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End-to-end sustainability

Enabling Offsets at scale in Ontario's Agricultural Sector

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INTRODUCTION

Ontario's commitment to reducing GHG emissions in the province will require significant efforts from regulated industries and other sectors to achieve the ambitious reduction targets. As such, GHG offset credits may provide a necessary bridge for industry to make a cost effective transition to cleaner activities while incenting other unregulated industries to develop through carbon revenues. The agricultural community has the potential to be an important contributor to addressing climate change however in order to do so, the system needs to be designed in such a way as to enable broad participation.

This paper explores the design elements and regulatory framework necessary to enable the agriculture community to make a meaningful contribution towards addressing climate change through participation in a market-based offset system.

Ontario has set ambitious goals to reduce greenhouse gas pollution by 15 per cent below 1990 levels by 2020 and 80 per cent by 2050. In order to help achieve its long-term targets Ontario committed to reduce emissions by 37 per cent below 1990 levels by 2030. The most recent national inventory of greenhouse gas (GHG) emissions indicates that GHG emissions for the province of Ontario totalled 171 million tons in 2014[1].

The Ontario government has undertaken a number of initiatives to help meet its goals including signing a memorandum of understanding (MOU) with Quebec and California, highlighting the urgency of accelerated global action to reduce greenhouse gas emissions and address climate change.

Ontario has also undertaken numerous actions within its borders to reduce its greenhouse gas emissions. Since 2005, Ontario's electricity sector saw its emissions decrease by 23.6 Mt (68%)– largely due to the closures of coal-fired electricity generation plants. By the close of 2013, all but one of these had been taken out of service (Thunder Bay).[3, 4, 5]

In the spring of 2015 Ontario announced its intention to create a Cap & Trade system. Ontario expects the cap and trade to reduce the amount of greenhouse gas pollution in the atmosphere. A market-based carbon compliance system which includes the use of carbon offset credits will provide regulated facilities with flexibility in meeting compliance with GHG regulations while allowing non regulated sectors to pursue opportunities to reduce their emissions. Not only is this approach internationally supported as a cost effective way of achieving climate change objectives, offsets provide an incentive for the development of greener technologies and industrial processes in the province.

[1] Canadian National GHG Inventory: 1990-2013 (http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/8812.php)

ESSENTIAL OFFSET CRITERIA

An offset credit is generated by unregulated actions which result in emissions reductions that go beyond what would have happened in the absence of the project. With appropriate rules and guidelines, offsets are a low cost method of making a meaningful contribution towards reducing global emissions. In order for an emissions reduction to be recognized as an offset credit, the reductions are subject to a number of eligibility criteria which not only ensure the integrity of the reductions, but also define the conditions under which these reductions may be considered an offset which can be applied towards meeting compliance with regulations. These criteria set the foundation for market design.

Real	Offsets must represent real emission reductions that have already occurred (i.e., the reduction is not projected to occur in the future) Offset reductions or removals must be quantified using accurate and conservative methodologies that appropriately account for all relevant greenhouse gas sources and sinks and leakage risks. All reductions and removals must be supported by sufficient and appropriate evidence that demonstrate the reduction or removal occurred.
Quantifiable	Net emission reductions or removals must be measured or modeled in a reliable, repeatable and consistent manner that includes all relevant sources and sinks. Quantification methodologies for GHG emissions or emission reductions must be appropriate to the GHG source or sink and current at the time of quantification as well as consider local conditions and account for uncertainty. Methods must be done in a manner that yields accurate and reproducible results. The principle of conservativeness can be applied when uncertainty is above the defined threshold.
Surplus to regulation & Additional	Offsets must represent emission reductions that are in addition to what would have occurred otherwise and must be beyond business-as-usual (BAU). Further, the reductions must not be required by law or come from actions covered by cap and trade regulations.
Permanent	Offsets must represent emission reductions that are non-reversible or 'permanent'. In theory, permanence means that if reductions or removals are reversible (i.e. in the case of bio-sequestration), WCI guidelines and policies state the permanence period is 100 years, meaning that the carbon must be sequestered for that time period. In practice, permanence refers to the risk that a carbon removal is reversed at a later date (in part or in full). As a result, offset projects that are based on the biological sequestration of CO_2 require safeguards to prevent or compensate for intentional (e.g. harvesting of trees in a reforestation project) or unintentional (e.g. a forest fire in a reforestation project) reversals that may result in the release of previously sequestered CO_2 back into the atmosphere (Diamant, Weisberg, & Zakreski, 2011). Various reversal and replacement mechanisms have been developed to address this risk and will be explored later in this paper.

Verified by a Third Party	Sufficient data quantity and quality must be available to ensure emission reductions can be verified by an independent auditor against an established protocol or methodology Verifiable means that a GHG reduction or removal, or assertion thereof, is well documented and transparent such that it lends itself to an objective review by a qualified verifier. Third party verification is a vital step in providing certainty of the validity of the offset.
Enforceable	Offset ownership must be undisputed and enforcement mechanisms exist to ensure that all program rules are followed and the program's integrity is maintained

ESTABLISHMENT OF OFFSET QUANTIFCATION PROTOCOLS

PRINCIPLES OF PROTOCOL DEVELOPMENT

Protocols are only as good as the protocol review process. A robust and transparent protocol review process is key to ensuring protocols will meet the regulatory requirements. The protocol development and review process may include a number of features designed to ensure a high degree of integrity is maintained including expert and market engagement, defensible scientific and technical methodologies and best practice guidance, a rigorous peer review process and documented transparency in development stages and final decision making on the part of the regulator.

