

Overall Market Response

Despite the concerns and uncertainties about verified offsets in the Alberta Offset System, the market response to carbon offsets have increased exponentially - the number of offsets being created and purchased has more than tripled over last year's 6 month compliance period. At a series of Buyers workshops held by C3 and Alberta Agriculture and Rural Development last December, the interest in understanding the fundamentals of agricultural offsets was expressed by the regulated companies in attendance. Obviously they have been satisfied with the level of due diligence applied to these projects since many of them do a site visit prior to purchase to understand the sophistication of the Project Developers data management and collection systems²¹.

It's important to note that agricultural offsets, with a few exceptions, are the major source of independently generated tonnes for regulated companies to buy in the market today. Most others are originated by regulated facilities or owners of regulated facilities for compliance in power purchase agreements or to satisfy their own compliance. Despite the large volumes of carbon offsets generated in the System to date, there still remains a shortage of tonnes and a relatively thin marketplace. The increased demand response largely reflects the economic downturn affecting the oil and gas sector – they are willing to take risks and purchase offsets, to obtain a lower price on compliance.

In summary, there is a willingness for both the supply side and demand side to engage in Carbon Offset purchases. Several of the projects implemented today have used the most straightforward protocols, but many are examining opportunities for implementing more complicated protocols and expanding their businesses. There has been a significant learning curve for all players in the carbon value chain, and many bumps have occurred along the way. Casualties, particularly in the agricultural marketplace, have occurred with at least half of the aggregator companies folding up their businesses. Further, the price ceiling on the market imposed by the unlimited access of the Technology Fund (\$15/tonne) by regulated companies has proved to be a challenge for the market, particularly for the supply side.

Looking forward, we expect to see a greater diversification of companies engaging in carbon offset projects. Those companies with business models that have been carefully fostered and don't rely on one single protocol for their businesses will survive – diversification, as in any business is more sustainable. It's acknowledged that the price of carbon is going to increase in the future as GHG regulations are implemented across North America. Alberta Environment has signaled that the price could rise to \$20 by 2010, and \$30 by 2015 in regulated markets²². Analysis by the federal Canadian government in their Turning the Corner Plan for regulating GHGs release March 2008, estimated carbon prices of \$25/tonne in 2010, and ramping up relatively quickly to over \$50/tonne by 2015. Regardless of which numbers are right, the value

²¹ TransCanada, a co presenter at the Buyers' workshops last December expressed being impressed by several of the Project Developer's sophistication. TransCanada and companies like ConocoPhillips do pre-audit investigations on Project Developer companies before entering into agreements.

²² President Obama signalled to Congress in his February 24th budget address that a cap and trade system in the US would generate approximately \$657B USD in government revenues and the average carbon price would be in the \$13-15 USD /tonne range.

of carbon will not be decreasing in the future, and many Alberta land managers would rather wait to see what happens before engaging in carbon contracts at this time²³

In addition, for the 2009 compliance year, Alberta Environment will be adapting the system to enhance its rigor. This will include providing further rules in the Guidance Documents to provide more clarity around expectations of system participants and templates for more consistent project documentation, reporting and verification. Alberta Environment will also be considering certifying Verifiers for the entire GHG regulatory framework. The Auditor General of Alberta has also been conducting a 'Value for Money' audit on the entire GHG Regulatory Framework, and Mr. Dunn's report is due out in May 2009. It is expected to be 'mixed' regarding the role of offsets in the GHG regulatory framework. This may prove to be challenging for Alberta's first broad scale EGS-related MBI.

Carbon Offset Market Experience – Lessons for Future implementation of EGS-related MBIs

The Carbon Market experience in Alberta has much to offer the federal government as they contemplate a national offset system, as well as the Institute as it contemplates other EGS-related Market Based Instruments. It hasn't been an easy path in Alberta to move forward on other markets. Reasons for this are varied. At a recent Government of Alberta Environmental Tools Workshop (October 2006), featuring experts from across Canada and the US, one speaker summed up why Alberta hasn't seen much adoption of Market-Based Instruments to meet environmental objectives.. These were characterized as:

- Insufficient scientific information to support implementation
- Alberta's comfort with reliance on 'planning' or strategy development
- Transaction costs leading to market failure
- Lack of political economy (industry perceptions, ENGO perceptions, government jurisdictional issues)
- Lack of capacity and expertise to implement
- Equity and/or competitiveness issues.

All of these were encountered in Alberta's early efforts to address climate change through a market-based approach. And many issues still remain to be addressed, but significant learnings have been gained towards these issues. They are summarized in Table 5.

²³ Feedback at Carbon Trading 101 sessions organized by C3 and Alberta Agriculture and Rural Development.

Table 3. Lessons Learned and Application to Future EGS-related MBIs

Criteria Category	Lessons Learned	Recommendations/Implications
(1) Strategic Priority Setting for EGS		
Identifying Priorities	GHG emissions inventories conducted at the National and Provincial scale have helped to identify the scale of the problem and which sectors are contributing to the problem Roundtable policy assessments in 1999 – 2000 both provincially and federally to feed into 2002 Climate Change Plan for Alberta - determine concern level for the EGS at risk (i.e. carbon and climate change)	Utilize/Develop inventories/monitoring programs of ecosystem related services; indicators of ecosystem health Conduct risk assessments to determine the nature and extent of the EGS most at risk Engage stakeholders in roundtables, at appropriate scales to tap into networks of expertise in various agencies to confirm the scale of the problem
Identifying Outcomes	Sector level agreement discussions helped to identify which sectors are implicated on the demand side; Conducted economic and policy assessments to assess short, medium and long term targets for GHG reductions	Economic efficiency and Environmental effectiveness analyses can help determine which sectors can be regulated to set demand, and which sectors can voluntarily take on EGS enhancement to offset the targets
Certainty for Regulated Sectors	The experience in Carbon Markets around the world has been to set targets based on the amount of GHG Benefit (i.e. so many Mt of GHG reduction). There's been push-back from the CAPP that they would prefer a price-setting mechanism like a tax. The discussion continues to churn.	Bring in a hybrid system like Alberta's Carbon Market : <ol style="list-style-type: none"> 1. Where the targets are set on quantity of an EGS benefit, but a price floor/ceiling can provide comfort to the regulated side; ensure that it's a strong enough price signal for the offset suppliers; or, 2. Rely heavily on offsets to control the volume/price of tradable units. This is predicated on there being enough offset liquidity to work with. Challenges will be that if caps are set on offsets, the market may lose interest.
(2) EGS-Related MBI Design		
Targets/Policies to set Demand	Sector level discussions on demand side helped to inform target setting Recognition early on that intensity targets would allow growth in the Alberta economy; GDP linked to energy revenues Began with reporting regulation to set baselines for regulated facilities	In absence of pilots, choose targets that are doable, recognizing that constraining use of a resource that wasn't formerly considered an economic input (with associated costs) will have an impact on the economy Economic analysis of costs and benefits is essential. Identify target groups who can enhance supply of the targeted EGS
Tailoring to the Region/Scale	Provincial level was appropriate due to non-localised impacts of GHGs but this is misunderstood by many	Clear communication of the environmental benefits provided by the program to the communities and general public is

