

Technical Guidance for Offset Protocol Developers

Version 1.0

January 2011

Specified Gas Emitters Regulation

**Government
of Alberta** ■

Alberta ■

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The information provided in this document is intended as guidance only. This document is not a substitute for the law. Please consult the Specified Gas Emitters Regulation and the legislation for all purposes of interpreting and applying the law. In the event that there is a difference between this document and the Specified Gas Emitters Regulation or legislation, the Specified Gas Emitters Regulation or the legislation prevail.

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Related AENV Publications

Climate Change and Emissions Management Act
Specified Gas Emitters Regulation
Specified Gas Reporting Regulation

Alberta's 2008 Climate Change Strategy

Technical Guidance for Completing Annual Compliance Reports
Technical Guidance for Completing Baseline Emissions Intensity Applications
Additional Guidance for Cogeneration Facilities
Technical Guidance for Landfill Operators

Technical Guidance for offset project Developers
Technical Guidance for Offset Protocol Developers
Quantification Protocols (<http://environment.alberta.ca/1238.html>)

1.0 PURPOSE OF THIS DOCUMENT

The purpose of this document is to assist offset market participants (protocol developers) wishing to develop quantification protocols for use in the Alberta offset system where the intended final purchaser of offset credits generated is a facility regulated under the *Specified Gas Emitters Regulation* (the *Regulation*).

Alberta's offset market was initiated as a market instrument to support compliance under the *Specified Gas Emitters Regulation*. The *Regulation* requires all large, industrial facilities in Alberta emitting over 100,000 tonnes of carbon dioxide equivalent (CO₂e) per year to reduce their emissions intensity by 12 per cent per year from their government approved baseline emission intensity.

Facilities and sectors not subject to the *Regulation* that are able to reduce their greenhouse gas emissions according to a government approved protocol and that meet the requirements of section 7 of the *Regulation* are eligible to generate offset credits where one tonne of CO₂e reduced is equal to one offset credit. These credits, once registered and serialized on the Alberta Emissions Offset Registry, become a tradable unit that can be bought and sold in the Alberta offset market. Credits remain active until such time as they are submitted to Alberta Environment for compliance by a regulated facility, or sold outside the Alberta market place.

Offset credits are one of three compliance options available to regulated facilities. Facilities may also purchase Climate Change and Emissions Management Fund Credits (fund credits), or use Emission Performance Credits (EPC)—emission reductions generated at regulated facilities that have reduced their emissions below their baseline emissions intensity limit.

This document provides guidance on the requirements and criteria for quantification protocols intended for use in the Alberta offset system.

1.1 Overview of Changes

The following is a summary of key program changes and relevant sections of this guidance document:

- Alberta Environment has committed to shifting to reasonable (audit) level assurance starting January 1, 2012. This will apply to all new offset credits generated after January 1, 2012 and to regulated facility compliance reports starting with the 2012 compliance submission due March 31, 2013. Offset credits generated in 2011 and verified in early 2012 will continue to be verified to a limited (review) level of assurance.
- As of January 1, 2012, all new credits serialized on the Alberta Emissions Offset Registry must be done on a go-forward basis. Go-forward crediting means offset projects must first be created, including a project plan and monitoring plan. The

credits are then generated forward in time from that point for a specified period of time. Verification continues to be *ex post* and occurs after the reduction activity occurs and before offset credits are serialized on the registry. Go-forward crediting is discussed in more detail in section 3.2.5 of the Technical Guidance for Offset Project Developers.

Offset protocols approved in early 2011 that are available for use in 2011 will have a short window in which retroactive credits can be generated under the protocol.

- Alberta Environment continues to explore accreditation options for third party verifiers and will provide further guidance on this shift as it becomes available.
- Alberta's protocol development process has evolved from a voluntary basis used in 2007 to establish the Alberta offset system to a regulatory, compliance framework needed to support compliance requirements of large industrial facilities regulated under the *Specified Gas Emitters Regulation*. This shift has necessitated a greater burden of proof for offset protocols being developed for use in the Alberta offset system. Key protocol development process changes are:
 - Protocol developers are required to submit an Intent to Develop a Protocol to Alberta Environment. This document will be reviewed to assess the proposed reduction/removal activity against program criteria. If the activity meets program requirements, Alberta Environment will issue written acceptance of concept and the activity will be allowed to enter the formal protocol development process.
 - The protocol development now places a higher emphasis on the initial technical development of the quantification protocol to ensure that all relevant assumptions, methodology, lists of records, and other protocol considerations are thoroughly vetted through a working team and several iterations of technical review are generally required to improve the robustness and transparency of the final draft protocol.
 - Protocols must be developed with assurance in mind. Protocol developers must draft protocols for clarity of assumptions, detailed lists of records available to support the activity, and are required to engage with a third party verifier to make sure the draft protocol being put forward for stakeholder review is sufficiently detailed to support third party verification. Protocols that do not have sufficient records to support third party verification will not be considered for development into a quantification protocol.
 - Greater emphasis is being placed on understanding protocol additionality. Additionality is discussed in detail in section 3.1 of this document.
- Details on a protocol review process including criteria for terminating existing protocols is presented in section 4.9 and 4.10 of this document.
- Templates for the Intent to Develop a Protocol, Request to Amend an Existing Protocol, Technical Seed Document and Quantification Protocol are appended to this guidance document. Electronic copies are available from Climate Change Central.

2.0 Regulatory Context for the Offset Market

In 2002, Alberta passed the *Climate Change and Emissions Management Act* signaling its commitment to manage greenhouse gas emissions in the province. In 2003, Alberta passed the *Specified Gas Reporting Regulation* requiring all facilities emitting over 100,000 tonnes of carbon dioxide equivalent (CO₂e) annually to report their emissions and in 2007, Alberta passed the *Specified Gas Emitters Regulation* (the *Regulation*) reinforcing its commitment to regulate greenhouse gas emissions from large industrial emitters. This *Regulation* requires all facilities in Alberta emitting over 100,000 tonnes of CO₂e per year to reduce their emissions intensity by 12 per cent below their 2003-2005 baseline emissions intensity. New facilities, or those facilities that began operation on or after January 1, 2000 and that have completed less than 8 years of commercial operation, have been given a graduated reduction obligation increasing 2 per cent per year starting in their fourth year of commercial operations to the 12 per cent reduction obligation starting in the 9th year of commercial operation.

The Alberta offset system was established as a market-based compliance option for facilities regulated under the *Regulation*. Facilities unable to meet their emission reduction obligation through direct facility improvements may choose to purchase offset credits (greenhouse gas emission reduction credits) generated at facilities and sectors not subject to the *Specified Gas Emitters Regulation*.

The use of market-based compliance tools offers emitters flexibility in meeting their reduction obligation by allowing markets to determine the most cost-effective emissions reduction opportunities. Alberta's offset system is based on pilot studies including the Greenhouse Gas Emissions Reduction (GERT) and Pilot Emission Reduction Trading (PERT), and the Pilot Emissions Removals, Reductions and Learnings (PERRL) programs, as well as sales of emission reductions to companies that have set voluntary emission targets. Similar market-based approaches have been used as an alternative to traditional command and control measures to reduce pollution and have been used to effectively implement other environmental programs such as the sulphur reduction framework in the U.S. and mercury reductions in Canada.

The Alberta offset system also supports Alberta's commitment to reducing provincial greenhouse gas emissions. In its 2008 Climate Change Strategy, Alberta committed to a 50 megatonne reduction in provincial greenhouse gas emissions by 2020, and a 200 megatonne reduction by 2050. Voluntary and regulatory emissions reductions, along with other actions such as the implementation of consumer rebate programs for energy efficiency and support for public transit, changes in technology use, and implementation of carbon capture and storage will be part of a suite of actions required to meet the provincial emission reduction objectives.

2.1 Scope of the Offset System

The Alberta offset system compliments the *Specified Gas Emitters Regulation* by providing a market-based compliance option for regulated facilities. Eligible offset

projects must be able to demonstrate real, quantifiable and verifiable emissions reductions that would not otherwise have occurred had the offset project not been implemented. That is, offset credits must be generated from activities that go beyond business as usual practices (sector common practice) to create incremental change not otherwise required by law.

Note: Offset projects must be additional to business as usual activities, sector common practice, regulatory and other emission reduction requirements. Offsets cannot be generated by activities that would otherwise have occurred.

2.2 Offset System Design Principles

The Alberta offset system has been designed to encourage cost-effective reductions and removals of greenhouse gas emissions in sectors that are not otherwise required by law to do so. The following key principles guided the development and implementation of the system:

- **Reduce Provincial Emissions:** offset projects must result in real, quantifiable, and verifiable reductions and/or removals in greenhouse gas emissions in Alberta;
- **Net Benefits:** project conditions must result in a net benefit in greenhouse gas emission reductions and removals, and improved environmental practices that would not have otherwise occurred had the project not been implemented;
- **Incremental Change:** protocols must support incremental change technologies and practices;
- **Balance Conservativeness and Accuracy:** Emissions and reductions and removals need to be quantified accurately based on best available methodologies and must result in conservative estimates for reductions and removals achieved;
- **Ability to Implement:** protocols must be developed to credit actions that can be implemented in Alberta;
- **Verifiable:** reduction and removal activities must be supported by regulatory quality data that supports a high level of assurance that the reductions have occurred;
- **Transparency and Accountability:** Alberta supports full transparency of quantification protocol development, and offset projects and supporting information for projects registered on the Alberta Emissions Offset Registry;
- **No Leakage:** offset projects must result in real emissions reductions incremental to any shifts in emissions that may occur as a result of the project condition;
- **Maximum Scope:** the Alberta offset system should, over time and to the extent practical, promote and enable projects across all sectors of the economy;
- **Building and Linking:** Alberta will continue to build on offset work undertaken in other jurisdictions to adapt emission reduction opportunities to suit Alberta's unique circumstances and will seek alignment between systems as deemed appropriate;
- **Reasonable Program Administration:** Alberta Environment, will, to the extent practicable, seek to balance administrative costs against program implementation.

The system has been designed to balance environmental integrity with the ability to commercialize market opportunities. Specific principles must be considered individually and as an integrated package of ideas and concepts that ensures a balanced and effective offset system.

2.3 ISO 14064-2: Project Quantification, Monitoring and Reporting

The Alberta offset system uses the ISO 14064-2 platform for establishing and quantifying greenhouse gas emissions reduction/removal projects. Protocols and offset projects must be developed and implemented according to this standard. ISO 14064-2 requires protocols to be developed through a detailed and transparent peer review process. Specific quantification methodology, emission factors and other parameters must be tailored to Alberta conditions.

These protocols serve as a consistent framework and approach for the development and verification of offset projects. Where practical, Alberta also draws on related protocols from other jurisdictions to inform its protocol development process. These include, but are not limited to:

- Clean Development Mechanisms (CDM);
- the Climate Action Reserve (CAR);
- The World Resources Institute (WRI);
- World Business Council on Sustainable Development (WBCSD);
- The Intergovernmental Panel on Climate Change (IPCC); and
- The National Inventory Report: Greenhouse Gas Sources and Sinks in Canada (Environment Canada, Annually since 1990)

Project developers and persons interested in developing protocols for the Alberta offset system should, at a minimum, familiarize themselves with the ISO 14064-2 standard, and should review relevant materials from other systems as preparatory work for advancing protocols in Alberta.

Note: Emission reduction quantification methodology must be tailored to reflect Alberta-specific conditions, and may not, in all cases mirror quantification methodologies and approaches used in other jurisdictions.

2.4 Overview of the Offset Protocol Requirements

Quantification protocols outline an activity specific emission reduction methodology based on best available science tailored to Alberta-specific conditions. These protocols provide a common methodology for reduction activities (offset projects) that ensure projects result in real, quantifiable and verifiable emission reductions. Where appropriate, protocols may include flexibility mechanisms for wider application of the protocol. These flexibility mechanisms must maintain the level of rigour and integrity of the protocol and associated reduction activity.

The development of a quantification protocol can be initiated by a company, individual, or agency and must address a specific emission reduction opportunity. Reductions may result from a behavior change (activity-based project) or technology-based practice changes (project-based). An example of an activity-based project would be the adoption of reduced or no-till farming practices whereas an example of a project-based change would be the installation of a landfill gas capture system at a landfill not regulated under the *Specified Gas Emitters Regulation*.

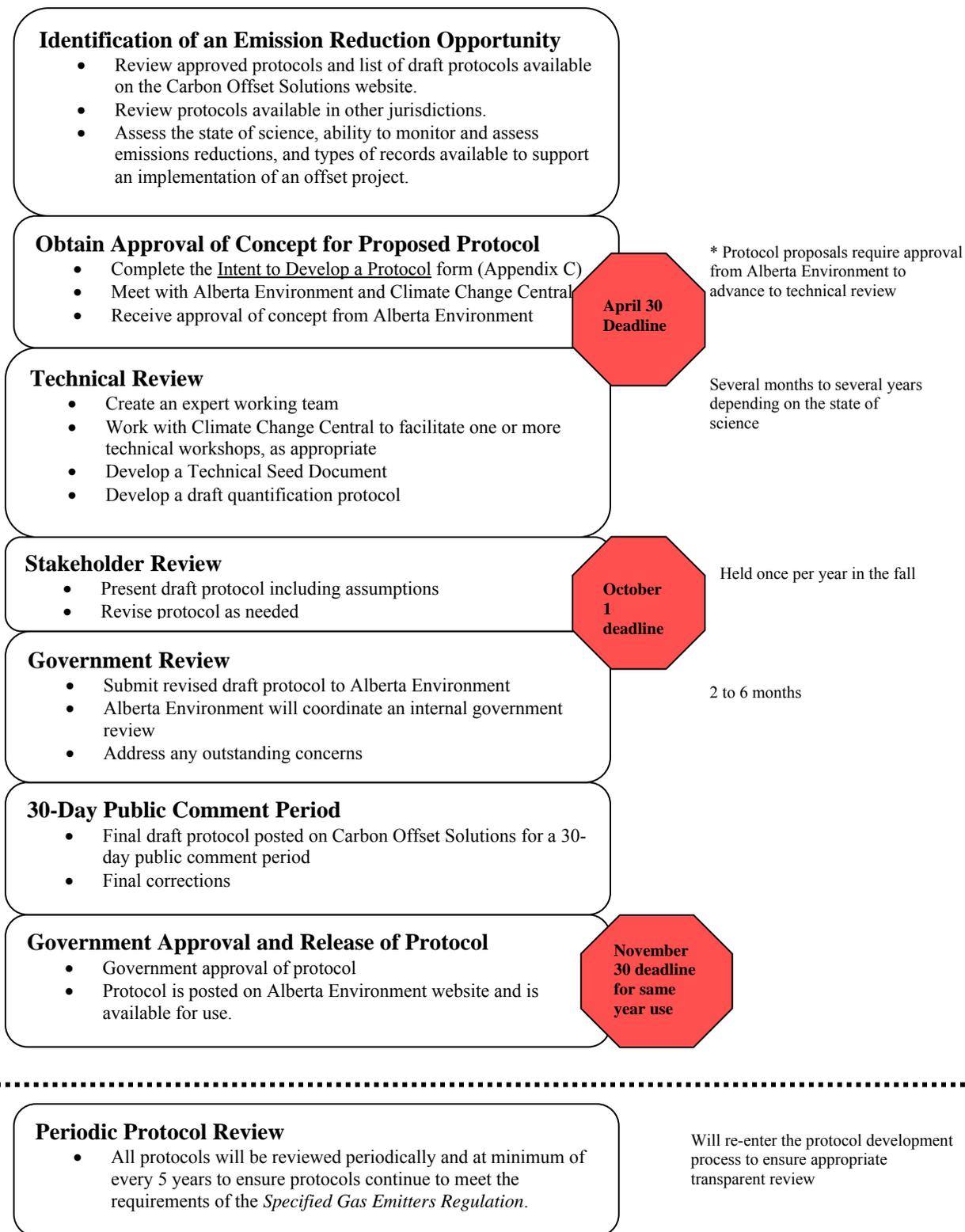
In addition, the reduction activity must meet all eligibility criteria in section 7 of the *Specified Gas Emitters Regulation*, and must have sufficient regulatory quality documentation to support project implementation and offset credits being claimed¹. Please refer to section 2.6 below for additional information on these eligibility criteria.

Figure 1 below outlines the general process and approximate time requirements for protocol development.

Note: Alberta Environment is not obliged to accept any protocols and may retract a protocol at any point in the protocol development process if it determined the protocol does not meet program requirements, climate change policy objectives, and other regulatory requirements.

¹ Alberta currently requires limited (review) assurance for offset projects. Alberta will be adopting reasonable (audit) level assurance for third party verification and government audits for the Specified Gas Emitters program, including offset projects for all offset credits generated on or after January 1, 2012. New protocols and protocol revisions must be designed to support this higher level of verification.

Figure 1 Offset protocol development process.



2.5 Key Participants

A number of different parties are required to ensure protocols are comprehensive and that the protocol development process is transparent. Alberta Environment requires a list of stakeholders including technical experts, academics, non-government organizations, industry experts, affected government departments, and third party verifiers as part of the supporting documentation for protocol development. Below is a discussion of key participants and when they are likely to engage in the protocol development process.

2.5.1 Academic

Includes persons with expertise and relevant research experience. Academics should be consulted during the technical review and assessment of the background science and assumptions being applied to the reduction activity.

2.5.2 Climate Change Central

Is an arms length organization hired by Alberta Environment to facilitate the protocol development process to maintain consistency in the protocol development process including hosting a record of discussion and supporting documents, all of which are available on the Carbon Offset Solutions website.

2.5.3 Consultant

Is a person or company with relevant expertise and background experience hired by the protocol sponsor to develop the quantification protocol. It is not necessary to hire a consultant to develop the protocol.

2.5.4 Government of Alberta

Alberta Environment, on behalf of the Government of Alberta, is the regulatory body that establishes the program rules and oversees the implementation of the *Specified Gas Emitters Regulation*. Alberta Environment approves all quantification protocols valid for the Alberta offset system and reviews and up-dates guidance documents, regulations, quantification protocols and related materials from time to time as needed and at a maximum of every 5 years.

2.5.5 Industry Expert

Are persons working in the field that have business and/or relevant market experience. These people may or may not have relevant academic qualifications and technical expertise. Industry experts may be protocol sponsors and may participate in the expert review, stakeholder review and/or the public review.

2.5.6 Non-Government Organizations

Non-government organizations are typically not-for-profit organizations working to advance social, environmental, and similar issues through advocacy, awareness and engagement. Appropriate non-government organizations should be included in the technical review process.

2.5.7 Protocol Developer

The protocol developer is responsible for initiating and developing the quantification protocol. This person or company will act as the key contact and will typically coordinate research and information review; develop draft materials; and liaise with stakeholders, government, Climate Change Central, and the protocol sponsor. The protocol developer may be the protocol sponsor or be a consultant hired by the protocol sponsor and should have appropriate subject matter expertise and familiarity with the Alberta offset system.

2.5.8 Protocol Sponsor

The protocol sponsor is a company or organization championing the development of a quantification protocol. The protocol sponsor may develop the protocol directly or engage a consultant to undertake the work. The protocol sponsor is required to fund the development of the quantification protocol.

2.5.9 Public

Encompasses any person with an interest in the protocol and associated reduction opportunity and may have varying level of understanding of the activity, offset program requirements, and emission reduction opportunities. The public would typically engage during the 30-day public review and may implement the final, approved protocol.

2.5.10 Third Party Verifier

The third party verifier is an independent third party that meets the requirements of a third party auditor outlined in section 18 of the *Specified Gas Emitters Regulation*. Protocol developers must engage and work with a third party verifier during the protocol development process to ensure records and project documentation are able to support verification requirements.

2.6 Offset Eligibility Criterion

Section 7 of the *Specified Gas Emitters Regulation* defines the eligibility criteria—minimum requirements—that must be met for an offset project to be eligible to generate offset credits for use as a compliance option in Alberta. The protocol developer must be able to demonstrate that the reduction/removal activity will result in emission reductions that meet these eligibility criteria to be considered for protocol development in the Alberta offset system. These eligibility criteria are:

- The reduction must occur in Alberta;
- Result from actions not otherwise required by law;
- Result from actions that are beyond business as usual and sector common practice;
- Result from actions taken on or after January 1, 2002;
- Be real, demonstrable, quantifiable, and verifiable;
- Have clearly established ownership;
- Be counted once for compliance purposes; and
- Be implemented according to a government approved protocol.

These eligibility criteria are supported by the following program constraints:

Geographic Boundary means projects must be located in Alberta and result in reductions of provincial greenhouse gas emissions regulated under the *Climate Change and Emissions Management Act*.

Additional means greenhouse gas emissions reductions/removals must be incremental to regulatory requirements and business as usual/sector common practices. Activities that are already covered under the *Specified Gas Emitters Regulation*, or that have any other federal or provincial regulatory obligations are **NOT** eligible for offset credits under the Alberta offset system. Municipal bylaws that affect an activity will also be considered to ensure the activity being credited is additional and results in emissions reductions that would not otherwise have occurred.

Program Start Date is set as January 1, 2002. This date coincides with the release of Albertan’s and Climate Change: Taking Action (2002), which signaled Alberta’s commitment to regulating greenhouse gas emissions in the province.

Project Start Date is defined as the first day of operation of the offset project or activity that is not for pilot or testing purposes. Table 1 below provides examples of project start dates for different protocol types.

Protocol	Project Start Date
Energy Efficiency	Date equipment installation, operating parameter changes or process reconfiguration are initiated or have effect.
Enhanced Oil Recovery	Date of initiation for commercial injection that is subsequent to any testing phases that may be needed.
Beef Feeding	Date the new feeding regime is implemented.
Tillage Management	Uses an adjusted baseline to account for sector-wide adoption levels as of January 2000 applied to all projects. Early adopters and projects implemented after January 1, 2002 are eligible to generate credits at a discounted rate starting January 1, 2002 or later depending on when the farmer converts to Reduced or No-till farming.

Table 1: Example of effective start dates for select offset projects.

Effective January 1, 2012, historic (retroactive) offset credits will no longer be accepted in the Alberta offset system. Historic credits generated up to December 31, 2011 and undergoing third party verification in early 2012 will be accepted under the existing program rules. Historic credits already serialized on the Alberta Emissions Offset Registry will be honoured.

New protocols approved in 2011 where projects can be implemented and undergo third party verification in early 2012 will be eligible to generate historic credits under existing program rules.

Credit Start Date is the point when a project is eligible to start generating offset credits. Projects must be able to demonstrate a project start date on or after January 1, 2002 and are eligible to start generating credits when the project plan and monitoring plan are developed and registered on the registry.

Where protocols are being adapted from existing greenhouse gas reduction projects, the projects will only be eligible to generate credits after the protocol is approved and once the required project documentation (offset project plan and monitoring plan) have been registered on the registry.

Credit Duration Period is the amount of time an offset project can generate offset credits under the Alberta offset system and is set as an 8-year with possible 5-year extension crediting period for all offset projects. This provides a stable period for business planning purposes that is independent of the life expectancy of the technology being implemented. It also assumes that technology will continue to improve over time, and that activities will achieve greater market penetration over time. Protocols will be reassessed periodically to ensure they continue to meet additionality requirements discussed below.

Carbon sequestration activities may be given a longer crediting period based on the need to maintain these sinks for a period of time to maintain the emissions reductions achieved through the project.

As such, reduced and no-till agriculture projects have been given two, 10 year crediting periods. The extended crediting period has been implemented to recognize that biological sinks must maintain the activity (e.g. storing of carbon in soils) over a 20-year period for the sink to reach saturation—the point where the soil cannot absorb any additional carbon.

Afforestation projects will have a longer crediting period to reflect the slower rate of growth of trees. Crediting periods for this protocol have been proposed as 3, 20-year cycles after which point, the activity is considered reforestation and is no longer eligible for credits.

Note: Credit generation must be for 8 consecutive years from the credit start date.

Note: If an activity that was previously unregulated becomes regulated, credit generation from that project will cease. Historic credits already owned and serialized will be honoured and will remain active in the Alberta offset system until they are submitted to Alberta Environment as a compliance option or voluntarily retired.

Real, Demonstrable and Quantifiable: means projects must be able to demonstrate that actions initiated under the project result in a net reduction of one or more greenhouse gases regulated under the *Climate Change and Emissions Management Act* as applicable to the project and that these emissions reductions and/or removals are quantified according to generally accepted methodologies. Project conditions cannot result in a displacement of emissions to another part of the facility or operation, or shift emissions upstream or downstream of the project condition.

Verifiable means the emission reduction activity must have sufficient regulatory quality records to support an independent third party review of the project condition and associated emissions reductions/removals. Reduction activities that cannot be supported by sufficient documentation will not be accepted in the Alberta offset system.

Ownership means that a paper trail confirming ownership and right to transact and use offset credits submitted for compliance must be available. Alberta Environment must be able to understand the chain of ownership for offset projects being submitted for compliance purposes. Credit is usually, but not always, given to the person who undertook the reduction activity. Protocols may attach ownership to a specific point in the supply chain based on project implementation and availability of records. Impacts to previously existing commercial contract agreements must be resolved through contractual agreement between affected parties.

Counted Once means emissions reductions must be unique and can only be counted once for compliance. Offset credits serialized and registered on the Alberta Emissions Offset Registry cannot be registered on any other registry where the intention is to buy, sell or trade tonnes that are already active in the Alberta market. Once the offset credits are used for compliance, they must be retired on the registry and removed from circulation.

Protocols that have the potential to double count emissions reductions under a different protocol or green attributes registry or program must address double counting risks and mitigation strategies during protocol development such that emissions reductions are only counted once.

Note: *offset credits are revocable licenses. It is an offence to knowingly contravene the Climate Change and Emissions Management Act and Specified Gas Emitters Regulation. Enforcement action, including but not limited to revoking affected offset credits, will be taken.*

Quantification Protocols are government-approved quantification methodologies applicable to a specific activity being undertaken in Alberta for the purposes of generating offset credits as a compliance option under the *Specified Gas Emitters*

Regulation. A complete list of approved protocols is available at:
<http://environment.alberta.ca/1238.html>.

Registered on the Alberta Emissions Offset Registry means all offset projects and associated credits intending to be sold as a compliance option for regulated facilities in Alberta must be registered and serialized on the Alberta Emissions Offset Registry.

3.0 Protocol Fundamentals

The following general assumptions are used to assess whether or not a reduction /removal opportunity meets the general requirements for greenhouse gas quantification needed to support offset projects. The general assumptions are:

- **Project:** the baseline and project condition (emissions and production or unit of measurement) can be separated and monitored independent of the rest of the larger operations. For example, if the project is at an industrial site, sufficient records and meters must be available to isolate the baseline and project to assess greenhouse gas reductions achieved through the implementation of the offset project.
- **Reporting Unit:** the baseline and project condition must have a common unit of measurement or frame of reference to compare emissions reductions achieved during the project condition against the baseline condition. This is referred to as functional equivalence and is discussed in more detail in section 3.8 below.
- **Time-period:** the emissions and removals of a project and baseline must be able to be divisible into artificial time periods, typically on an annual basis to support quantification and credit serialization. In some cases, such as for agricultural projects, the time period may need to be adjusted to reflect the environmental constraints placed on the project condition. An example of this would be to coordinate the project year with cropping cycles for nitrogen fertilizer application.

All offset protocols must assess how the resulting offset projects can be implemented according to the following accounting principles:

- **Completeness principle:** requires the protocol developer to account and report emissions reductions/removals achieved in the offset project based on a lifecycle analysis for both the baseline and project condition.
- **Accuracy principle²:** requires protocol developers to understand and quantify the uncertainty associated with the quantification methodology being proposed. Justification must be provided that explains why the methodology included in the protocol is the most accurate methodology achievable based on reasonable costs.
- **Additionality principle:** requires that the greenhouse gas emissions reductions/removals resulting from the offset project are beyond business as usual/sector common practice and all regulatory requirements. That is, the implementation of the project must result in emissions that are lower than in the baseline condition.

² Accuracy is determined during protocol development, and requires understanding and quantifying the uncertainty in the quantification methodology being used. Materiality is applied during third party verification and is used to assess whether the project was correctly quantified (within 5 percent difference) relative to the approved quantification methodology.

- **Comparability principle:** ensures both the baseline and project condition have common units of measurement to allow meaningful comparison and quantification of emissions reductions/removals achieved through the implementation of the offset project. This is known as functional equivalence and is discussed further in section 3.8 below.
- **Transparency principle:** requires information be tracked and managed in a sufficiently transparent manner to support protocol development, project implementation, third party verification, and registration on the Alberta Emissions Offset Registry.

Protocols and relevant assumptions must be developed within the following constraints:

- **Objectivity:** the protocol assumptions and conditions must be based on objective evidence.
- **Consistency:** requires the use of the same accounting principles and quantification methods from year to year and between baseline and project.
- **Conservativeness:** protocol developers must select quantification methodologies, baselines, or projections that are least likely to overstate emission reductions or removals resulting from a project.

3.1 Additionality

In order to be considered for protocol development, the protocol developer must be able to demonstrate that the reduction and/or removal activities being quantified in the protocol results in a reduction in greenhouse gas emissions that are additional or incremental to business as usual/sector common practice and regulatory requirements. The baseline is considered to be what would have happened had the project not been implemented while the project must represent a change from this baseline as shown in figure 2 below. Offset credits, then, are generated for reductions in greenhouse gases below what would otherwise have occurred.