Criteria Category	Lessons Learned	Recommendations/Implications
	stakeholders (i.e. “letting the big polluters off easy by letting them buy offsets” is a commonly held view)	important
Motivating Demand	Intensity targets, with a safety valve of a \$15/tonne Technology Fund was essential to move forward for the regulated facilities	Understand the constraints the demand side will be under; policy dialogue will be needed in order to ensure effective implementation
Identifying and Motivating Supply	Sectors that could provide supply opportunities were identified in a series of round table discussions (2000-2002) federally Based on volume of potential supply, ease of implementation; cost effectiveness; increases in efficiencies of operations Recognize early action Additional or Incremental performance has been controversial	Internalizing positive and negative externalities is a dual pronged approach (i.e. target supply with high environmental co-benefits) Can build on the carbon market platform/process Good action recognition is important and needs to be balanced off with the need for increased environmental performance
Selecting the MBI	A baseline credit emissions trading system selected instead of an absolute cap and trade to ease into the mechanism ²⁴ A series of early pilots were implemented to signal to supply side the opportunity and build understandings of Offset Projects (GERT, PERT, PERRL pilots from 2004 to 2007) ²⁵	For the regulatory side, Alberta implemented the framework directly without a pilot in a bold move in North America, based on “learning by doing” adaptive management – this lead to significant underestimation on the part of the regulated facilities, government and the supply side as to the level of resources required to meet the system (Auditor General report in May 2009 should prove interesting). Better assessments about the administrative burden are needed
Understanding Tradeoffs	Balancing the demand and supply side has been problematic. While easing the regulated or demand side into attaining reduction levels is priority, the supply side has felt alienated Likewise, the demand side does not like to see value siphoned from their sector into other sectors \$15/tonne price cap has been a challenge	Clear communication is needed to manage expectations in an MBI where there is a regulatory backstop Managing relationships between buyers and sellers should be more of a focus, particularly at the nexus of agriculture, forestry and energy, where past land use conflicts can impact market function Distorting the marketplace with a price cap is not

²⁴ Mechanism largely based on and international policy drivers and early industry-government assessments of emissions trading in 2000-2002 timeframe at federal level.

²⁵ Collaborative industry-government pilots across the country helped to stimulate capacity and understanding; GERT -Greenhouse Emission Reduction Trading pilot; PERT - Pilot for Emissions’ Reduction Trading; PERRL - Pilot for Emission Reduction and Removals Learnings coordinated by the federal government for agriculture, forestry and landfill gas sectors.

Criteria Category	Lessons Learned	Recommendations/Implications
	Early complaints of a bias in the system towards the regulated side Perception by government that offsets will not help get us to where we need to go and keep the price signal too low	recommended; see above section on Certainty for Regulated Sectors Accurate assessments of supply potential is necessary and marginal abatement cost curves are very useful in understanding the capacity of firms to engage in the MBI
Financing the MBI	Administration burden on players has been high; estimates of the cost on the government side should be in Auditor General's report in May 2009 Financing of carbon reductions largely through the private sector	Build on this and other system's cost estimates by doing a full cost accounting of administrative burden on government, industry and partnering agencies.
Testing through Pilots	See Selecting the MBI row above	Given the unexpected cost implications, and if transferred to other EGS benefits where measuring, monitoring and verification information will take time to build, pilots may serve as useful ways to gather cost and benefit information relevant to Alberta regions.
(3) Market Requirements		
Guidelines Clear Rules of the Market	Guidance Documents are essential to further lay out expectations and requirements of buyers and sellers More explicit templates are needed Meeting these requirements has been problematic on the supply side	Clear market rules are necessary; even down to monitoring and reporting templates Supply side will need extension and technology transfer to build needed capacity and expertise
Science Based Quantification/Measurement Standards	Measurement standards are based on International and National accounting frameworks (GHG calculations) Quantification protocols are based on an ISO framework for consistency and veracity -use emission factors and formulae for ease of use) Protocols lay out the measurement, reporting and QA/QC requirements for the project Units of measurement of gases are based on equivalents - relative impact) Build on industry best management practices	Assess the scientific feasibility of measuring and quantifying the EGS benefit – where there is information available, be specific in the EGS benefit (i.e. tonnes of GHG's reduced) The less information available, the less credibility the system will have if offsets are created – the market needs confidence ²⁶ Practices/technologies in protocols must be feasible and practical – look to BMP literature ISO framework can be extended to other EGS related benefits Standards should be created with the implementers in mind

²⁶ Note, for other offsets or banking mechanisms, it may be premature to quantify a set amount of biodiversity or a wetland function...the more general linkages made in terms of 'land/habitat type banking' may be more appropriate.

Criteria Category	Lessons Learned	Recommendations/Implications
	Conduct an open and transparent protocol/standard technical and stakeholder review process	and at the table. Recognize that developing these standards/protocols is a considerable investment -cost sharing has greatly reduced the burden, but disaggregated sectors will be ignored if this is the only avenue (i.e. land –based EGS opportunities offered by agriculture and forestry – government has developed these) Further guidance will be needed to help Project Developers meet the requirements
Institutional Support	The Alberta Emissions Offset Registry has been an important facilitating mechanism for the market Created confidence in the market	Consider the necessary structures to register EGS benefits, tracking and transfer of units, and provide transparency to the marketplace Can be done by the private sector, but by an agency that has no vested interest in the marketplace
Transparency of Market information	Information to support the market has to be transparent and engage stakeholders Price transparency has been a challenge in this bilateral market	Perfect information is never achievable, but running processes that are transparent and provide stakeholder input is essential Recognize that at a provincial scale, markets for EGS will take time to grow. Price discovery will take time as well, and so the playing field for information is not going to be level Consider a brokerage agency (e.g. Trust/Bank) to assist the supply side.
Quality Assurance – Monitoring and Verification Standards	The protocol format enabled by the ISO 14064 series of standards have assisted in monitoring and verification in the system Verification has been a challenge in terms of capacity and expertise – the learning curve has been steep Verification standards are likely needed	Consider ISO standard framework for other EGS-related markets Third party verification is still important Consider some kind of training and certification of verifiers (can be done by private sector) Consider more prescriptive, specific to EGS verification standards for quality assurance
Government Certification of the EGS Benefit	Despite the tools, process and infrastructure put in place, there continues to be this call for Government to certify or ‘stamp’ the 3 rd party verified carbon offset No ‘certified’ commodity is issued back to the project developer, causing large carbon financing firms to stay away from Alberta’s market	Consideration should be given to ‘certifying’ the EGS benefit or offset, to provide greater investment opportunities for the offset supply sectors involved. Means liability for government.
Respect for Jurisdiction/Property Rights	Individual land owners don’t want their land locations publicly displayed – privacy is important	Ways can be found to keep anonymity and still have a rigorous system