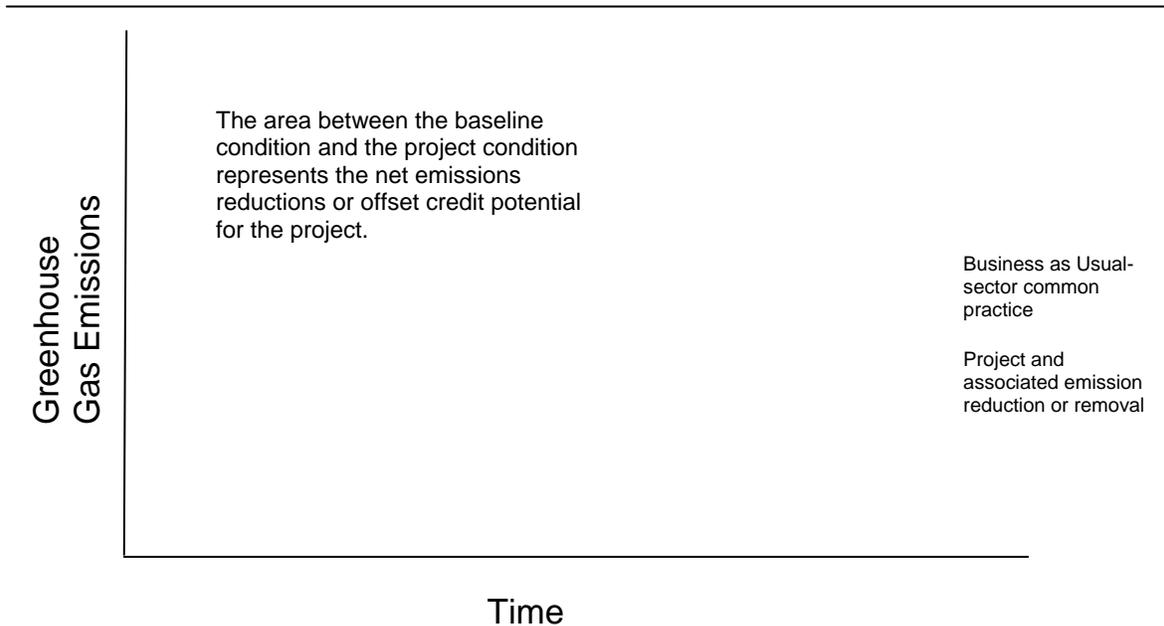


Figure 2: Illustrative example of the credit potential for an offset project.

Additionality is assessed by evaluating the regulatory requirements for the activity and barriers affecting project adoption. Alberta Environment has adapted the barriers assessment tool from the Clean Development Mechanism adjusted to the requirements of the Alberta offset system where:

- Required by law applies to any federal, provincial, or municipal regulation that directly affects or requires the activity, and may be for purposes other than controlling greenhouse gas emissions;
- Alternative technologies assesses other options available to the project developer that would result in the same end function. These alternatives may have different costs, barriers, technology requirements, and emissions profiles. The protocol developer will need to demonstrate that the activity being proposed results in the lowest greenhouse gas emissions while delivering the same or comparable level of service as the alternatives;
- Barriers are assessed primarily based on technological, financial, and social limitations.
 - **Technological barriers** for example, would require development and installation of new technology to provide the same outcome. In some cases, this technology may not be readily available or may require significant capital investment to install. If the technology is readily available and economic to install, this is not considered a significant barrier and would not be considered additional.
 - **Financial barriers** occur when there is a negative or extremely long return on investment that affects a company’s willingness to invest in the project. Financial additionality is a tool used to differentiate transformative projects from commercially attractive projects that would have gone ahead without the offset program. Alberta Environment has a lower weighting on financial

additionality than the CDM and other systems such as the Climate Change and Emissions Management Fund; however, projects and associated protocols that have no financial barriers will no longer meet Alberta Environment additionality criteria.

- **Social barriers** occur when public perception and understanding limits the ability to adopt a new activity. While less common than technological or financial barriers, social barriers may be significant and may be grounds to advance a protocol in the Alberta offset system. Protocol developers must identify social barriers during protocol development.
- Sector level adoption is the final test for assessing additionality and considers the adoption level of the activity across affected sector. If adoption levels are low, the above additionality tests hold, and the activity is determined to be additional. If adoption levels are high, the above additionality tests are negated and the activity is determined to be business as usual. In other words, if a significant number of other people have engaged in the same activity, then the arguments for financial, technological, and/or social barriers do not hold true and it is assumed that remaining members of the sector can also adopt the activity and/or practice change.

For the purposes of the Alberta offset system, Alberta Environment has set a 40 per cent adoption level as representing business as usual for an activity. While 40 per cent is considered a guide or benchmark adoption level for business as usual within a sector, protocol developers can discuss alternatives with Alberta Environment where there is sufficient rationale to advance a reduction opportunity that may have higher adoption levels.

These barrier analysis are intended as guidelines to help determine eligibility of a proposed reduction/removal activity. Activities that do not have major technological, financial or social barriers may be considered if it can be demonstrated that there are sufficient other barriers that justify advancing the protocol. Likewise, activities with higher adoption levels are not precluded from being considered for protocol development; however, these activities must demonstrate to Alberta Environment that sufficient other barriers exist to merit advancing the protocol for use in Alberta.

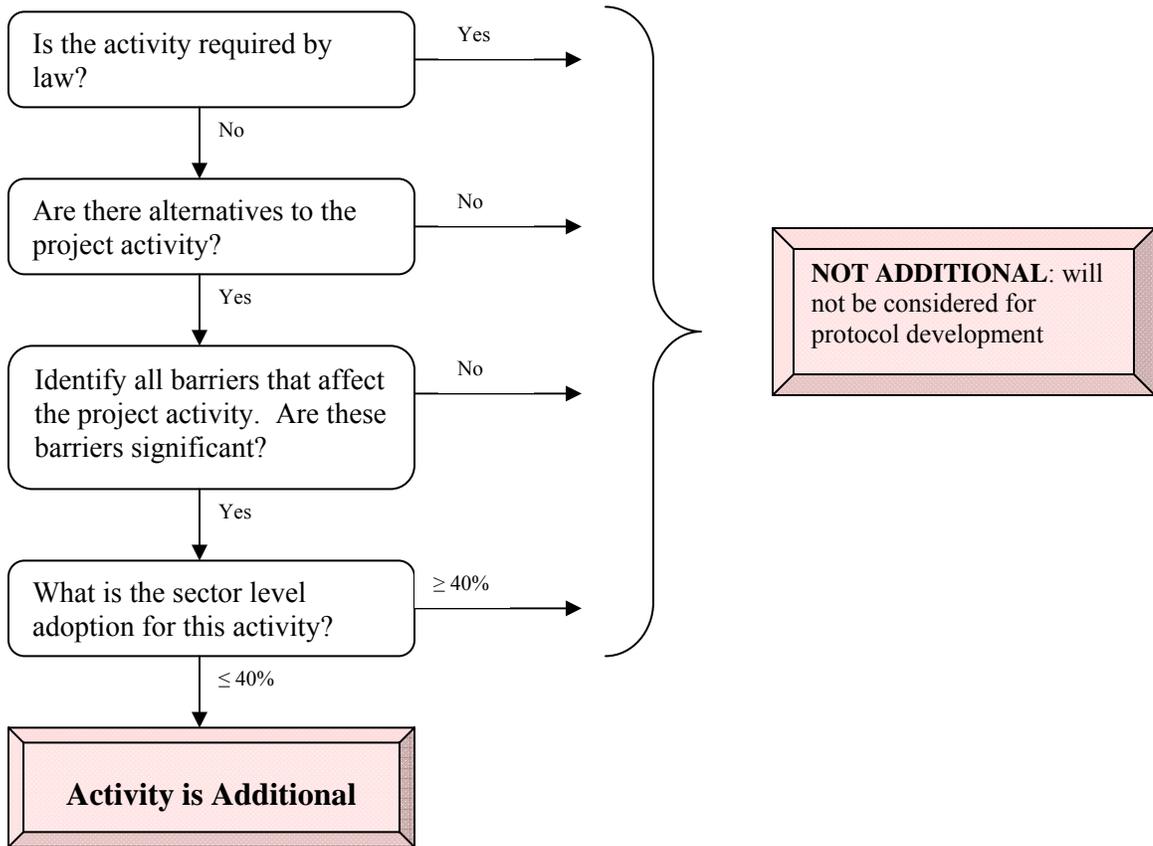


Figure 3: Guide to assessing additionality for a reduction activity.

Alberta assesses additionality during protocol development. If an activity is determined to be additional, and a protocol is approved, then all projects implemented under that protocol that occur on or after January 1, 2002, will be considered additional until such time as the protocol is reviewed and/or the credit duration period lapses.

It is conceivable that upon review, an activity that previously qualified as an offset activity under the Alberta offset system, is determined to be business as usual for the sector. This occurs when the activity becomes widely adopted as best practice for the sector. In these cases, Alberta reserves the right to discontinue the quantification protocol for the activity. No new projects will be allowed once a protocol is terminated.

If an activity that was previously unregulated becomes regulated, the protocol and associated offset projects will no longer meet additionality requirements. Credit generation potential for these projects will cease when the regulation comes into force. The projects will not be able to generate further offset credits and will not be eligible for a 5-year extension.

3.2 Covered Emissions

Reduction activities must result in emissions reductions and/or removals of greenhouse gas emissions regulated under the *Climate Change and Emissions Management Act*. These emissions include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFC), perfluorocarbons (PFC), and sulphur hexafluoride (SF₆). Table 2 provides a list of the specified gases including their 100-year global warming potential used to calculate CO₂e emissions.

Specified Gas	Formula	100-year GWP
Carbon dioxide	CO ₂	1
Methane	CH ₄	21
Nitrous Oxide	N ₂ O	310
Sulphur Hexafluoride	SF ₆	23900
Perfluorocarbons (PFC)		
Perfluoromethane	CF ₄	6500
Perfluoroethane	C ₂ F ₆	9200
Perfluoropropane	C ₃ F ₈	7000
Perfluorobutane	C ₄ F ₁₀	7000
Perfluorocyclobutane	c-C ₄ F ₈	8700
Perfluoropentane	C ₅ F ₁₂	7500
Perfluorohexane	C ₆ F ₁₄	7400
Hydrofluorocarbons (HFC)		
HFC-23	CHF ₃	11700
HFC-32	CH ₂ F ₂	650
HFC-41	CH ₃ F	150
HFC-43-10mee	C ₅ H ₂ F ₁₀ (structure: CF ₃ CHFCHFCF ₂ CF ₃)	1300
HFC-125	C ₂ HF ₅	2800
HFC-134	C ₂ H ₂ F ₄ (structure: CHF ₂ CHF ₂)	1000
HFC-134a	C ₂ H ₂ F ₄ (structure: CH ₂ FCF ₃)	1300
HFC-143	C ₂ H ₃ F ₃ (structure: CHF ₂ CH ₂ F)	300
HFC-143a	C ₂ H ₃ F ₃ (structure: CF ₃ CH ₃)	3800
HFC-152a	C ₂ H ₄ F ₂ (structure: CH ₃ CHF ₂)	140
HFC-227ea	C ₃ HF ₇ (structure: CF ₃ CHFCF ₃)	2900
HFC-236fa	C ₃ H ₂ F ₆ (structure: CF ₃ CH ₂ CF ₃)	6300
HFC-245ca	C ₃ H ₃ F ₅ (structure: CH ₂ FCF ₂ CHF ₂)	560

Table 2: Specified Gases and Gas Species Subject to the Climate Change and Emissions Management Act.

3.3 Types of Reduction Activities

The protocol developer must determine whether the reduction opportunity is an activity based or project based activity to accurately reflect the nature of the reduction activity.

Activity-based offset projects tend to be transitory in nature where the activity reduces emissions as long as the activity continues. If the activity is stopped, the reductions may cease or be reversed. Input costs, market factors, and management practice changes are factors that may influence whether or not an activity is maintained over time and will influence the risk (likelihood) of a reversal occurring. Activity based projects must assess the permanence of the reductions and/or removals achieved as well as the risk of reversal over the credit duration period and project life during protocol development. Examples of activity based projects are the adoption of reduced or no till cropping practices and the shift to modal freight shipping.

Technology-based projects require capital investment into equipment that is non-mobile once in place. These projects tend to be relatively stable and do not have significant outside market influences. That is, once a technology based project is implemented, it is unlikely to be removed or altered during the normal crediting period. Examples of technology based projects are the installation of wind turbines and the construction of a landfill gas capture system.

3.4 Project Boundaries

The protocol developer must assess the boundary conditions for the reduction/removal opportunity. This includes determining the applicable boundary conditions for the baseline and project condition relative to the larger context within which the reduction activity is nested. Emphasis needs to be placed on understanding how the emissions sources, sinks and projection metrics are tracked and quantified and how the baseline and project conditions can be isolated and the resulting reduction, verified.

3.5 Sources and Sinks

An emission **source** is any process or activity that releases a greenhouse gas into the atmosphere. A **sink** is any process, activity, or mechanism that removes a greenhouse gas from the atmosphere. All applicable sources and sinks including all energy and material flows for the project and baseline condition must be identified in the protocol development process. Following ISO 14064-2, sources and sinks are then evaluated using a lifecycle analysis to identify and understand the relationship of the source and/or sink to the proposed project/activity and will further inform the baseline and project boundary conditions.

Sources and sinks are classified first as:

- Upstream: occurring upstream of the project/activity;
- On-site: occurring at the project/activity location; and
- Downstream: occurring downstream of the project/activity.

Sources and sinks are then evaluated as:

- Controlled: this activity is under the direction and influence of the project developer through financial, policy, management or other instruments.
- Related: this activity has material and/or energy flows into, out of, or within a project, but not under the direct control of the project developer.
- Affected: this activity is influenced by the project activity through changes in market demand or supply of products or services associated with the project, but is not controlled by the project developer.

Sources and sinks from the baseline and project condition must then be compared to assess changes related to the proposed greenhouse gas reduction activity.

- Included: sources and sinks that are expected to change between the baseline and project condition are included in the quantification protocol and must be quantified. The change in greenhouse gas emissions resulting from these activities will form the basis of the protocol's emissions reductions, and offset credits calculations.
- Excluded: sources and sinks that are unlikely to change between the baseline and project condition are excluded from the quantification methodology. Some sources and sinks may be excluded to improve the conservativeness of the emission reduction calculations.

Identification and quantification of sources and sinks forms the basis of the quantification protocol. Protocol developers must be able to support the decisions made to include and exclude sources/sinks and be able to justify all calculation methodologies applicable to the activity.

3.6 Baseline Condition

The baseline condition for a project is a reasonable representation of conditions that would likely have occurred during the offsets credit period had the offset project not been implemented. In other words, the baseline represents “business as usual” and the project represents a change from this practice. Greenhouse gas emission reductions achieved by a project are measured by comparing the project conditions against the project baseline to quantify the difference in emissions between the two scenarios as illustrated in figure 2 above.

Baselines can be calculated in a number of different ways depending on available information and project type. Baseline options are assessed during the protocol development process to select the most appropriate baseline for the offset project to determine what would reasonably have occurred had the project not been implemented. Rational for the scenario selected must be provided in the protocol, including a detailed discussion on assumptions and criteria required to establish the baseline condition.

Below is a discussion on baseline types that are acceptable for use in Alberta:

- Historic Benchmark: assumes that past trends will continue into the future. It is site-specific and constructed to reflect activities for a specified base period.

- **Performance Standard:** uses an assessment of comparable activities within a given industry or sector. It assumes that the typical emissions profile for an industry or sector is a reasonable approximation of the baseline scenario.
- **Comparison Approach:** uses actual measurements of parameters from a control group to compare with the project condition. Emissions or removals from the control group are monitored throughout the project and compared with the emissions from the project site. A control group may be used as the baseline for more than one project.
- **Projection Based:** uses projections of reductions or removals in the future to estimate the baseline activity that would have occurred in the absence of the project. Projections may include straight-line growth assumptions or more complex modeling, and may be based on a set of constant parameters or be varied over time according to pre-defined procedures.
- **Adjusted Baseline:** takes into account current practice levels of a particular project and specifies that the same baseline is used for all projects of a certain type, regardless of historical practices. This policy was adopted to encourage the maintenance of soil carbon and provides an incentive to early adopters to maintain sequestering practice and not revert to previous practices. To balance the equity of the program, all adopters receive the lower coefficient going forward, but all are able to participate. An adjusted baseline may be considered for project types where current practice levels are well documented and are relatively low relative to total adoption potential.

Baselines are further classified as static or dynamic over the credit duration period.

- **Static:** the emissions profile for the baseline activity does not change during the credit duration period. Both the input parameters for baseline calculations and the quantification methodology remain constant; or
- **Dynamic:** the quantification methodology does not change over the credit duration period, but the input parameters such as weather conditions, project operational parameters, etc. change over time. Dynamic baselines are recalculated annually (or when emission reductions are quantified) to ensure reductions quantified represent real emission reductions from the baseline condition.

3.6.1 Adoption Levels

In order for a reduction activity to be considered for protocol development in Alberta, the Alberta adoption rates for that activity must be understood and defined. Where Alberta specific data is not known, the protocol sponsor/protocol developer will need to undertake further work to establish Alberta relevant baseline conditions before the reduction activity can be brought forward for consideration as a quantification protocol.

The baseline activity must be supported by scientific research and data, and must be quantifiable. Baseline conditions that cannot be quantified cannot be accepted as valid in the Alberta offset system. Further, baseline adoption rates, emission factors, etc. must be applicable in Alberta and have Alberta-relevant supporting data. If the baseline activity

cannot be understood in the Alberta context, it will not be accepted for consideration in the Alberta offset system.

Note: Alberta uses a 40 per cent adoption level to determine whether an activity is business as usual for the sector. It is assumed that if 40 per cent of more of the sector members have engaged in the behaviour, significant barriers to adoption do not exist and the activity can be reasonably assumed to be business as usual.

3.6.2 Adjusted Baselines

In some cases, an activity may have significant greenhouse gas and other benefits, but may already have a certain level of adoption within the applicable sector. Where adoption is less than 40 per cent, an adjusted baseline may be considered to discount offset credits generated by current projects based on historic adoption levels/market penetration. The adjusted baseline will apply to all projects being brought forward under the protocol as a means ensuring conservatism in the offset credits generated by effectively discounting for early adoption of the technology/activity.

Adjusted baselines are typically done as a discount factor (percentage multiplier) applied to the baseline calculation that discounts the relevant percentage from the baseline emissions calculated.

Note: The adjusted baseline does not replace the program start date. Projects being implemented under protocols with adjusted baselines must still be able to demonstrate they were initiated on or after the program start date of January 1, 2002.

3.7 Project Condition

The project condition is a specific action or intervention targeted at reducing, removing or storing greenhouse gas emissions and may consist of one or more inter-related activities developed according to a government approved protocol. The project condition may include modification of existing production, process, consumption, service, delivery or management systems, or introduction of new systems.

Emissions associated with the project condition must be real, quantifiable, and verifiable. Emission reductions that cannot be quantified with a reasonable degree of accuracy will not be accepted in the Alberta offset system.

Note: Risk assurance factors and discount factors do not apply to uncertainty in quantification methodologies and cannot be used as “conservative” estimates to address quantification uncertainty.

3.7.1 Leakage

Leakage occurs when the implementation of an activity or project shifts emissions upstream or downstream of the project boundary. Leakage may occur, for example,

when a project switches from natural gas powered equipment to electricity powered equipment. Leakage occurs if there is no net reduction in emissions resulting from the activity, and instead, emissions are shifted or increased up/downstream of the activity.

Leakage may also occur if incentives to preserve one area cause the adverse action to occur at another location under the control of the project developer.

Leakage must be assessed during protocol development to ensure that emissions reductions claimed during the project condition represent real emissions reductions. Protocols must speak to criteria and conditions used to manage leakage to ensure projects result in real emission reductions/removals. Examples of leakage management tools include: monitoring plans, minimum project boundaries, and conservative emission factors. If leakage cannot be managed, or if the impact of the shifted emissions is greater than the savings at the project, the idea will not be considered for protocol development in the Alberta offset system.

3.7.2 Permanence

Permanence is the likelihood of reversal associated with emission removal (biosequestration) project such as tillage management and afforestation. Reversals may be deliberate (e.g.: early tree harvest, returning to conventional tilling on a field) or unintentional (e.g.: wild fires, insect infestations, or drought conditions) reversals. In all cases, reversals will cause previously stored carbon to be re-emitted to the atmosphere.

The likelihood of reversal needs to be assessed during protocol development. The incidence of reversal must be assessed based on historical data and future projections using statistical methods. It should take into account regional variability across the sector to assign a coefficient based on the likelihood of reversal over a minimum period of time as appropriate to the activity. This provides an estimate of the magnitude of reversals that can reasonably be expected during the project condition. Discounting based on the likelihood of reversal is applied to the calculated emissions reductions using a percentage based multiplier and is known as **risk based assurance factor**.

This likelihood of reversal is quantified as a percentage and applied as a coefficient modifier to emissions reductions calculated during the project condition to discount all credits generated by all projects. These “buffer credits” are transferred to a government held account and may be used to true up provincial emissions inventories in the event that accidental reversals occur. Buffer credits are permanent removals from calculated emissions reductions and are not refundable to the offset project developer and cannot be used to cover deliberate reversals or errors within a project. The use of a risk based assurance factor ensures that remaining offset credits generated by the project are considered permanent reductions similar to direct removal projects such as energy efficiency or landfill gas destruction projects.

While Alberta Environment recognizes that other assurance factor models are available in other offset systems, it has been determined that a protocol level discount be used for protocols and projects developed for use in Alberta. This results in lower

emission reductions being claimed and provides added conservativeness in the Alberta offset system.

Assurance factors will be re-assessed periodically and may be adjusted over time and during protocol review. This review will include an assessment of observed reversals and new science to ensure that the discount factor remains valid. If changes in the discount factor are made, they will apply on a go-forward basis when the new version of the protocol is published.

3.7.3 Flexibility Mechanisms

Flexibility mechanisms may be developed to expand the scope and level of rigour applied to a protocol to result in better greenhouse gas emission reduction quantifications. These flexibility mechanisms can only be developed for project conditions where there is sufficient data to support the project scenario covered under the mechanism.

Flexibility mechanisms vary between protocols and are not required in all protocols. Examples of flexibility mechanisms include the ability to use site-specific emission factors instead of default factors; the use of more detailed, site specific monitoring methodologies; and the ability to add or remove sources and sinks based on their applicability.

Flexibility mechanisms may also include related projects that require co-implementation with the protocol project condition or where the activity is similar and sufficiently closely related to the approved project condition that it does not merit a separate protocol, but can leverage off work already vetted through the protocol development process. For example, the shift to continuous cropping systems (elimination of summerfallow and chemfallow in crop systems) requires co-implementation with reduced and no till farming practices and only applies to one soil of Alberta's soil ecozones. The conversion to continuous cropping is therefore a flexibility mechanism that allows an expansion on the scope and coverage of the Quantification Protocol for Tillage System Management.

Note: Flexibility mechanisms cannot offer a less rigorous quantification approach than the one provided in the approved quantification protocol.

3.8 Functional Equivalence (Consistency)

Emission reductions are calculated by comparing greenhouse gas emissions in the project condition relative to the baseline condition for the project or activity. In order for this comparison to be meaningful, the project and the baseline must provide the same function and quality of products or services. This is known as functional equivalence. This consistency in metrics and units of production provides an ability to quantify actual emissions reductions achieved in the project condition.

For example, if a project is designed to reduce emissions by recovering waste heat from an industrial process, the emission reductions should be compared to an equivalent level

of heat generation under the baseline condition. The common unit would be the number of kilowatt hours of energy required to produce the heat.

In some cases, the project condition, by definition, cannot have the same units as the baseline. An example of this would be the biofuel protocol, which seeks to displace conventional oil with biofuel. In this case, the common metric would be the energy content of each fuel, reported as energy content/litre of fuel.

3.9 Conservativeness and Accuracy

Accuracy, or understanding uncertainty, enables projects to meet the system criteria for real and quantifiable emission reductions.

The accuracy varies depending on the methodology being proposed. Direct measurement is usually considered more accurate than engineering estimates; however direct measurement may not be practical for every situation and in some cases, the most accurate methodology available may be cost prohibitive relative to the project. Protocol developers must assess the accuracy associated with the various quantification methodologies and provide justification for why the methodology proposed in the protocol is the most appropriate—accurate relative to available data and cost—for the offset project.

Conservativeness ensures that emissions reductions being claimed by a project are not overstated and must be assessed within the range of uncertainty associated with the proposed quantification methodology. The protocol developer is required to document the analysis and decision around the conservative estimate used in developing the quantification methodologies for the reduction activity.

Quantification protocols must find an appropriate balance between conservativeness and accuracy. Conservative hedge factors cannot be used as a surrogate for an inability to quantify uncertainty. That is, a protocol cannot apply a conservative discount factor based on the fact that they are unable to obtain an accurate estimate of the parameter. In all cases, the uncertainty range of the parameter must be understood in order for a quantification methodology to be approved.

3.10 Project Documentation

Project documentation forms the basis of the offset credit. Without proper documentation, it is impossible to verify that a reduction has occurred and that an offset has been generated. Offset credits provide a compliance option to large industrial facilities regulated under the Specified Gas Emitters Regulation. As a result, offset projects developed for use as a compliance option in Alberta must meet regulatory quality data retention and burden of proof. Projects that are not able to meet this high level of assurance cannot be accepted in the Alberta offset system.

Alberta is moving to a **reasonable** level of assurance for the Specified Gas Emitters program, which includes the Alberta offset system starting in the 2012 calendar year. This means offset project developers must be able to demonstrate to a third party verifier,

and government auditor, with a high level of certainty, that the emissions reductions generated by the project have resulted in actual emission reductions being claimed. Further information on third party verification is available in section 6.0 of the Technical Guidance for Offset Project Developers.

Consideration must be given to the quality of records available to support an emission reduction activity.

.....
Note: Protocols must speak to minimum data records available to support a reduction activity. Activities that cannot be supported by evidence cannot be accepted for use in the Alberta offset system.
.....

3.11 Grid Displacement Factor

Emissions reductions generated by displacing coal fired electricity from the grid must use a grid displacement factor of 0.65 for reductions occurring in Alberta.

The electricity grid displacement factor is intended to recognize the environmental benefits of using renewable energy relative to non-renewable energy. Traditionally, Alberta's electricity mix has been comprised predominantly of coal, with smaller, but growing sources of natural gas, biomass, wind, hydro, and other alternate and renewable sources. Calculating offsets credits must recognize and incorporate the different greenhouse gas intensities associated with these different emission sources.

Quantification protocols for renewable and energy efficiency require an electricity displacement factor to determine the appropriate baseline emission rate for these activities. This factor is used to quantify the indirect greenhouse gas reductions from project-generated renewable electricity and improvements in energy efficiency. The factor was developed using available best practice guidance from the World Resource Institute (WRI) and the Clean Development Mechanism (CDM) for calculating applicable, regional grid intensity factors. Both methods rely on a weighting of emission factors representing the time-weighted marginal electricity production and the overall electricity capacity for the region.

The Alberta factor below is based on an average intensity for the operating margin, grid greenhouse gas intensity, and the build margin for new generation. The factor also includes a conservative discount of 12 per cent, which represents the reduction target that electrical generators are subject to under the *Specified Gas Emitters Regulation*. It will apply for a period of 5 years to 2012, after which time, the build margin and grid intensity numbers will be recalculated and the electricity displacement factor revised using the same methodology. The new factor will be valid beginning the year it is published.

The electricity grid factor for Alberta is:

0.65 tonnes of CO₂e/MWh

Note: the grid displacement factor may not be appropriate for use in project conditions where the project is to convert from other fuels to electric power as it may result in overstating greenhouse gas emission reductions relative to the provincial grid average. In these situations, the protocol developer should contact Alberta Environment to discuss their specific activity.

3.12 Biosequestration

Biosequestration is a naturally occurring process of capturing and storing carbon in the biosphere. The biosphere includes trees and plants that remove CO₂ from the atmosphere through photosynthesis and incorporate the carbon into the trees or plant biomass. Through soil microbe decomposition, the plant biomass residues are converted into soil organic carbon – a process known as carbon sequestration. Different biological sequestration pathways (trees, soil organic carbon, below ground biomass) have different carbon uptake rates that need to be correctly quantified to measure the sequestration opportunities for a particular reservoir.

Biosequestration is a reversible activity. As long as the reservoir is maintained, the carbon is absorbed and stored. If biosequestration activities are reversed, stored carbon will be released back to the atmosphere; the sink will become an emission source. Further, cases exist where the amount of respiration of CO₂ and the amount of sequestered CO₂ reach equilibrium, or respiration is greater than sequestration, and the sink may become an emission source (e.g. an aging forest stand). Alberta Environment recognizes the value of maintaining and improving biological sinks in the province and takes into account these time-based events during the development of the quantification protocols and quantification methodology.

Biosequestration activities are reversible activities. Reversals may result from natural or anthropogenic disturbances including stop or alter the sequestration activity. Therefore, these types of activities require the use of an assurance factor to address possible reversals. Assurance factors are discussed in section 3.7.2 above.

4.0 Protocol Development

The Alberta offset system uses a multi-stakeholder review process to assess greenhouse gas emission reduction/removal opportunities, including associated quantification methodologies, where the intended outcome is to develop quantification protocols for use in the Alberta offset system. Protocol ideas undergo a number of reviews including approval in concept by Alberta Environment, technical development, technical expert review, broader stakeholder review, government review and public review to ensure that protocols developed for use in Alberta represent best available science are technically defensible and represent real emissions reductions that are additional to business as usual/sector common practice and all regulatory requirements.

The protocol development process can take anywhere from 1 to 2 or more years depending on the state of the science and supporting information. The proposed reduction activity must achieve consensus deemed to be no sustained objection at each review stage before it can proceed and may be terminated at any point in the development process if Alberta Environment determines the protocol does not meet program eligibility requirements. If there is sustained objection, the proposal will not advance to the next round of review until all outstanding issues have been resolved.

Figure 1 (page 11) outlines the protocol development process, key deliverables and expected timelines for each portion of work. Timelines serve as guidelines and are variable based on the complexity of the reduction activity and the state of science and supporting information.

4.1 **Contact and submission information**

Climate Change Central facilitates the protocol development process on behalf of Alberta Environment. Climate Change Central maintains the Carbon Offset Solutions website including the public posting of all protocol development documentation and records of comments and questions. Climate Change Central can be contacted at:

Protocol Development
Climate Change Central
Suite 930, 10303 Jasper Avenue
Edmonton, Alberta Canada T5J 3N6
protocolcomments@climatechangecentral.com

Alberta Environment is the regulator for the Alberta offset system. Alberta Environment will review draft protocol documents to ensure policy coherence and approves protocols for use in the Alberta offset system. Alberta Environment can be contacted at:

Climate Change Secretariat
Alberta Environment
12th Floor, 10025 – 106 Street
Edmonton, Alberta, Canada T5J 1G4
AENV.GHG@gov.ab.ca

All protocol documentation described below must be submitted to both Climate Change Central and Alberta Environment by the document submission deadlines. Electronic submissions compatible with Microsoft Office are preferred; however, hard copy submissions will also be accepted.