Criteria Category	Lessons Learned	Recommendations/Implications
	Voluntary is the key word for resource managers to engage	
(4) Implementation		
Transaction Costs	Transaction costs have been reduced in many ways by the system, but they still remain high Small amount of GHG reductions are delivered by many operators on the land	Consider a brokerage agency (e.g. Trust/Bank) to assist the supply side In other EGS-benefit areas, the same situation of small amounts of supply, with numerous sources will occur This agency can coordinate actions on landscapes through reverse or conservation auctions to better coordinate ecosystem level/landscape outcomes.
Leveraging Partnerships	Relying on partnering agencies and the private sector to deliver certain aspects of the market can distribute costs	Clear communication and expectations need to be laid out from the beginning
Embedded Entities for Trust	Honest broker agencies like C3 and obviously ARD/SRD essential for the supply side to find information	Consider who in what agencies are the right folks to target extending information and support to EGS providers
Informational Support	Not enough has been done to extend information to the supply side Regulated facilities have also had their challenges in understanding requirements despite early stakeholder information sessions Market Bulletins that publish volumes and prices will be needed at the end of every cycle – this is proprietary to buyers and sellers so it's a challenge	Target the right people in supporting agencies to extend information Develop resource materials to assist understandings and project implementation Communicate clearly the intent of the system to stakeholders.
Evaluation and Monitoring	It's been a challenge to find the right way to communicate results and outcomes of compliance without compromising commercial interests in the early stages of the framework	Putting in place the necessary infrastructure to track and report on system performance is important The government needs to communicate with Albertans and stakeholders the environmental results of the EGS MBI
Adaptive Management	Review sessions with stakeholders after each cycle has provided valuable information Assessing weaknesses through higher level audits on components of the system has worked well, but caused uncertainty and consternation in the marketplace Risk management in contracting has been a result where liability language in contracts is beginning to 'push down the chain' to suppliers and project developers	Updates to stakeholders are important at review sessions Realize that adaptive management frameworks work well in principle, but when establishing markets, markets need certainty Large investments are at stake on the regulated side, and any course corrections can cause ripples across the market and disturb confidence
Public Support	Alberta's actions on GHG remains poorly understood by	Clear communication and marketing is important in early and

Criteria Category	Lessons Learned	Recommendations/Implications
	<p>general Albertans Few realize that we have the first multi-sectoral GHG regulation in North America and the first compliance – based offset system</p>	<p>ongoing stages. The lack of public awareness has been extremely frustrating for those involved in the system</p>

Proposed EGS-related MBI Opportunities for Alberta

Compiling the various initiatives that have occurred in Alberta to date, and the recommendations arising from them, this section outlines where potential lies to pursue EGS opportunities in Alberta²⁷. The list is not comprehensive, and certainly there are other areas that could be considered, these have risen to the top as part of the analysis for what's needed in Alberta. Obviously further work will be needed to flesh out the Process Design and Key Elements of moving forward on these initiatives, it's provided as food for thought to the Institute for their consideration.

Eco-Efficiency Program for Agriculture

- Based on improved inputs per yield of crop or unit area or kg animal produced.
- Linked to EFP²⁸ for certification program (mandatory worksheets filled out; improved practices identified; verification of information tracking systems to bear out improved practices)
- Information tracking systems key to benchmark and show improvements over time.

Nutrient Trading Program for Southern Alberta

- Conduct small watershed nutrient budgets²⁹ or balances to identify “sending” and “receiving” zones for nutrients
- Create a nutrient brokerage, bank or exchange to facilitate transfers (even a possible “return to sender” program)
- Identify how transportation incentives would help the program (subsidized costs for transportation)
- Provide local incentives, adding on to bioenergy program incentives, to construct regional digesters and manure processing facilities for creating “value added manure products” for the exchange to market (these products would overcome social stigma barriers and transportation economics).
- Conduct needed information and market analysis to help transform the perception of manure from waste to valuable resource.

Carbon Top Up Programs

- Recognizes and values standing stocks of soil and forest carbon in maintained grasslands, undrained wetlands and forest stands – not just incremental improvements..
- Applying the proper protocols (e.g. forage C offset protocol conversion of annual to perennial or improved grazing management) may apply for an additional payment in recognition of EGS benefits.
- Payments to be coordinated by a “Carbon Trust/Carbon Fund” mechanism (see next);

²⁷ Land Use Framework, AENV MBI Initiative; Ag Summit, Ag and Food Council's EPIP project; AAFC EG&S Pilot Programs; ARD EGS Feasibility Study; Cumulative Effects Management; Wetlands Strategy; Water for Life Strategy; SRD's Biodiversity Strategy; South Saskatchewan River Basin water quality and water quantity trading work by Finance and Enterprise and Alberta Environment..

²⁸ EFP =Environmental Farm Plan

²⁹ At a regional scale, calculate the level of nutrients being imported to a region in the form of feed and forage (sending levels), and then calculate the tolerable land limits and how much the budget is 'over'. This forms the basis for identifying sending and receiving zones and correcting for the nutrient accumulation through policy tools. Dr. Brad Stelfox's ALCES model can be utilised for this purpose.

Carbon Trust/Bank/Credit Brokering for Small Projects

- Can reduce transaction costs for buyers and sellers so a fair and reasonable price could be arrived at in carbon transactions.
- Carbon Trust would provide the 'honest mechanism' for buyers and sellers in this early commodity development who don't trust the current marketplace; facilitating transactions, absorbing some risk, providing more certainty and transparency.
- Can foster access to Voluntary Carbon markets for those companies/agencies that wish to participate because of multinational compliance drivers, anticipated regulations or for good corporate citizen reasons, could also contribute to the Fund. This could be an important transition to a liquid market down the road, familiarizing both buyers and sellers with project-based systems and establishing relationships for further market developments.
- The Fund/Bank approach would allow project developers to discover true costs of project implementation before more complex market structures appear, and reflect these inherent costs in the 'price bids' they submit to the fund agency when the tendering or call for project process is made. This approach would also provide more value for the land resource manager, and ensure transparency because the agency would be required to report on projects and successful proposals
- A request for proposal or conservation auction process allows a technical committee to choose the most efficient and effective projects. The pilot will reveal sellers perceived/real value for carbon services as well as strike a mutual willingness to accept a negotiated price between suppliers and providers of carbon services.
- The conservation auction process applies to the Conservation/Biodiversity Bank as well (see below).

Purchase of or Transfer of Development Rights through Conservation Easements

- Purchase of development rights. Land is not allowed to be developed, using conservation easements which either leave the land in a natural stage or allow agricultural use only.
- The level of easement purchase is a function of the difference between fair market value and agricultural tax assessments.
- Transfer of development credits. Development rights on one parcel are transferred to another. Land values remain similar but development occurs in a managed manner –can be linked to conservation banking (see below).

Biodiversity or Conservation Banks

- Privately or publicly owned lands that are managed for endangered, threatened, and other at-risk species. Instead of money, the bank owner has habitat or species' credits' to sell.
- Conservation bank maintains the biological bank account and targets the sensitive lands/species through analytical framework; sets out needed conservation management practices or set aside lands;
- Auctions for conservation/biodiversity offsets by the bank owner allow local evaluation of those offsets, value pricing and, targeted or desired conservation practices on landscapes (e.g. priority on woodlands or, priority on stream protection, priority on wetlands)

- Investors in banks can be motivated by ‘banking’ policies such as no net loss of wetlands or no net loss of species in targeted areas; collaboration with Alberta Biodiversity Monitoring Program for analytical framework.

Conclusions

Alberta’s Carbon Market is still very nascent in its development, but much has been learned in how to implement this EGS-related MBI, but it’s doubtful that Alberta’s market will continue to operate in isolation once Canadian and US federal emissions trading legislation/regulation start to materialize. However, important lessons have been learned as outlined in the above sections of this report, and the federal government as well as other provinces and states have looked and are looking to Alberta for these learnings.

It’s important to note that before Alberta implemented the GHG Regulatory Framework, much preparatory cost-benefit ; risk assessment analysis; consultation with stakeholders and piloting of offsets had occurred in a federal-provincial context. Therefore significant collection of information and development costs for the measuring, monitoring and verification of GHG quantification had occurred for various sectors, informed by the International UN context, and the National Emissions Inventory accounting methodologies.

For Alberta to pursue other EGS related-MBIs, it’s highly recommended that Pilot studies be pursued to test program feasibility, participation and design as mentioned throughout this paper. Well designed pilot studies can generate a wealth of information with which to assess future potential programming. In the National EGS Pilot study, whose results will be shared with stakeholders the end of April 2009, the objectives were to:

1. Support national policy development on EG&S by:
 - Providing (or building upon) the scientific basis for policy action;
 - Providing new information to address critical information gap(s);
 - Validating and improving developing EG&S policy models;
 - Providing evaluative feedback on new or existing policy instruments and options;
 - Recognizing regional opportunities and issues
2. Test and demonstrate innovative approaches to EG&S policy by:
 - Validating and/or evaluating a potential model in a real-world, Canadian context;
 - Testing the feasibility, efficiency and effectiveness of an idea or working approach in the Canadian policy context;
 - Producing measurable results that validate the contribution of policy alternatives to achieving environmental performance targets;
 - Facilitating broader understanding of complex EG&S concepts by providing more interpretable, tangible working examples.
3. Engage stakeholders in the development, evaluation and improvement of EG&S policy, and build consensus on preferred alternatives by:

- Utilizing a community based approach where appropriate;
- Creating opportunities for collaboration and co-operation between governments, industry groups, ENGOs and others;
- Providing an opportunity to get feedback from farmers and other stakeholders to inform policy development.

Perhaps by identifying a similar set of objectives/criteria for implementing EGS related MBI as they are developed by the various Environmental/Ecosystem objective setting exercises in the province, the needed information for developing more fulsome broader program initiatives can be generated.

Appendix A –Summary of Past and Current MBI Initiatives tailored to Stewardship

	General Description	Results
Landowner Habitat Program	Started in 1989 and 1990, the Fish and Wildlife Division of the Alberta Government offered the Buck for Wildlife program.	The program paid annual rental or lease payments to secure habitat. Program has been maintained and expanded by the Alberta Conservation Association.
County of Barrhead Property Tax Rebate	A municipal tax rebate tool, started in 1990, agreements are signed to assist in retaining natural areas.	Several thousands of acres of natural areas have been set aside and nominal tax rebates have been offered in recognition of the taxpayers' conservation effort and commitment.
Municipal District of Rocky View	Early 1990's farm managers were required to develop Farm Resource Management Plans, developed at a one-day workshop.	The program offered three incentive options; 1) crop residue improvement, 2) new shelterbelts, 3) permanent cover. Applicants received \$150 credits on their tax bill for participating.
PFRA Permanent Cover Program	Began in the 1990's to establish perennial grass on erosion prone soils.	The program paid incentives for seeding and maintaining perennial cover.
Ecological Gifting – Environment Canada	Began in 1995 and involved provisions to the income tax act to encourage gifting of easements or title to ecologically sensitive land	Uptake has been slow; approved organizations are eligible to hold required conservation easements. Enhancements to the program are in the process of becoming part of the income tax act.
The North American Waterfowl Management Plan	An international joint government/private non-government organizations conservation partnership for restoration of wetland and upland habitat waterfowl. The program offered lease and other acreage based incentives for specific land management.	The program has been operating for about 20 years. The program has affected a total of 1,4M acres of upland and wetland habitat.
Agriculture Policy Framework(APF) 2003-2008– Incentives for BMPs	A part of the environment chapter of the federal government's APF. Through the Environmental Farm Planning (EFP) process, BMPs that reduce risk to the environment will be implemented by landowners that have completed a risk assessment of their farm.	Incentives to support implementation of BMPs that are offered through the EFP. Ultimately the BMPs will provide some level of EGSs – maybe not at the ecosystem level.
Agriculture Policy Framework 2003 - 2008 – Green Cover Program	A part of the environmental chapter of the APF. The Greencover program will target erosion prone soil, critical areas as well as shelterbelts and woodlots.	This incentive based program identifies specific BMPs to be implemented. Most of which are offered through the EFP program.
Albertan's Climate	Provides a comprehensive regulatory framework to	To date (system started July 1, 2007) over 5 Million tonnes of carbon offsets or

Change: Taking Action	reduce greenhouse gas emissions, through an emissions trading system.	emission reductions have been generated; over 1.3Million tonnes of offsets from No Till projects. (at \$10/tonne... is approximately 13 \$Million in revenues for the Ag Sector.
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Appendix B – Explanation of the Policy Process and Key Elements Criteria for EGS related Market Based Instruments

Strategic Priority Setting for EGS

The first step is the higher level decision making as to what are the strategic areas to focus on. These are typically based on high level indicators from monitoring programs of threats to air, water, and terrestrial ecosystems (i.e. habitat or species). Often, this can largely be a balancing act for the agency conducting the analysis since one kind of land use or land management can have a detrimental effect on another desired outcome. Conversely, synergies can be found in other areas, where EGS are ‘stackable’ and enhance ecosystem function.