Deadlines applicable to the Alberta offset system:

- **April 30** – Submission of the Intent to Develop a Protocol for consideration in the fall Stakeholder Review workshop.
- **October 1** – Submission and acceptance of technical seed document and draft protocol for inclusion in the fall stakeholder review workshop.
- **November 1** – Deadline for government approval of a protocol for use in that year's compliance cycle.

Note: Protocol developers are encouraged to work on protocols throughout the year and submissions may be made at any point up to the deadline. Alberta Environment and Climate Change Central will do their best to review all submitted documents in a timely manner, however, protocols will be reviewed in the order they are received. Submission of a large number of documentation at the deadline may delay the response time on an individual submission.

Alberta Environment maintains a mailing list for purposes of communicating program up-dates to the offset community. People are encouraged to subscribe to the Alberta Offset Mailing list at

http://environment.alberta.ca/Carbon_Emission_Offset_subscribe.aspx

4.2 Identification of Emissions Reduction/Removal Opportunity

The first step in the protocol development process is to identify a greenhouse gas emission reduction opportunity for one or more of the covered emissions (see Table 2 above for a list of covered emissions). The reduction opportunity must result in quantifiable emission reductions in Alberta, meet all eligibility criteria stated in section 2.6, and must meet additionality criteria stated in section 3.1 above. If the activity meets these criteria the protocol sponsor should review the list of approved protocols and protocols under development available on the Carbon Offset Solutions³ website.

If this activity is covered under or relates to, but is not an exact fit with an approved protocol, the protocol sponsor should work with Climate Change Central and Alberta Environment to assess whether the activity can be incorporated into an existing protocol such as through a flexibility mechanism.

If the proposed reduction activity aligns with a protocol already under development, the protocol sponsor may wish to contact the protocol developer to participate on the protocol review team.

³ Carbon Offset Solutions website: www.climatechangecentral.carbonoffsetsolutions.ca

If the activity is a new reduction activity, the protocol sponsor will need to contact Climate Change Central to discuss options for bring the reduction activity forward for consideration as a quantification protocol in the Alberta offset system.

4.3 Intent to Develop a Protocol

The *intent to develop an Alberta offset system quantification protocol* is a screening tool used by Alberta Environment to assess the eligibility of a reduction opportunity within the Alberta offset system. This document must be sufficiently complete and detailed to provide Alberta Environment with an overview of the proposed activity, assumptions, and emissions generation potential. It must provide a rationale for why the protocol is needed, how it will result in emission reductions in Alberta, and how it meets additionality criteria, including being supplemental to regulations and business as usual activities.

Alberta Environment will review the submitted information, and have one or more follow-up meetings with the protocol developer and/or sponsor to discuss the activity being proposed. Emphasis will be placed on understanding:

- Baseline (business as usual activity) including adoption rates, market penetration and regulatory requirements;
- Project condition including relevant supporting science from peer reviewed literature, availability of technology, ability to quantify the reduction opportunity, and consistency with Alberta Environment eligibility and program criteria;
- Additionality including barriers analysis and general applicability in Alberta;
- Credit generation potential at a project and sector level adoption;
- Types of records available to support the activity;
- References and experts available to review the proposed reduction activity; and
- Assess the idea against other government initiatives to ensure that, at a high level, there are no obvious regulatory issues with the proposed activity.

Reasonable efforts will be made to review and provide feedback within 30 days of receipt of the intent to develop a protocol document. A final decision on the applicability of the reduction opportunity relative to the Alberta offset system will be provided in writing to the protocol sponsor. Protocols that receive approval in concept to proceed will move to development of the technical seed document.

*Note: Receiving approval in concept for a reduction activity does **not** guarantee that the protocol idea will be accepted as an approved protocol. All protocol proposals must go through the peer review process and receive final government approval before they can be used as protocols for offsets projects under the Alberta offset system.*

The intent to develop a protocol template is available in Appendix A.

4.4 Development of the Technical/Scientific Basis for a Protocol

If a protocol concept is approved for protocol development a small team of subject matter experts coordinated by the protocol developer will be expected to champion the technical development for the protocol. This team will produce a technical seed document, which will be reviewed by a wider set of technical experts, and if accepted, will be developed into a draft quantification protocol. The technical development and review process is outlined below.

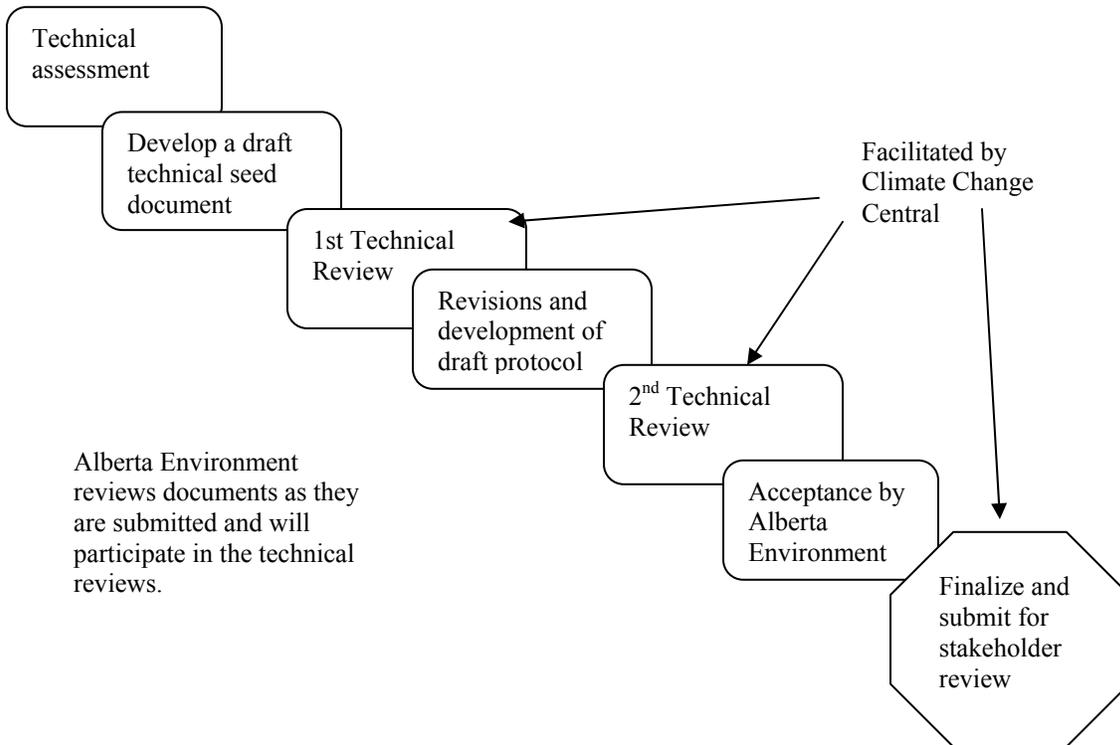


Figure 4: Technical development process for draft protocols.

The first step in this process is to develop the technical seed document, which is a detailed analysis of the background information relevant to the reduction/removal activity. It is posted on the Carbon Offset Solutions website and serves as a reference document for persons wishing to better understand the final, approved protocol.

The technical seed document is generally compiled by an expert working team consisting of several subject matter experts and may include a consultant with relevant protocol development experience. This expert working team must have demonstrated subject matter expertise and is responsible for compiling the science and background information, developing quantification equations for the activity, assessing and comparing sources and sinks in the baseline and project condition to determine the reduction activity and associated emissions reduction equations, and review the proposal for completeness against technical knowledge and the Alberta offset system requirements.

This document is the underpinning technical resource that guides the adaptation of technical elements of the reduction activity into the ISO 14064-2 based Alberta protocol template. It makes up the scientific basis of the greenhouse gas quantification approach. The document(s) must represent the best available science/technical information relating to the project activity to connect the science/technology information to the greenhouse gas emissions quantifications.

The technical seed document must address the following:

- Explanation of the project type, including a clear description of the activity generating the emission reduction or removal;
- Best practice guidance used to support the activity. This may include protocols from other jurisdictions including the Clean Development Mechanism (CDM);
- Mechanisms for addressing permanence, leakage, and ensuring additionality if needed;
- Discussion on business as usual, common practice, level of up take, and regulatory requirements pertaining to the activity as applicable in Alberta;
- Barriers to implementation;
- Review of science, relevant research, and/or technology appropriate to the activity;
- Example calculations;
- Assessment of and justification for the baseline scenario selected;
- Evaluation of sources and sinks in the baseline and project condition; and
- Any flexibility mechanisms appropriate to the activity.

Ability to verify the emissions reductions being claimed is a fundamental requirement of the Alberta offset system. As such, protocols must be written with verification in mind. Protocol developers are required to engage a third party verifier at some point during the technical development to ensure that the reduction activity being proposed can be verified. Verifiers will be looking for things like clarity in the project and baseline descriptions, clarity in the assumptions, availability of records to support the reduction activity, etc to ensure that final protocols can be verified.

The technical seed document must undergo a technical review by a wider range of technical experts including representation from the technical working group, government representatives, non-government organizations, academics, project developers and other parties that will be directly affected by the protocol or that can provide a rigorous vetting of the concepts being presented. The composition of the review team will vary by protocol and activity type, but must strive to bring together an objective team to review the proposed reduction/removal activity. Protocol developers are encouraged to work with Climate Change Central to identify technical experts. Alberta Environment reserves the right to request additional technical experts be included if required to ensure an objective and balanced review.

The technical review will assess the proposed emission reduction activity for:

- Environmental integrity of the assumptions and activity/project to ensure reductions are real, quantifiable, and verifiable;
- Completeness of the sources and sinks;
- Usability of the methodology and reduction activity to ensure reasonableness of assumptions against program requirements using consistent, conservative approaches to decide what needs to be quantified in baseline and project;
- Consistent with similar approved protocols, but correctly adapted to the Alberta offset system;
- The streamlined life cycle analysis approach applied to the reduction activity is consistent with the ISO 14064-2 framework; and
- Any other technical or scientific issues that may be identified.

The review by the third party verifier may be included in this technical review or be done independently as determined by the protocol developer.

The technical seed document must have consensus⁴ (no sustained objection) to be approved for adaptation into a draft quantification protocol. This draft protocol must be presented to the technical review team for assessment. Any outstanding questions or concerns must be addressed. If the draft protocol has no sustained objections, it, along with the technical seed document are submitted to Alberta Environment for review. Alberta Environment will review, and if there are no outstanding concerns, Alberta Environment will issue written notice for the protocol to proceed to stakeholder review.

Climate Change Central, as the facilitator for protocol development, helps coordinate the technical review sessions, and provides records of discussion for the technical review, stakeholder review, and public comment periods explained below. These records of discussion along with the final technical seed document and supporting information are posted on the Carbon Offset Solutions website and are available for review by interested parties.

This process will typically take between 6 months and several years to complete and is the most intensive and time-consuming part of the protocol development process. The level of effort required will vary depending on the complexity of the reduction activity, the amount of original research required to support the activity, availability of records to support the activity, etc. Greater emphasis and time spent during this phase will yield a more robust protocol with less likelihood of being halted later in the protocol development process.

⁴ Consensus here is defined as, general agreement, characterized by the absence of sustained opposition to substantial issues. Consensus does not imply unanimity. The absence of sustained opposition is when everyone agrees to function under the agreed conditions given constraints and/or diversity of opinions. Alberta Environment holds the right of discretion of the process to determine whether the protocol will proceed through the next step in the development process working collaboratively with the protocol developers and other stakeholders.

.....
Note: Protocols that do not have appropriate review at the development stage may be halted later in the process until all appropriate persons/organizations have had a chance to review and comment on the proposed activity.
.....

A template for the technical seed document is available in Appendix C of this document. A template for the quantification protocol is available in Appendix D of this document.

4.5 Stakeholder Review

The stakeholder review is a broader stakeholder workshop held once a year in the fall. Draft protocols accepted for review in the Alberta offset system that have no sustained objections, are presented to a larger stakeholder group made up of interested parties. It may include, but is not limited to technical experts, non-government representatives, academics, industry representatives including large final emitters (buyers of the offset credits), market participants, and third party verifiers.

The protocol developer will present the draft protocol and background information and respond to questions on the proposed protocol. Emphasis will be placed on presenting the protocol development complete with technical considerations made during the technical review explaining how and why decisions were made as presented in the draft protocol. Protocols will be reviewed for environmental integrity, usability, adaptation of precedents, and life cycle analysis based on the perspectives from the larger, more diverse audience with the objective of having dialogue and discussion to improve clarity and robustness of the draft protocol.

A record of questions and discussion is kept and all questions raised must be addressed before the protocol can move forward in the protocol development process. If sustained objections are raised, the protocol will return to the technical review phase to address the concerns.

4.5.1 Important Protocol Considerations

Alberta regulates greenhouse gas emissions at large industrial facilities. Offset credits are a compliance mechanism for these large industrial sites. Protocols approved for use in Alberta must meet regulatory quality requirements including a high burden of proof that the activity has taken place. Protocols must be written with this end objective in mind. **Protocols that cannot support regulatory quality data collection, records management, or monitoring and verification will not be approved by the Director and will not be available for use in Alberta.**

Further, Alberta Environment is moving to a **reasonable** (audit) level of assurance in 2012. Reasonable assurance requires a positive statement (high level of proof) that an activity has taken place and has generated the emission reductions being claimed. The following are considerations for supporting this higher level of assurance:

1. Specific:

- clearly identify the reduction/removal activity addressed in the protocol, including a description of the activity generating the reduction/removal;
- clearly articulate assumptions and limitations of the protocol and scope including, where applicable, stating what activities are included and excluded from consideration;
- clearly identify and explain the baseline scenario applicable for the reduction/removal activity;
- clearly state all formulas and calculations required to calculate emissions reductions or removals; and
- Explain monitoring and data requirements needed to support project implementation and verification.

2. Verification

Protocols must be written to support verification. This is greatly enhanced by having clear, specific protocols written in plain English.

Further, the protocol must provide a detailed list of records and documentation available to support the activity. This includes activities that result in greenhouse gas emissions reductions and have good ancillary benefits, but are difficult to quantify and cannot be supported by records. Activities that cannot be supported by regulatory quality records will not be able to meet reasonable assurance and will not be considered in protocol development in Alberta.

3. Plain language

Protocols must be drafted with the end user (project developer and verifier) in mind. Protocols must clearly articulate all assumptions, baseline/project conditions, methodologies, document requirements, etc. in plain English to ensure ease of use and comprehension by parties other than those developing the protocols. Alberta Environment reserves the right to edit all protocols prior to approval and release.

4. Reference materials

Protocols should include sufficient reference materials including look-up tables and discussion on key scientific/technical data in the appendices to support consistent interpretation and application of the protocol. Tables should include, where appropriate the year of publication of the reference materials.

4.6 Government Review

Once protocol developers have addressed outstanding issues raised during the stakeholder review workshop, the draft protocol is submitted to Alberta Environment for review. Alberta Environment will initiate a formal government review of the protocol with appropriate government departments.

While some government departments may choose to participate in the technical review and at other stages in the protocol development, this formal government review is

conducted to ensure that all policy issues are addressed and that the protocol being presented has been accepted by all affected departments. Where there are unresolved policy issues, Alberta Environment will ask the protocol developer to clarify the protocol to address concerns raised during the government review.

The protocol **must** meet all requirements to the satisfaction of all departments participating in the government review to proceed to final review and public posting. Alberta Environment will not approve a protocol that has sustained objections from another department.

Protocol developers should allow several months for the government review depending on how involved government departments have been in the protocol development process.

A final draft protocol will be developed following the government review. This draft protocol will then be posted for a 30-day public comment period consistent with the Government of Alberta expectations for transparency and public engagement.

4.7 30-Day Public Comment Period

Final draft protocols will be posted on the Carbon Offset Solutions website for a formal 30-day public comment period.

A summary of comments received and responses will be posted on the Carbon Offset Solutions website as part of the official records for the protocol development process.

In the event that significant issues are raised, or that there are unresolved issues associated with the proposed draft protocol, Alberta Environment will work with the protocol developer and review team to take appropriate action to address issues and reach a consensus. The protocol must achieve no sustained objection to be considered for final approval.

4.8 Government Approval and Release of Protocol

Protocols that have no sustained objection and meet the requirements of the Alberta offset system will be presented to the Director for final review and approval. Protocols approved before November 1 will be available for the use in the current compliance cycle, which ends March 31 of the following year. Protocols approved after November 1 will be available for use in the following compliance cycle.

Written notice from the Director will be issued for approved protocols.

Protocols are available for use once they are posted on Alberta Environment's website at <http://environment.alberta.ca/02275.html>.

4.9 Protocol Review Process

All approved protocols will undergo a mandatory review every 5 years or sooner as needed to assess the assumptions, calculations, level of adoption, risk based assurance factors, emission factors, regulatory requirements etc. It is anticipated that the level of work required will vary depending on the protocol and level of up-take.

In general, Alberta Environment will conduct an initial review of the protocol to identify policy issues that may have arisen including, but not limited to:

- errors or changes in equations;
- documentation requirements;
- issues encountered during implementation, including issues identified through supplemental government audit;
- changes in regulatory requirements for the activity;
- level of up-take; and
- stakeholder concerns.

If the current assumptions are still valid or if minor corrections only are needed, Alberta Environment will address these issues and post the protocol for a 30-day comment period. Any changes will apply on a go-forward basis from the approval date.

If there are more substantive issues with the protocol, Alberta Environment will coordinate a review of the protocol which may include, but is not limited to a reassessment of protocol assumptions, baseline and project conditions, and methodology. Depending on the extent of revisions required, a protocol may need to be re-introduced into the protocol development process for transparency and review of the proposed changes.

Revised protocols will be clearly marked with a new version number and date of publication. Applicable changes will be tracked in a summary of changes in section 1.0 of the protocol. Supporting analysis and records of discussions, clarification, or rework will be made available on the Carbon Offset Solutions website.

4.10 Termination of Protocols

4.10.1 Protocols under Development

Protocols may be terminated at any point in the protocol development process if the protocol fails to meet program requirements, additionality considerations, or has unresolved sustained objections. Generally speaking, the likelihood of rejection decreases as the protocol moves through the process if all previous reviews have been completed in sufficient detail to provide good understanding of decisions being made.

If a protocol is brought forward for consideration and subsequently becomes inactive for a period of one year, the proposed protocol will expire. Expired protocol ideas can be re-introduced, but must be re-introduced into the protocol development process as a new protocol. That is, the protocol sponsor and protocol developer will need to submit an

intent to develop a protocol application with emphasis being placed on explaining issues that caused the earlier submission to expire and how those issues have been resolved. The proposed activity will need to go through a science review to ensure assumptions are consistent with current science and technology standards and make any adjustments required.

Approved protocols will be reviewed a maximum of every five years and may be reviewed sooner if required. Issues that may cause a protocol to be flagged for revision include errors in formulas or assumptions, ambiguity in the protocol, errors or difficulties with protocol implementation as identified through a supplemental government audit, policy and/or program changes, introduction of new regulations, etc.

4.10.2 Existing Protocols

Protocols will undergo a mandatory review every 5-years to assess the state of science, general assumptions on emission factors, coefficients, etc, and to assess adoption rates and additionality of the activity. Protocols will be adjusted to reflect current science and technology data. If the activity is deemed to be business as usual or common practice, the protocol will be terminated. Existing projects will be allowed to complete their current crediting cycle, but will not be eligible for an extension. No new projects will be accepted under a protocol that has been terminated.

Approved protocols that are not implemented and reach the 5-year review may be terminated unless sufficient justification can be provided to maintain the protocol. Protocols that have not been used, but where there is interest in not having them expire, will need to do a detailed analysis to assess why the protocol has not been used, the likelihood of the protocol being used, and make any up-dates to assumptions and protocol conditions consistent with a normal protocol review.

4.10.3 Existing Protocols Affected by Regulatory Changes

If a previously unregulated activity becomes regulated, the protocol will automatically be reviewed for additionality to new regulatory requirements. The protocol may either:

- a) Be revised to reflect a change beyond new regulatory requirements, or
- b) Expire upon commencement of the regulations.

Any changes made to the protocol will apply upon commencement of the regulation and will affect all new and existing projects on a go-forward basis from the implementation of the regulation.

Note: No new projects can be implemented under protocols that have been terminated.

GLOSSARY OF TERMS

Additionality	An action that results in greenhouse gas emission reductions that are beyond business as usual and supplemental to all regulatory requirements.
Alberta Emissions Offset Registry	A web-based platform that displays Alberta Offset Projects and tracks associated offset credits.
Alberta Environment	Regulator for the Specified Gas Emitters Regulation and Alberta Offset System.
Aggregated Projects	A collection of small projects using same quantification methodology that have been bundled to create a larger volume project for marketing, verification, and registration.
Baseline	A reference case against which the performance of the project is measured.
Biosequestration	The process of storing carbon dioxide in biological reservoirs including trees, plants, and soil biomass.
Biomass	Non-fossilized and biodegradable organic material originating from plants, animals and micro-organisms.
Business as Usual (BAU)	Projection of normal operating conditions that would have occurred in the absence of incentives or regulatory changes.
Carbon Dioxide Equivalent (CO ₂ e)	Is the 100-year global warming potential average of a unit of greenhouse gas (e.g. methane) compared to an equivalent unit of carbon dioxide (reference gas).
Climate Change and Emissions Management Act	Legislation in Alberta passed in 2002 allowing Alberta Environment to manage greenhouse gas emissions in the province.
Climate Change Central	Is an arms length organization contracted primarily by Alberta Environment to support delivery of a variety of climate change programs including consumer incentive programs and supporting delivery of the Alberta Offset System.
Eligibility Criterion	Are minimum requirements an offset project must meet to be eligible under the Alberta offset system.
Emission Factor	Is a representative value that can be used to estimate the

	rate or quantity of greenhouse gas emissions released to the atmosphere or removed through sequestration processes.
Emission Reduction	Occurs when emissions released into the atmosphere by a source are decreased or eliminated.
Emission Removal	Occurs when CO ₂ or CO ₂ e is removed from the atmosphere through sequestration.
Global Warming Potential (GWP)	measures a greenhouse gas's relative warming effect Earth's atmosphere compared with carbon dioxide expressed as a 100-year average.
Incremental	Is an <u>eligibility criterion</u> referring to a change in practice that results in additional emission reductions beyond business as usual.
Leakage	A shifting of greenhouse gas emissions outside a project boundary that is a result of the offset project.
Level of Assurance	Identifies the amount of work required to reach a stated level of comfort with an offset project.
Offset Credit	Is a tradable credit issued per tonne of greenhouse gas emissions reductions expressed as CO ₂ e.
Offset Project	An activity implemented by a project developer in accordance with a government approved protocol that results in greenhouse gas emissions reductions or removals.
Project Developer	A person who implements an offset project in accordance with a government-approved protocol.
Project Start Date	Is an <u>eligibility criterion</u> referring to the date when the greenhouse gases are initially reduced ore removed by the offset project.
Protocol Developer	Person or company responsible for coordinating the development of a quantification protocol.
Protocol Sponsor	Company or organization championing the development of a quantification protocol for an identified reduction/removal opportunity.
Quantifiable	Is an <u>eligibility criterion</u> requiring that the emissions and reductions of greenhouse gases be calculated and

	monitored or estimated in accordance with the requirements set out in an approved quantification protocol appropriate to the project type.
Quantification Protocol	Is a government-approved methodology that outlines appropriate baseline conditions, eligible sources and sinks, and emission reduction calculations for a specific emission reduction activity.
Real	Is an <u>eligibility criterion</u> requiring that the offset project be a specific and identifiable action that results in a net greenhouse gas emission reduction or removal after leakage is taken into account.
Regulated Facility	Is a facility located in Alberta that emits over 100,000 tonnes CO ₂ e per year. The regulated facility may purchase Offset Credits for compliance under the Specified Gas Emitters Regulation.
Reversal	Is a release of carbon sequestered or stored in a reservoir back to the atmosphere.
Sequestration	The process of storing carbon in a reservoir to prevent its release into the atmosphere.
Scope	Is an <u>eligibility criterion</u> that refers to the Offset Project requirements stated in section 7 of the Specified Gas Emitters Regulation.
Sink	Any process, activity or mechanism that removes greenhouse gas from the atmosphere.
Source	Any process or activity that releases greenhouse gases into the atmosphere.
Specified Gas Emitters Regulation	Is the regulation passed under the Climate Change and Emissions Management Act that enables the Alberta Offset System.
Validation	An optional process that is used to assess a project condition including quantification methodologies before the project is implemented
Verifiable	Is an eligibility criterion requiring that a Third Party Verifier be able to confirm that the reductions or removals have been achieved as claimed.

Verification	Is an independent third party review of a project to assess project operating conditions against the baseline conditions to confirm the Offset Credits being claimed.
Third Party Verifier	Is a person or organization that meets the requirements of a third party auditor stated in section 18 of the Specified Gas Emitters Regulation.
Unique	Is an <u>eligibility criterion</u> that requires that a greenhouse gas reduction or removal be used only once to create an offset credit.

Appendix A: Intent to Develop a Protocol Template

Intent to Develop Alberta offset system Quantification Protocol: {Enter Proposed Title}

Please contact Climate Change Central with any questions or clarification of requirements at contact@climatechangecentral.com.

This Intent to Develop an Alberta offset system Quantification Protocol document is intended to provide Alberta Environment with an overview of the proposed protocol idea to demonstrate how this protocol will meet the requirements of the Alberta offset system. The protocol developer is required to present this information to Alberta Environment and must receive approval in concept for the protocol before the protocol idea will be considered for development in the Alberta offset system.

Familiarity with and general knowledge of the Alberta offset system is required prior to initiating a protocol. Information on the Alberta offset system is available on the Carbon Offset Solution website (<http://carbonoffsetsolutions.climatechangecentral.com>) and on the Alberta Environment website (<http://environment.alberta.ca/02275.html>).

Alberta Environment will review the submitted information in order to assess and provide feedback on the following elements:

- How the proposed protocol meets the eligibility criteria in Section 7 of the Specified Gas Emitters Regulation;
- Applicability of the proposed protocol against purpose and intent of the Alberta Offset System;
- Baseline adoption levels and credit potential for Alberta;
- Baseline, project condition, and key assumptions for the proposed protocol;
- Key stakeholders and technical experts in the field; and
- Relevant science and technical information

Lead Protocol Developer: Primary contact for correspondence regarding the Protocol.	
Organization:	Address:
Name:	City:
Position:	Province:
Telephone:	
Website (optional):	Postal Code:
E-mail:	
Date submitted:	
Protocol Sponsor: If same as above please leave section blank.	
Organization:	Address:

Name:	City:
Position: Telephone:	Province:
Website (optional):	Postal Code:
E-mail:	

General Description of the Proposed Protocol⁵ [Provide a written overview on the intent, purpose and relevant background information on the protocol.]

Intent [Describe the protocol activity and reduction opportunity.]

Baseline [Explain the project baseline condition, adoption levels for the province, business as usual activity, general baseline assumptions, credit potential in Alberta, other relevant information.]

Project Condition [Explain the project condition, activity creating the emission reduction or removal, other relevant information. Please include sample calculations if available. If unavailable, effort should be made to provide a high level technical assessment to of the reduction opportunity being claimed.]

Relevant project emissions [state which greenhouse gases will be affected by this project]

Specified Gas	Formula	100-year GWP	Applicable to Project
Carbon Dioxide	CO ₂	1	Y/N
Methane	CH ₄	21	Y/N
Nitrous Oxide	N ₂ O	310	Y/N
Sulphur Hexafluoride	SF ₆	23,900	Y/N
Perfluorocarbons*	PFCs	Variable	Y/N
Hydrofluorocarbons*	HFCs	Variable	Y/N

Applicability [Who is the intended user(s) for this protocol?]

⁵ **Some important notes to consider:**

- *Protocols should be based on best available science.*
- *Follow the ISO 14064:2 standard processes – specifically addressing principles of conservativeness, completeness, relevant, consistent with others, accuracy and be completely transparent in development and descriptive processes.*
- *Be very clear with respect to the Measurement, Monitoring and Verification requirements to allow little interpretation.*

Regulatory Requirements [Describe all relevant regulations that apply to this activity and explain how the activity is going beyond regulatory requirements.]

Additionality [Explain how this activity result in real, quantifiable, and verifiable reductions beyond business as usual activity and government regulations. How does this protocol result in new, incremental greenhouse gas emission reductions and/or removals that would not otherwise have occurred? Additionality is considered in conjunction with sector level adoption and the barriers analysis provided below.]

Barriers [Identify barriers that would, in absence of the offset protocol, disincet or prevent this activity or project from taking place. Barriers may be technical, financial, or social, and may be one large barrier or a number of small barriers that affect the ability of a project activity to move forward. Each barrier should be discussed in the context of the reduction/removal activity and will be used to support project addtionality]

Permanence [Are emission reductions and/or removals reversible. If so, how does the protocol developer propose to address permanence of offset credits associated with this activity?]

Leakage [Will this protocol result in or threaten leakage of greenhouse gas emissions, and if so, how will these risks be mitigated? Include a discussion on possible scenarios that may occur.]

Conservativeness [How does the proposed protocol idea address conservativeness in emission reduction quantifications?]

Aggregation [Is this protocol likely to result in aggregated projects? If so, are there risks associated with aggregated projects, and how does the protocol propose to handle these risks?]

Verification [What types of records are available to support implementation and verification of the proposed activity or project?]

Ownership [Identify issues around ownership chain that pertain to this activity or project.]

Related Protocols and/or Methodologies [Do other jurisdictions, programs or offset systems have similar or related protocols available, and if so, discuss similarities and differences between the proposed protocol idea for Alberta relative to other jurisdictions. Please also indicate knowledge gaps and areas where more research is needed or being undertaken to further support the proposed activity]

Other Benefits [List all associated benefits that will result from this activity. These other benefits can include environmental benefits, economic benefits, etc.]