Additional information can be gathered through methods like those used in the 2005 EGS Feasibility study by ARD where stakeholders are asked about their priorities for their region. By combining these methods – the science based and the socioeconomic – the potential for identifying strategic EGS that markets will support is enhanced. Typically, what emerges are those EGS that can be used to minimize the negative externalities of resource users (non-point source emissions) as well EGS that result from enhancing the positive externalities from well-managed Alberta landscapes (biodiversity and habitat).

Risk assessments can be then used to determine the nature and extent of the environmental issue/conditions - is a solution required immediately; who or what is being impacted; how severe are the impacts?; what is causing the problem (source, sector, nonpoint source?); is the problem local or province wide? These are key questions to answer. This would be an appropriate role for the Institute in its coordinating role. Further, some of the t

These decisions are best made in the context of public dialogue. There are several public fora occurring in the province that are already attempting to decide on some of these outcomes, but lack the coordinating mechanism. These groups represent a cross section of government, NGO or private sector initiatives – the Land Use Framework, the Wetlands Strategy (through the Water Council), Cumulative Effects Regions (e.g. Industrial Heartland), South Saskatchewan River Basin work, Agri-Environmental Partnership, Canadian Boreal Initiative among others. All are either seeking to establish limits/constraints at the provincial or regional level on resource use, and set targets accordingly. The Institute could tap into these and find commonalities in establishing needed policy frameworks.

Market Requirements for EGS – Process and Design Related Issues

At the most fundamental level, in order to target MBIs for EGS several considerations are needed for governments:

1. **Deciding on the EGS Objectives** – to create the demand for the EGS; this can be at a Provincial, Regional or Program level depending on the strategic level of decision in the above step (e.g. 12% reduction in greenhouse gas emissions; 30% improved water quality in Southern Alberta ; No net loss in wetlands across the province);
2. **Designing the MBI(s)** – to achieve the objective. These can be tools that (a) directly intervene such as regulations (to achieve the targets) or financial incentives, or (b) tools that enhance private markets – sometimes a combination of ‘a’ and ‘b’ prove to be most effective. See Table 2 for a description of possible policy tools to enhance practices that produce EGS; Financing mechanisms are important to consider at this stage too.
3. **Understanding the Capacity to Respond** – conducting needed policy and market research into why EGS markets have ‘failed’ (i.e. are undersupplying current levels of EGS), the motivations and willingness of EGS providers to respond and communicate to beneficiaries to build confidence and validity for the initiative;
4. **Identifying needed policy, institutional and information support** – ensuring credible measurement, reporting, compliance monitoring and certainty for transactions, as well as policy extension and knowledge exchange that hits the right level in engaging organizations. (to be covered in a later chapter).

Table 4. Possible Policy Tools to Enhance EGS

Direct Intervention Tools (publicly funded/driven)		Enabling Private Market Tools (leveraging private funding)
Direct Measures	Economic Incentives	Market Instruments
<ul style="list-style-type: none"> • Regulations • Prohibiting land uses • Direct Payments • Emission Taxes • Purchase of Ag Conservation Easements (PACE) 	<ul style="list-style-type: none"> • Cost-share payments • Fees/fines (e.g. water pricing) • Tax incentives • Cross compliance • Eco-efficiency programs 	<ul style="list-style-type: none"> • Carbon Offsets • Biodiversity Offsets • Transfer of Development Rights • Land Use Permits • Water Trading • Nutrient Trading • Conservation Auctions

Unfortunately, there is no tried and true method to picking the best market-based instrument or mix of policy tools to achieve the desired environmental objective. Most jurisdictions have found that using Pilots as the basis of moving forward on EGS-MBI programs is more prudent. In the past, too often the human response component of EGS-MBI policy is ignored in program design. The socioeconomic response to policy can result in increased costs and unintended consequences and should require as much attention as the environmental basis for moving forward.

Capacity to Respond - Demand and Supply Side of the Markets

The design of the MBI for the strategic EGS has to take into account the ability and willingness of the supply and demand side to respond – after all, these are market-based approaches being utilized³⁰. Policy makers need to evaluate what the appropriate role for government is in designing tools that will enhance supply of EGS, including financing mechanism, which are related to understanding the appropriate role. This will involve understanding the motivations and reasons for current market failure for EGS – is it a public good problem or is it a transaction cost problem that's barring EGS markets from emerging.

Public Goods

Many of the strategic EGS are 'public goods', in that a private resource manager can't exclude the public from enjoying the benefits that his/her investments provide. For example, well-managed wetlands/ wooded area and the habitat and species they provide can be enjoyed by all. Likewise, one can't exclude the downstream users from enjoying higher water quality from a well maintained riparian area on farmland. In effect, the resource manager cannot capture the costs or reap the benefits of their investment of "feeding the queen's deer" or maintaining a healthy riparian habitat, because many can 'free ride' on the benefit. For this reason, there is a tendency for private markets to undersupply EGS, mainly due to poorly defined property rights for these goods (i.e. they "belong to all"). There is a role for government to provide EGS that are underprovided by the market.

Transaction Costs

Transaction costs tend to be the other reason why private markets fail to recognize EGS, mainly due to a lack of:

- Scientific, quantitative information about the types of management practices or technologies that deliver a set amount of EGS (defining the supply);
- Information about the private costs of supplying EGS;
- Search costs for finding appropriate projects that give rise to EGS
- Bargaining and negotiation costs between suppliers and buyers to address risks and uncertainties;
- Measuring, Monitoring and Verification information
- Inadequate market guarantees or market infrastructure to facilitate transactions.

The 2005 EGS Feasibility study determined that transaction costs were the main reason that water quality and habitat/biodiversity EGS were undersupplied relative to demand.

First, If public good issues are at play, the role of the government more often than not is to use an MBI that directly intervenes to overcome the free riding problem, either through regulated measures that better define property rights such as environmental

³⁰ Even in the case of a regulatory backstop on point-source emissions; bringing in punitive measures without recognizing the ability of emitters to meet targets can result in unintended consequences

taxes, trading systems (e.g. carbon tax), limiting activities on certain lands (no wetlands drainage) or through the use of voluntary mechanisms such as direct incentives, tax credits or cost sharing mechanism for behaviour or management change.

Secondly, if transaction costs are impeding the private market from functioning³¹, then the role for government is to provide the market with quantified and verified³² information about the costs and benefits of providing EGS and which management practices give rise to a certain amount of EGS – and perhaps set a regulatory backstop to encourage demand. The government can also provide extension to producers trying to manage for EGS; and improve the legal and institutional infrastructure to enable private transactions and contracting for EGS. An example of this actively being done in Alberta is the Carbon Offset System which will be discussed in a subsequent section.