Adverse Effects [List any adverse effects that may result from implementing this activity or project.]

Proposed Timing for Submission into the Offset System Review Process

[Please identify the anticipated submission date for this protocol to be considered for stakeholder review. Note: the stakeholder review is held once per year in the fall.]

Expert Working Group: [Please list anticipated or potential technical experts involved in the development of the Technical Seed Document and Draft Protocol. Technical teams should be comprised of technical experts, academics, non-government organizations, government representatives, and industry members as appropriate and will vary from one protocol to another.]

- First Name, Last Name, Organization

Anticipated Technical Review Committee: [Please list anticipated or potential technical experts involved in the review of the Draft Protocol. Technical review teams should be comprised of technical experts, academics, non-government organizations, government representatives, and industry members as appropriate and will vary from one protocol to another. Note: Alberta Environment and Climate Change Central observe and provide feedback during the technical review, but are not considered technical experts for the purposes of rounding out review team perspectives.]

- First Name, Last Name, Organization

References [Provide a list of relevant references.]

Appendix B: Protocol Revision Template

Protocol Revision Template
 Alberta Offset System Protocol Revision Request for
 Quantification Protocol: {Enter Title/Version}

PART A: IDENTIFICATION OF THE PROTOCOL DEVELOPER

A.1. Title of the Existing Protocol: (Title must clearly identify the name and current version of the approved Alberta Quantification Protocol)	
A.2. Lead Protocol Developer: (Will be the primary contact person for all correspondence and inquires)	
Organization:	Mailing Address:
Name:	City:
Title:	Province:
Website (optional):	Postal Code:
Telephone:	E-mail:
Fax (optional):	
Signature of Authorized Party:	
Date:	
A.3. Secondary Protocol Developer: (Will be the alternate contact for correspondence and inquires if Lead is unavailable)	
Organization:	Mailing Address:
Name:	City:
Title:	Province:
Website (optional):	Postal Code:
Telephone:	E-mail:
Fax (optional):	
Signature of Authorized Party:	
Date:	
Rationale for initiating the revision of the existing Quantification Protocol:	

Part B: Description of Proposed Revision

This section should provide an overview of the proposed revision to existing Quantification Protocol including any changes to: project type, project-specific technology, quantification methodology and how the revision will continue to meet or exceed requirements of the Alberta Offset System.

B.1. Description of the Change to Project Type/Eligibility: (The project type is a set of project practices or technologies that represent the change from a normal business operation/practices or common industry practice.)		
Description of how real reductions or removals will be achieved with this modification: (The Protocol Developer must ensure the GHG(s) that will be reduced by the activities for this project type are within the scope and criteria of the Alberta offset system and the Specified Gas Emitters Regulation.)		
B.2. Demonstration of Additionality: (The Protocol Developer must demonstrate how real reductions or removals are beyond business as usual. Please provide a summary of how your protocol ensures additionality of offset projects. Also include a discussion of whether your project type additionality is impacted by input and/or activity mobility, and/or management decisions influenced by market or social forces.)		
B.3. Description of Background Information/Best Practice Guidance Used for Modification:		
1. Document Title	2. Publishing Body/Date	3. Description
Eg. Canada's National Inventory	Government of Canada, 2006	Description of IPCC tier 2 and 3 applications for quantifying GHGs from sectors at a national level.
B.4. Regulatory, Legal Requirements and/or Government Incentive/Grant Programs:		
List of potentially relevant regulations/legal requirements:		
List of potentially relevant climate change incentives:		
B.5. Barriers to Implementation of Existing Protocol: (Review and discuss the barriers impeding the projects outlined in the protocol from being implemented)		

B.6. Risks to Implementation: (Review and discuss the risks associated with the protocols project-type and how these risks are being addressed / mitigated)			
B.7. Review of Technology/Scientific Knowledge: (Describe the applicable practice(s) or technology producing the GHG emission reductions and the scope of activities considered)			
B.8. Review of Existing Projects: (Review of trends and statistics on existing practices/projects in the Alberta and Canadian context.)			
B.9. Summary of Quantification Approach Modifications: (Include a summary of any modifications to the GHG quantification approaches and methodologies. Include a justification for the inclusion of the “New Source or Sink” specifying where the proposed approach deviates from the existing protocol and reference Best Practice Guidance for the proposed alterations in quantification approach(es).)			
B.10. Other Impacts and Co-Benefits: (Include other air emissions, odours, risks, environmental impacts on vegetation, wildlife, water resources etc.)			
B.11. Assessment of Baseline Scenarios (if suggesting modification) Evaluate all possible Baseline Approaches in the list below, and identify which ones are appropriate for the proposed protocol. Justify why each selected Baseline Scenarios is appropriate. Justification should relate to why each appropriate Baseline Scenarios conservatively and accurately represents “business as usual”. Also, justify why the other Baseline Scenarios are not appropriate and are excluded from the Protocol. Must explain why the Baseline approach is static or dynamic, justify the selection of the most appropriate baseline scenario(s) including references and any assumptions.			
TABLE 1.2: Re-Assessment of Possible Baseline Scenarios			
1. Baseline Options	2. Description	3. Static / Dynamic Baseline	4. Accept or Reject and Justify
Historic Benchmark:	(Typically site-specific and can be constructed to reflect reductions in a base period (such as the average emissions of the previous three years).)		
Performance Standard:	(Assumes the typical emissions profile for the industry or sector is a reasonable representation of the baseline.)		

<p>Comparison-based:</p>	<p>(Actual measurements of parameters from a control group to compare with the project.)</p>		
<p>Projection-Based:</p>	<p>(Projections of reductions in the future can use a variety of techniques, from simple straight-line growth assumptions to complex models.)</p>		
<p>Adjusted Baseline:</p>	<p>(Takes into account current practice levels of a particular project and specified that the same baseline is used for all projects of a certain type, regardless of historical practices.)</p>		
<p>Other (Explain):</p>			

B.12. Re-definition of the Project Condition: (Define the project condition and justification for the scope of the activity considered.)

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B. 13. Functional Equivalence (if suggesting modifications): (Explain and justify how the project and the baseline are comparable in terms of products and/or activity level. This type of comparison requires a common metric or unit of measurement (such as the mass of beef produced, tonne-kilometers traveled, or energy content of fuel volumes in the case of displacing fossil fuels with biofuels).)

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B.14. Flexibility Mechanisms (if suggesting modification): (Explain optional approaches for quantifying the reductions to be achieved from the project type.)

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Appendix C: Technical Seed Document Outline

Alberta Offset System Guidance for Protocol Development
Technical Seed Document

IDENTIFICATION OF THE PROTOCOL DEVELOPER

Proposed Title of Protocol: (The title for the protocol must clearly identify the Project Type. If adapting an existing protocol, the title must clearly identify the name of the protocol and the system within which it was approved.)	
Lead Protocol Developer: (The Lead Protocol Developer is the primary contact person for all correspondence and inquires regarding the Technical Protocol Plan. Where applicable, an alternate contact is to be included.)	
Organization:	Mailing Address:
Name:	City:
Title:	Province:
Website (optional):	Postal Code:
Telephone:	E-mail:
Fax (optional):	
Signature of Authorized Party:	
Secondary Protocol Developer: (Where applicable, an alternate contact can be included.)	
Organization:	Mailing Address:
Name:	City:
Title:	Province:
Website (optional):	Postal Code:
Telephone:	E-mail:
Fax (optional):	
Signature of Authorized Party:	
Initiating Group(s): (The initiating group is the group that has a direct interest in developing an Alberta offset system protocol for the project type(s) being proposed. Typically, the initiating group contracts the services of another firm to act as Lead Protocol Developer, but sometimes they may be the Lead Protocol Developers themselves.)	
Organization:	Mailing Address:
Name:	City:

Title:	Province:
Website (optional):	Postal Code:
Telephone:	E-mail:
Fax (optional):	
Signature of Authorized Party:	

Sample technical seed document outline

1 Introduction and summary of project/activity type protocol development process/foundation etc.

2 Scope and applicability of protocol

- i. review of technology/practices
- ii. greenhouse gases identified/targeted
- iii. additionality
- iv. review of existing projects/common practice

3 Applicability to all Alberta offset system criteria

- i. barriers
- ii. permanence
- iii. risks to implementation/leakage
- iv. impacts/co-benefits
- v. ownership
- vi. verification

4 Protocol Technical Scientific Foundation

5 Protocol Operational Framework

Baseline Condition

Assessment of Baseline Scenarios

Selection and Justification of Baseline Scenario

Additionality

Identification of Baseline S

Baseline Determination/Quantification

Risk Assurance Factors, if appropriate

Project Condition

Project Condition

Project Scope

Definitions of Practices (incl. ownership chain)

Identification of Project Sources and Sinks

Permanence and Reversibility

Comparison of Project and Baseline Sources and Sinks
Identification of Relevant Sources and Sinks

6 State of Science — Findings, Gaps, Issues

7 Consultation Workshop results

8 References

9 Appendices
— Method for Calculating Emissions

Appendix D: Quantification Protocol Template

QUANTIFICATION PROTOCOL FOR

Version [X.X]

[Date]

Specified Gas Emitters Regulation

Disclaimer:

The information provided in this document is intended as guidance only and is subject to periodic revisions. This document is not a substitute for the law. Please consult the *Specified Gas Emitters Regulation* and applicable legislation for all purposes of interpreting and applying the law. In the event that there is a discrepancy between this document and the *Specified Gas Emitters Regulation* or other legislation, the *Specified Gas Emitters Regulation* and other legislation prevail.

All Quantification Protocols approved under the *Specified Gas Emitters Regulation* are subject to periodic review as deemed necessary by the Department, and will be re-examined at a minimum of every 5 years from the original publication date to ensure methodologies and science continue to reflect best-available knowledge and best practices. Any updates to protocols occurring as a result of the 5-year and/or other reviews that are not due to legal requirements will apply at the end of the first credit duration period for applicable project extensions and for all new projects coming forward.

Where a project condition differs from approved government methodologies, or the project developer is unclear on protocol interpretation relative to their specific project, the project developer must contact Alberta Environment to discuss an appropriate interpretation and receive approval for any methodology changes prior to undertaking the project.

Any comments, questions, or suggestions regarding the content of this document may be directed to:

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Alberta Environment Related Publications

Climate Change and Emissions Management Act
Specified Gas Emitters Regulation
Specified Gas Reporting Regulation

Alberta's 2008 Climate Change Strategy

Technical Guidance for Completing Annual Compliance Reports
Technical Guidance for Completing Baseline Emissions Intensity Applications
Additional Guidance for Cogeneration Facilities
Technical Guidance for Landfill Operators

Technical Guidance for Offset Project Developers
Technical Guidance for Offset Protocol Developers
Quantification Protocols (<http://environment.alberta.ca/1238.html>)

Alberta Quantification Protocol Development Process

Alberta's quantification protocol development requirements are based on the framework and principles of the *ISO 14064 Part -2: Specification with Guidance at the Project Level for Quantification, Monitoring and Reporting of Greenhouse Gas Emission Reductions or Removal Enhancements* standard. This internationally accepted standard helps ensure consistency and transparency for the quantification, monitoring, reporting, and verification of project-based greenhouse gas (GHG) reductions or removals and integrity of the emission offsets. The ISO 14064-2 Standard provides a policy-neutral, non-sectoral, verifiable template and specifications upon which a protocol can be customized to the regulatory requirements of specific greenhouse gas programmes.

Main principles are considered throughout the protocol development process, i.e. development of the Technical Seed Document(s), technical and stakeholder reviews etc.

- **Environmental Integrity:** The project-type provides real, measurable, and quantifiable greenhouse gas reductions and/or removals. Identify and address permanency of project conditions.
- **Completeness:** Include all relevant greenhouse gas emissions and removals. Include all relevant information to support criteria and procedures. Review and assessment of leakage through project condition.
- **Consistency:** Enable meaningful comparisons in greenhouse gas-related information.
- **Accuracy:** Reduce bias and uncertainties as far as is practical.
- **Transparency:** Disclose sufficient and appropriate greenhouse gas-related information to allow intended users to make decisions with reasonable confidence.
- **Relevance:** Select the greenhouse gas sources and sinks, data and methodologies appropriate to the needs of the intended users.
- **Conservativeness:** Use conservative assumptions, values and procedures to ensure that greenhouse gas emission reductions or removal enhancements are not over-estimated.

1.0 Offset Project Description

[Describe the project]

1.1 Protocol Scope

[Describe the scope for the Offset activity including the following]

- Detailed description of the reduction/removal activity
- Eligible project conditions
- Justification for the baseline
- Current adoption levels
- Metric for evaluating emissions reduction/removals
- If applicable, discussion of discount factor being applied
- Greenhouse gases affected by the activity

Table 3: Relevant Greenhouse Gases Applicable for [reduction/removal activity]

Specified Gas	Formula	100-year GWP	Applicable to Project
Carbon Dioxide	CO ₂	1	Y/N
Methane	CH ₄	21	Y/N
Nitrous Oxide	N ₂ O	310	Y/N
Sulphur Hexafluoride	SF ₆	23,900	Y/N
Perfluorocarbons*	PFCs	Variable	Y/N
Hydrofluorocarbons*	HFCs	Variable	Y/N

* A complete list of perfluorocarbons and hydrofluorocarbons regulated under the *Specified Gas Emitters Regulation* is available in Technical Guidance for Offset Project Developers.

1.2 Protocol Applicability

[Provide detailed discussion of project requirements under this protocol. This section explicitly lays out minimum requirements in order to implement this protocol.]

[Identify if the protocol can be co-implemented/requires co-implementation with another approved protocol.]

1.3 Protocol Flexibility

[Provide detailed discussion on flexibility options available for this activity including context for when a flexibility mechanism can be used relative to the standard protocol approach.]

1.4 Glossary of New Terms

[List new terms specific to the protocol. Typically, this would be terms specific to the reduction/removal activity.]

2.0 Baseline Condition

[Provide overview of the baseline conditions and assumptions for this reduction/removal activity.]

Explain the baseline scenario for reduction/removal activity, why it is applicable and how it is used.

This discussion must be sufficiently complete to allow clear interpretation by persons wishing to implement activities under this protocol.]

Figure 5: Process Flow Diagram for the Baseline Condition

[Insert process flow diagram for the baseline condition]

2.1 Identification of Baseline Sources and Sinks

Sources and sinks for an activity are assessed based on Guidance provided by Environment Canada and are classified as follows:

Controlled: The behaviour or operation of a controlled source and/or sink is under the direction and influence of a Project Developer through financial, policy, management, or other instruments.

Related: A related source and/or sink has material and/or energy flows into, out of, or within a project but is not under the reasonable control of the project developer.

Affected: An affected source and/or sink is influenced by the project activity through changes in market demand or supply for projects or services associated with the project.

[Describe baseline sources and sinks for this project.]