Through a collaborative framework, with stakeholders at the table, and tapping into a network of expertise, realistic and simplified approaches can be developed that take into account industry and consumers' capacity and willingness to engage in the market, and sort out the reasons for market failure. Further, through analyzing the distribution of costs and benefits of the proposed mechanism and with Industry and ENGOs at the table, new appreciations of complexities and solutions can emerge. Agreement and negotiation can take place; ensuring one group doesn't bear the full burden of implementation, including government, as common objectives and methods are embraced. This has been demonstrated with the Carbon Offset market in Alberta.

Financing Mechanisms

A fundamental consideration for governments, related to EGS related MBIs, is “costs and how these mechanisms are funded. It takes a significant amount of public investment to fund the design, administration and implementation of these policy tools, and this is apart from the funding required to incent the EGS supply³³. For funding, the key question to ask is “are we enhancing EGS with public funds (through direct intervention tools like incentives) or are we enhancing EGS with private funds, through leveraging private market-based tools?”. For Alberta, most of the EGS tools should focus on leveraging private funding through enabling private markets, according to the 2005 EGS Feasibility study.

Several countries have found that private sources (through enabling private markets where possible) prove to be more sustainable. How to provide sustainable funding can be done in a number of ways, but should be a considered component of the choice for the MBI³⁴. If public good issues are the main source of the problem, a mechanism such

³¹ Meaning there's willingness for the private sector to purchase EG&S in a market setting.

³² Verification can be a private sector function, so long as government provides the rules and criteria for verifying the production of the EGS.

³³ In an Agriculture and Food Study on EGS Feasibility, an average cost of \$800K \$1.2M was recommended to design and implement Pilot Projects for EGS. This was based on learnings from the Australian MBI study.

³⁴2006 National Symposium on EGS in Agriculture, AAFC; http://www.agr.gc.ca/pol/egs-bse/index_e.php?page=symp06

as a small environmental tax on food, or fertilizer/pesticide use for urban centres can be used to re-direct public funding into more sustainable practices on the land. If transaction cost issues tend to dominate, the best mix of tools may be to combine a regulatory backstop to create private market demand with a market-based mechanism, with institutional infrastructure (e.g. registries, clearinghouses, auction marts, 'public' brokerage agencies) to allow private markets to transact (e.g. carbon markets, biodiversity banking, tradable land use permits or transfer of development rights).

Policy, Institutional and Information support

As mentioned, understanding the requirements of well functioning markets and successful transactions can help in identifying what government or other agencies can implement to support and foster the EGS markets. These can fall into several general categories:

- **Consistent EGS Performance Standards** - that set out the scientific quantification, measurement and reporting for EGS providers regarding the amount of the EGS delivered by the management change on a landscape; minimum reference levels or baselines of performance can be set out in these standards³⁵;
- **Quality Assurance Mechanisms** – verification and certification standards, applied by qualified third parties that provide market confidence and certainty for buyers and sellers as well as assurance to government that compliance is being met;
- **Institutional Structures** – registries, clearinghouses, auction marts, 'public' brokerage agencies to allow private markets to transact with confidence;
- **Information Programs** – additional rules; information, policy extension and knowledge exchange with buyers and sellers in the EGS-MBI program and agencies coordinating action on the ground.

Many of these services can be provided jointly between government agencies, NGOs and private sector organizations. Examination of the Carbon Market in a subsequent chapter will outline how this is happening to relieve the administrative burden from any one organization.

Monitoring, Measurement and Enforcement

Regardless of whether there is a legal framework backstopping the demand for EGS (e.g., GHG regulatory targets or caps on nutrient/solids load on the South Saskatchewan) for an MBI or a voluntary program funded through public-based incentives is implemented, value for money needs to be demonstrated to Albertans. Further, a critical element of program implementation is design of appropriate

³⁵ Known as the requirement of 'additionality' or beyond business as usual in carbon policy

monitoring and evaluation tools to ensure that objectives are being met, and that new information is incorporated in program design.

The key to being able to track the performance of the EGS-MBI is to have clear, unambiguous measurement, reporting and verification standards, set out by government. These standards and their proper implementation are tied to the practice uptake on the ground through EGS projects. These outcome measurements need to be tracked by credible, trusted registries so that participation rates and quality performance measurement can be assessed. Transparency in these measurements is important so that the overall benefit of the program can be demonstrated to the marketplace, the regulators/investors and the general public.

Adaptive Management

The concept of adaptive management is an important tool to accommodate learnings, public priorities and science development/improvement over time. Implementing successful EGS-MBI programs involves assessing ecosystem conditions and responses to targeted EGS practices, as well as the distribution of the costs and overall benefits of the program. In addition, constant evaluation of the interactions between programs aimed at different EGS, and being able to gather scientific data to better improve the measurement, monitoring and reporting is also important.

The consensus in all EGS-MBI literature is to use pilots to test the effectiveness of a particular program. Pilots can 'test' the uptake of certain market-based mechanisms and are the best way to determine what works. It's analogous to conducting market questionnaires of consumer buying habits. In these cases, market analysts won't really know what people are willing to pay for certain products until actual purchasing studies are conducted in supermarkets - so too with EGS policy tools. Pilot projects give insight to the willingness of suppliers (resource managers) to provide (i.e. change behaviour) and consumer's willingness to pay. Larger programs can be built on these early learnings.

The Think Tank experts recognized that innovative regulatory and policy frameworks will be needed to be flexible enough to adapt as new learnings come forward and changing economic/environmental conditions affect program outcomes.

Appendix C – The Alberta Quantification Protocol Development Process

When Alberta began developing protocols first at the provincial level (circa 2002) and then later in a federal-provincial-territorial process, there had been little experience and even lesser expertise in the area. We have relied on learning our way into protocol development and application. Early work in protocol development in a federal-provincial-territorial context began on a pork protocol. National support and cooperation continued with other protocols up until 2006. Many federal, provincial and academic scientists and technical experts collaborated on these protocols. The last protocol to be worked on by a federal-provincial initiative was the soil tillage management protocol. A change in federal government stalled further development until 2008. Alberta continued protocol development on a unilateral basis during the two-year stall in federal interest as protocols were needed for the 2007 amendment to the Alberta Climate Change and Emissions Management Act which created the compliance market.

The development of a new protocol may require the coordination of relevant scientific research and/or technical data related to the GHG reduction or removal activity and/or the baseline approaches. These take the form of technical seed document(s) (TSDs).³⁶ The TSDs are working documents that identify the potential practices/technologies that will lead to the emission reductions/removals and draw upon Best Practice Guidance to identify relevant activity data, emission factors and formulae to arrive at quantification approaches. To develop these, engagement of federal, university and other specialists from across Alberta other provinces, the USA, and sometimes overseas, is needed.

The TSDs are the underpinning technical resources that guide adaptation of technical elements into the ISO 14064-2 Alberta Protocol template. They make up the scientific basis of the GHG quantification approach and therefore should represent the best available science relating to the project activity. The strength of a protocol ultimately relies on the extent to which the TSDs have been developed from science review and coordination of expert judgement on the subject matter. TSDs should contain the most recent and relevant science from well-established sources, and ratify the link between practice change or new technologies, and quantified GHG reductions. Typically, workshops of relevant experts are held to collectively decide on the synthesis science and technical issues under the discipline of the ISO 14064-2 principles.³⁷ Agricultural protocols typically proceed in a series of phases of collective decision-making about the certainty of the science at hand.(see points below).

³⁶ Technical Seed Document (single or multiple documents) are the series of technical foundation pieces that support the GHG quantification and approaches in an eventual protocol.

³⁷ This may only be relevant for activity based protocols or where the relationship between GHG impacts and the practice at hand is less robust.. Using the principles of completeness and conservativeness in the ISO 14064-2 standard are applied here.

The Alberta development process is currently a 10-step process that can take anywhere from 8 to 20 months (Figure 1) –the more complex the protocol, the longer it takes and land-based agricultural protocols can take the longest depending on the availability and robustness of consensus and synthesis science. An August 2008 call by the federal environment agency for existing protocols to be adapted for the soon to be developed National Offset System has rekindled interest. Over half of the protocols on the federally approved “fast track” eligibility list are Alberta government protocols. They will be adapted into the national offset system.

Standards, such as ISO, can be used to provide a consistent framework for quantifying project-based GHG offsets. They provide a policy-neutral, non-sectoral, verifiable template or specifications upon which a protocol can be customized to the regulatory requirements of the jurisdiction at hand. Using a standard promotes consistency and transparency in GHG quantification, monitoring, reporting and verification.

The ISO 14064-2 standard provides a template and a process to ensure quantification protocols (1) are based on a streamlined life cycle assessment for project and baseline conditions; (2) evaluate all potential baseline scenarios; (3) identify the relevant GHG emissions controlled by the project, and identify impacts upstream and downstream of the project, and (4) decide which sources and sinks are material to the quantification methodologies.

Some key points in the Alberta protocols are:

- Alberta Government approved quantification protocols are developed on an ISO 14064 Part 2 framework. Third party verification of offset projects follows the ISO 14064 Part 3 standard.
- Scientific/technical data and standards are all considered. The value of coefficients may depend upon the level of scientific data available, uncertainty, expected variability of application (soils, landscape, livestock classes, climate, etc).
- Protocols account for all GHGs (CO₂, N₂O, CH₄ and consideration of all 21 gases listed in the Act).
- Protocols rely on Best Practice Guidance – IPCC Guidance, WRI GHG Protocol, Canada’s National Emissions Inventory methodology; applicable standards and procedures; other System methodologies and protocols.
- Verification and harmonization or linkage factors are considered. It will be more valuable if it is compatible with future national or other provincial protocols. Where possible, the protocols are applicable across Canada.
- Verification is completed after the credits have been created (*ex poste*). There is no project approval or validation step, so well articulated protocols are critical to the function of the marketplace.
- The more rigor in producing offset quantification protocols should yield more of a blue-chip protocol that produces a higher value offset.
- Alberta has the largest suite of compliance-quality agricultural protocols than anywhere in the world, including soil carbon sequestration protocols.
- The Agricultural Protocols are the most complex to develop and require substantial technical and scientific coordination and review. They proceed in 4 Phases to prepare the technical seed documents that form the foundation of the protocol:
 - Phase 1 – Compilation and synthesis of available scientific information (4 to 8 mos)*
 - Phase 2 – Development of a Science Discussion Paper for consultation (3 to 4 mos)
 - Phase 3 – Science Coordination Workshops (1 to 2 mos)
 - Phase 4 – Standardize into Alberta ISO 14064-2 based Template (1.5 mos)
 - Enters the Alberta Protocol Review Process (2 to 6 mos)

*Note – at end of this stage, the technical steering committee may decide that the science is not robust enough and stop the process.

Currently 10 of 23 approved protocols are of interest to agriculture:

Afforestation	Biofuel	Energy efficiency
Beef feeding edible oils	Biogas	Pork
Beef days on feed	Biomass	Tillage management
Beef life cycle		

Current protocols in the development cycle are:

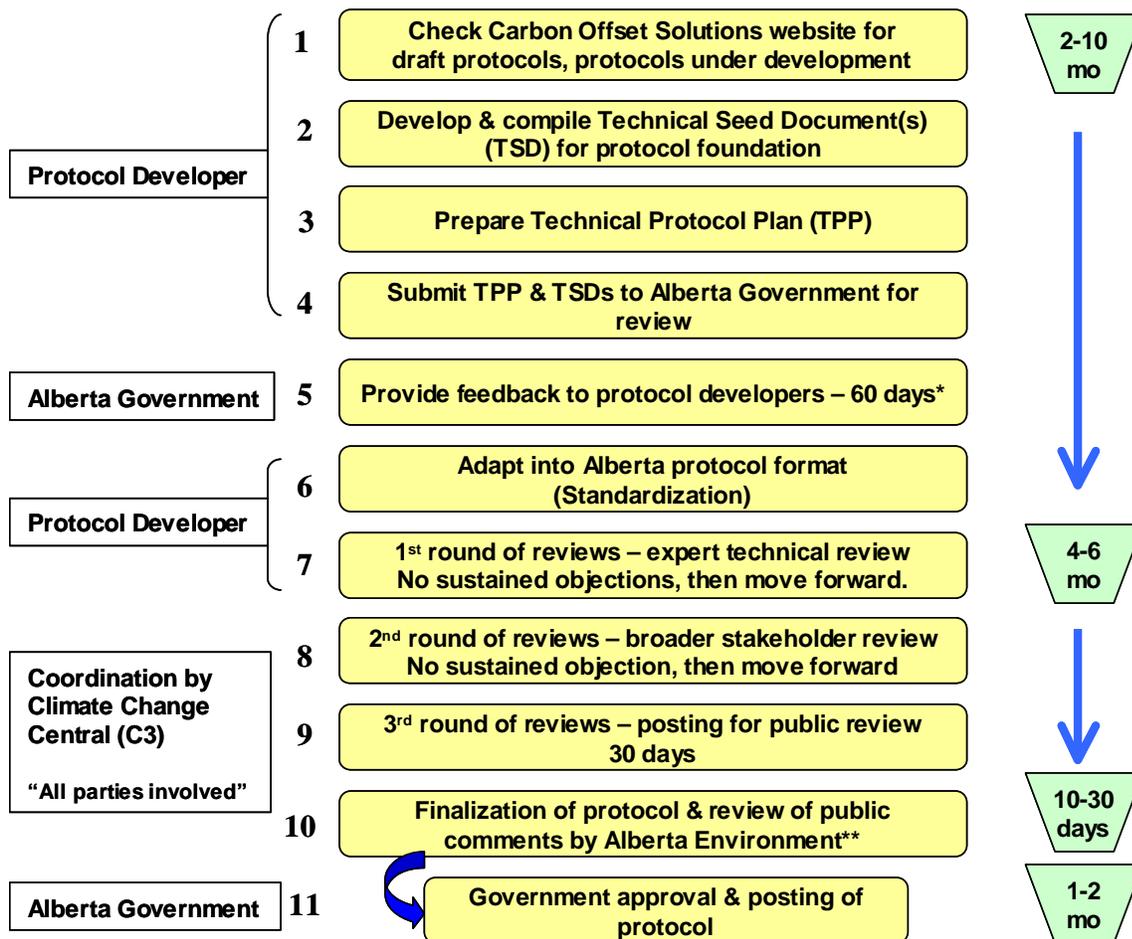
Nitrous Oxide Reduction Protocol	Soil amendment protocols
Reducing summerfallow	Native Rangeland Management
Beef Residual Feed Intake	Pasture Management
Conversion to Perennial Forage	Wetlands Management