Figure 6: Baseline Sources and Sinks for [reduction/removal activity]

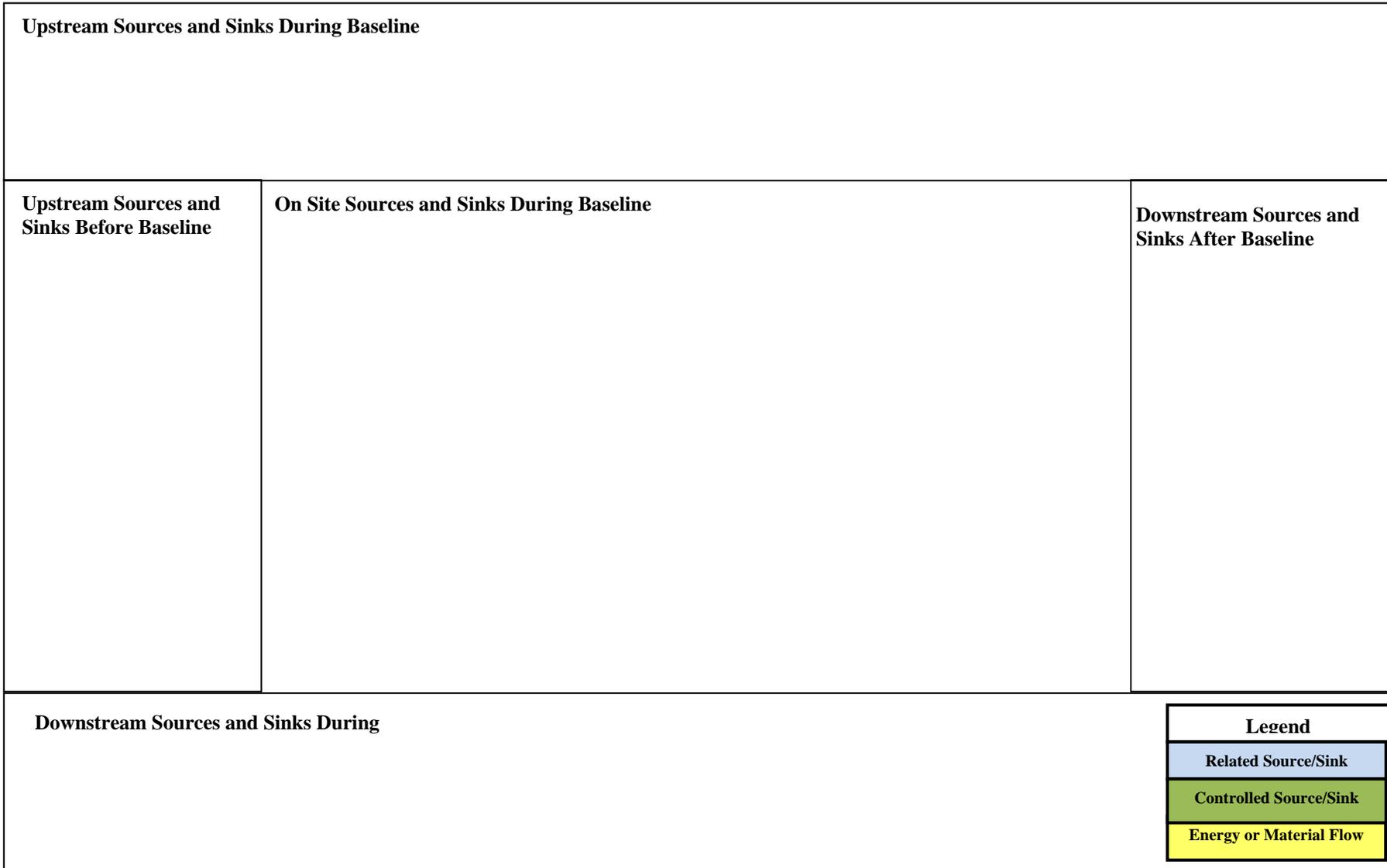


Table 4: Identification of Baseline Sources and Sinks

Source/Sink	Description	Controlled, Affected, Related
<i>Upstream Sources and Sinks Before Baseline</i>		
<i>Upstream Sources and Sinks During Baseline</i>		
<i>Onsite Sources and Sinks During Baseline</i>		
<i>Downstream Sources and Sinks During Baseline</i>		
<i>Downstream Sources and Sinks After Baseline</i>		

3.0 Project Condition

[Provide overview of the project conditions and assumptions for this reduction/removal activity.]

Explain how the project condition removes emissions relative to the selected baseline.

This discussion must be sufficiently complete to allow clear interpretation by persons wishing to implement activities under this protocol.]

Figure 7: Process Flow Diagram for the Project Condition

[Insert process flow for the project condition.]

3.1 Identification of Project Sources and Sinks

Sources and sinks for the *[reduction/removal activity]* were identified based on scientific peer review. This process confirmed that source and sinks in the process flow diagram (Figure 3) covered the full scope of eligible project activities under this protocol.

These sources and sinks have been further refined according to the life cycle categories identified in Figure 4. These sources and sinks were further classified as controlled, related, or affected as described in Table 3 below.

[Discussion of sources and sinks. Highlight any changes relative to the baseline assumptions.]

Figure 8: Project Conditions Sources and Sinks for *[reduction/removal activity]*

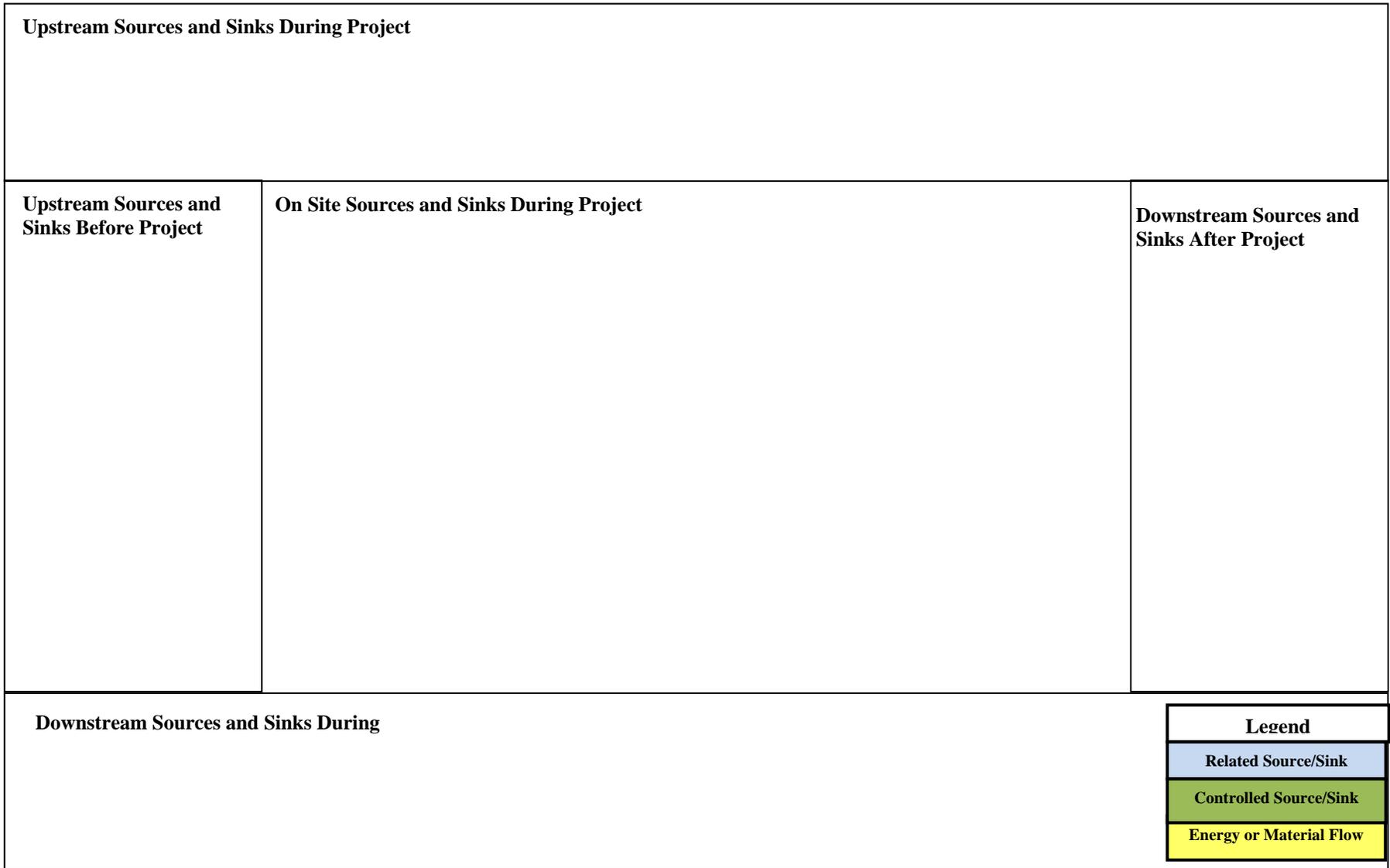


Table 5: Project Condition Sources and Sinks

Source/Sink	Description	Controlled, Affected, Related
<i>Upstream Sources and Sinks Before Project</i>		
<i>Upstream Sources and Sinks During Project</i>		
<i>Onsite Sources and Sinks During Project</i>		
<i>Downstream Sources and Sinks During Project</i>		
<i>Downstream Sources and Sinks After Project</i>		

4.0 Quantification

Baseline and project conditions were assessed against each other to determine the scope for reduction/removals quantified under this protocol. Sources and sinks were either included or excluded depending on how they were impacted by the project condition. Sources that are not expected to change between baseline and project condition are excluded from the quantification. It is assessed that excluded activities will occur at the same magnitude and emission rate during the baseline and project, so will therefore not be impacted by the project.

Emissions that increase or decrease as a result of the project must be included and associated greenhouse gas emissions must be quantified as part of the project condition.

All sources and sinks identified in Tables 2 and 3 above are listed in Table 4 below. Each source and sink is listed as include or excluded. Justification for each of these choices is provided.

Table 6: Comparison of Sources/Sinks

Identified Sources and Sinks	Baseline (C, R, A)**	Project (C, R, A)**	Include or Exclude from Quantification	Justification for Inclusion/Exclusion
Upstream Sources/Sinks				
<i>Eg. P1</i>				
<i>Eg. B1</i>				
<i>Eg. P2</i>				
<i>Eg. B2</i>				
Onsite Sources/Sinks				
Downstream Sources/Sinks				
Other				

**Where C is Controlled, R is Related, and A is Affected.

4.1 Quantification Methodology

[Detailed discussion of quantification methodology including:

- Formulas
- Assumptions
- Emissions factors
- Discount factor(s) (justification and quantification)]

$$\text{Emission Reduction} = \text{Emissions}_{\text{Baseline}} - \text{Emissions}_{\text{Project}}$$

$$\text{Emissions}_{\text{Baseline}} = \text{Emissions}_{\dots} + \text{Emissions}_{\dots} + \dots$$

$$\text{Emissions}_{\text{Project}} = \text{Emissions}_{\dots} + \text{Emissions}_{\dots} + \dots$$

Where:

$\text{Emissions}_{\text{Baseline}}$ = sum of the emissions included under the Baseline Condition.

Emissions B1(*as above*) =

Emissions B2(*as above*) =

Etc.

$\text{Emissions}_{\text{Project}}$ = sum of emissions included under the Project Condition.

Emissions P1(*as above*) =

Emissions P2(*as above*) =

Etc.

Table 7: Quantification Methodology

Source/Sink	Parameter / Variable	Unit	Measured/ Estimated	Method	Frequency	Justify measurement or estimation and frequency
Baseline Condition						
Source/Sink 1	Equation					
Source/Sink 2	Equation					
Project Condition						
Source/Sink 1	Equation					
Source/Sink 2	Equation					

5.0 Data Management

Data quality management must be of sufficient quality to fulfill the quantification requirements and be substantiated by actual records for the purpose of verification.

The project developer shall establish and apply quality management procedures to manage data and information. Written procedures must be established for each measurement task outlining responsibility, timing and record location requirements. The greater the rigour of the management system for the data, the more easily verification will be to conduct for the project.

5.1 Project Documentation

5.1.1 Project Eligibility Documentation

[Describe minimum documentation required to prove eligibility for this protocol. Note: Attestations are not considered sufficient evidence that an activity has occurred. Complete Table 6 below.]

5.1.2 Baseline Condition Documentation

[Describe minimum documentation required to prove baseline eligibility for this protocol. Note: Attestations are not considered sufficient evidence that an activity has occurred. Complete Table 6 below.]]

5.1.3 Project Quantification Documentation

[Describe minimum documentation requirements for project quantification under this protocol. Note: Attestations are not considered sufficient evidence that an activity has occurred.]

5.2 Record Keeping

Alberta Environment requires that Project Developers maintain appropriate supporting information for the project, including all raw data for the project for a period of 7 years **after** the end of the project crediting period. Where the Project Developer is different from the person implementing the activity, as in the case of an aggregated project, the individual projects and the aggregator, must both maintain sufficient records to support the Offset Project. The Project Developer (project implementer and aggregator) must

keep the information listed below (in addition to others that will support the project) and disclose all information to the verifier and/or government auditor upon request.

Record Keeping Requirements:

[This list needs to be tailored to the offset reduction/removal activity]

- Raw baseline period data,
- A record of all adjustments made to raw baseline data with justifications
- All analysis of baseline data used to create mathematical model(s)
- All data and analysis used to support estimates and factors used for quantification
- Expected end of life date of equipment removed or renovated under the project
- Common practices relating to possible greenhouse gas reduction scenarios discussed in this protocol
- Metering equipment specifications (model number, serial number, manufacturer’s calibration procedures)
- A record of changes in static factors along with all calculations for non-routine adjustments
- All calculations of greenhouse gas emissions/reduction/removals and emission factors
- Measurement equipment maintenance activity logs
- Measurement equipment calibration records
- Initial and annual verification records and audit results

In order to support the third party verification and the potential supplemental government audit, the project developer must put in place a system that meets the following criteria:

- All records must be kept in areas that are easily located;
- All records must be legible, dated and revised as needed;
- All records must be maintained in an orderly manner;
- All documents must be retained for 7 years after the project crediting period;
- Electronic and paper documentation are both satisfactory; and
- Copies of records should be stored in two locations to prevent loss of data.

Note: Attestations will not be considered sufficient proof that an activity took place and do not to meet verification requirements.

5.3 Quality Assurance/Quality Control Considerations

Quality Assurance/Quality Control can also be applied to add confidence that all measurements and calculations have been made correctly. These include, but are not limited to:

- Ensuring that the changes to operational procedures continue to function as planned and achieve greenhouse gas reductions/removals
- Ensuring that the measurement and calculation system and greenhouse gas reduction/removal reporting remains in place and accurate
- Checking the validity of all data before it is processed, including emission factors, static factors, and acquired data
- Performing recalculations of quantification procedures to reduce the possibility of mathematical errors
- Storing the data in its raw form so it can be retrieved for verification/audit
- Protecting records of data and documentation by keeping both a hard and soft copy of all documents
- Recording and explaining any adjustment made to raw data in the associated report and files
- A contingency plan for potential data loss

5.4 Liability

Offset projects must be implemented according to the approved protocol and in accordance with government regulations. Alberta Environment reserves the right to audit offset credits and associated projects submitted to Alberta Environment for compliance under the *Specified Gas Emitters Regulation* and may request corrections based on audit findings.

6.0 References