The Alberta regulation states the rules that determine an eligible offset in Alberta:

1. They result from actions taken on or after Jan 1, 2002 (where applicable due to the nature of the protocol). This acknowledges the signals sent in 2002 with the Climate Change and Emissions Management Act and gives credit for early actions.
2. They are real, demonstrable, quantifiable, and measurable – they must be net of all relevant GHG sources and sinks stated in the Act. Suppliers, buyers and the public must be confident in what is being created and sold.
3. They occur at a place other than a regulated facility and from actions not otherwise required by law.
4. Ownership is established and clear.
5. They are only counted once for compliance purposes (they are unique).
6. They are verified by a qualified third party (engineer or an accountant).
7. Credits occur from Alberta-only projects.

Note that the Alberta Offset System defines additionality or ‘beyond business as usual activities’ at the regulation level as ‘after 2002’ activities only, and surplus to regulation. Additionality criteria are further satisfied through the identification of the baseline condition as defined in the protocol.

Details of not only protocols and all the development information, but also calculators and Government guidance documents are available on the C3 Carbon Offset Solutions website specially set up for the Alberta offset market (www.carbonoffsetsolutions.ca). In addition the website contains many items such as the Registry, a listing of aggregator companies, verifiers and brokers operating in the Alberta market and their contact information. It’s essentially the “one-stop shop” for all things related to the Alberta carbon market.



* Timing may vary depending on the volume of protocol proposals received.
 ** Additional time may be required depending upon the public comments received.

Figure 1. The Alberta protocol development process.

**Appendix D – Summary Powerpoint from On-line Survey of
Offset System Performance**

please see attachment

Appendix E. C3 SWOT Analysis of Offset System Performance in the First Cycle

Strengths	Weaknesses	Opportunities	Threats
<ul style="list-style-type: none"> • 1.5 Mt of Verified Emission Offsets were created through the Offset regulatory process by project developers in very short timeframes (Sep '07 to Mar '09) • The Alberta Offset System proved the aggregation model can be done through the significant number of tillage-based offsets that were verified in 2007. • Strong set of science-based protocols have been developed to seed the market. • Alberta stakeholders can participate in protocol development by initiating their won project-types in the protocol process. • Collaborative, transparent stakeholder process on protocol development. • C3-CSA partnered in developing the Offset Registry in time for the 	<ul style="list-style-type: none"> • 1.5 Mt of Verified reductions were created , but there has been mixed reaction by Government to this amount; a minority of project developers were able to verify offsets • The amount of revenue accruing to project developers is not sustainable to their businesses; significant discounting drains the value • The market is in its infancy –needs to develop momentum measured by the pace of market growth and critical mass measured by the size of the market • The ownership criteria has proven to be particularly problematic with soils-based protocols. Verification for proof of ownership has been a major barrier. • The uncertainty around the compliance quality or guarantee of review level verified offsets is significant with emitters. It has also added to the cost and complexity of the verification process. In the absence of certification 	<ul style="list-style-type: none"> • Emitters require sufficient quality for permanent retirement of their compliance needs. • A much wider scope of protocols and especially in agriculture is needed to overcome sustainability and market momentum weaknesses • Office of the Farmer's Advocate has offered to assist COTA in developing a fair dispute resolution and process. • As a trade association COSAA would be capable of providing services such as arbitration of disputes, verifier standards, contracting standards, and even an association certification. • The market needs to show and promote the application of high standards in the Alberta Offset System both internally and externally 	<ul style="list-style-type: none"> • The credibility of the regulated process required to create the offsets is not clearly understood - this potentially devalues the Alberta offsets. • Market sustainability both from the point of view of the current design and the impact of harmonization with the federal system. • Verification attracted some controversy as different verifiers interpreted the official guidance slightly differently. There have been clear signals from emitters that the requirement for a review level audit only with no certification from the regulator is directly affecting the perceived value and acceptance of offsets. • This marker has become politicized as it is often directly affected by recognized practice start dates. And ensuring additionality/incrementality. There has been some divergence between the Alberta approach and the proposed Federal approach. Baselines must be preserved for sustainability of the market.

Strengths	Weaknesses	Opportunities	Threats
<p>first compliance period. After a few start up bumps it has functioned appropriately with little impact upon the market.</p> <ul style="list-style-type: none"> The Alberta Offset System has used experiences and draft guidance from the national offset system processes and has consulted with national scientists and policy developers throughout the launch of the system. 	<p>of offsets from the regulator some emitters are feeling exposed to a potential open ended liability.</p> <ul style="list-style-type: none"> Data Collection and management systems to support even review level verification have been very technically challenging and expensive tasks for project developers. Start-up was bumpy - knowledge and information to support the market didn't come until Sept 2007; unclear communications from the regulator was a challenge. Some aggregators overestimated the actual tonnage that would be available from reduced tillage. The process of transferring ownership of offsets from primary suppliers through to emitters has required several levels of contracts to be created. Contract transparency and fairness were issues in this start up year. If Offset Registry fees are applied for the 2008 compliance year, this could be problematic for some project developers and aggregators. 	<ul style="list-style-type: none"> There is a need for proactive advocacy action beside other stakeholders including Climate Change Central and IPOG to encourage the national system to respond to and integrate the learnings of the Alberta Offset System. 	<ul style="list-style-type: none"> The Alberta Offset System has dealt very effectively with the Permanence challenge of Biosinks through application of an assurance factor. By all accounts, the federal offset system has been maintaining an unworkable position around a temporary offset and/or a liability period. This is a large threat to the Alberta market. Some of the controversy around the gap between early market expectations and the reality of the first compliance period may have affected the attractiveness of the market for external investors