Uncertainty and accuracy are key principles in protocol development. Quantification methodologies and measurement techniques set the standard for acceptable statistical precision and they must be based on the best available science. Protocols must also reduce bias and promote conservative estimates. When dealing with uncertainty it is necessary to apply the principle of conservativeness which means when uncertainties are above a defined threshold, offset quantification methods should use more conservative quantification parameters, assumptions, and measurement techniques to minimize the risk of overestimating emission reductions and removals. These principles should be employed when significant uncertainties arise to ensure a higher level of confidence that all calculated reductions are real.

In general, protocols are built upon similar core principles, including relevance, completeness, consistency, accuracy, transparency; and conservativeness, as outlined in the ISO 10064:2 process based standard. Protocols must:

- Be scientifically sound
- Be economically viable
- Support aggregation
- Be prescriptive yet flexible

- Be focused on monitoring and measuring the data/activities that results in an emission reduction. (Do not waste time on fluff)
- Be rooted in the reality of on farm emission reductions.
- Developed by people that understand agricultural offsets

A number of factors should be addressed in defining a protocol development, approval, and revision process:

- Government Coordination: The regulator may choose to coordinate protocol development from within Government or open the process to the private sector to create protocols.
- Review Process Coordination: The review process may be coordinated by the regulator or alternatively may be outsourced to a designated entity that is neutral in the marketplace;
- Clearly defined timelines: Timelines of protocol development must be clearly established and communicated. Protocol development times must clearly outline dates which protocol documentation must be submitted, technical reviews/public consultations are to be conducted, and when responses from the regulator can be anticipated. Timelines should be established which ensure an adequate period for development and review and regulators need to ensure necessary resources are addressed. Final approval of protocols by the Government requires discretion with respect to time, particularly if there are outstanding policy issues that need clarification. Where ever possible, it is important to establish and ensure timelines are met.

  Lack of a timely process has been a large criticism of many offset systems. The protocol development process is lengthy and expensive, it is important to give protocol developers confidence in the development process so that they can invest time and money with a degree of certainty.

- Effective technical review process: Technical reviews are important to ensure industry experts are consulted on protocol scope, applicability, relevance, robustness and conservativeness.
- Effective stakeholder review process: Having the broader set of market stakeholders review the technically reviewed document is important. It's important to ensure the verifier community, project developer community, potential purchasers as well as other technical experts can understand and apply the protocol;
- Public review process: Most governments have public review periods for regulatory documents although it can be a challenge to engage the public. Building stakeholder mailing lists and using web-based meetings has been the preferred method with periodic mail outs reminding the public that the document is posted and to review the materials.

In order to encourage expert participation, a number of options may be exercised, Including awarding compensation for the time and resource provided by technical experts; and as exemplified by the CDM development process, a rotating methodology panel, including those persons with a good understanding of the protocol development process, various technologies and related markets, may be established to ensure persons are always available for the review of proposed protocols. Using web-based tools like webinars, wiki sites and online collaboration tools are other mechanisms to facilitate broad scale participation.

- Continuous participation by the regulatory agency: In order to ensure a streamlined offset quantification protocol development process, it may be necessary that representatives of the regulatory agency are aware and actively participating in the development and technical review of quantification protocols. Active participation will ensure the regulatory agency is aware of decisions made by the protocol developers and may facilitate opportunities for the agency to provide feedback along the development process, thereby streamlining the development process.
- The establishment of an official, formal revision process and timeline: Offset quantification protocols are organic, continuously evolving documents which may require frequent adjustments and revisions as the protocol is applied and project specific scenarios are unveiled. As such, protocols which are written as static regulatory documents may inhibit potential projects from being able to quantify emissions reductions, particularly under time-sensitive conditions. A formal timely review process, may prove to be beneficial for long term protocol and project development. Particular project types may be impacted by changing market and regulatory conditions, as such, periodic review processes may be established to ensure protocols continue to remain true to the key principles of the offset system and eligibility conditions.
- Documented Transparency: Transparency in the review process, who was engaged and the decisions made by the protocol committees and regulator is critical to public acceptance and credibility of the Offset protocols. It also enables clear decision-making on the part of the regulator, and minimizes claims of favouritism or industry pressure.

GHG offset quantification protocols provide specific guidance on defining the baseline and project scenarios for an offset project in addition to illustrating the scope of quantification, data management and collection procedures, among other points of instruction. It is against an offset quantification protocol that assertions of emissions reductions are verified and as such must be developed under strict standards. Given the central role quantification protocols play in the generation of offsets, the multiple standards, formats and quantification approaches which may be adopted in establishing these documents requires consideration.

AVOIDED CONVERSION OFFSETS

Generating offsets for new activities that sequester carbon while ignoring the potential release of existing carbon stocks undermines the credit and weakens the 'environmental benefit and co-benefits' associated with crediting carbon sequestration. Allowing the crediting of conservation activities is an important means of enabling continued carbon storage in the landscape. Offset systems can be designed in such a way as to enable ensure additionality, permanence and realness of avoided conversion offsets.

In order to be considered real it must be shown that the identified lands will, at some point in the future, be subject to a legitimate risk of being disturbed, without the protection provided by a 'Avoided Conversion offset' designation. Simply protecting lands is not sufficient to claim an offset as there is no assurance of permanence of the carbon storage. For instance, protecting an existing Provincial park would not pass the test of additionality, as the lands within the park are already protected and, as such, there is no legitimate risk of disturbance in the future and therefore the additionality test is not met. Similarly, private lands where a conservation easement already exists to protect the habitat values would not qualify for a carbon offset.

Avoided conversion offsets can occur on private or public land as long as the offsets meet the test of additionality and permanence. For private land, in most cases, additionality is relatively easy to show, given the rate at which private land has been historically cleared and converted to agriculture or real estate developments (Government of Canada 2011). Without an existing conservation easement there is a legitimate risk that sometime in the future most privately held land will be converted from its native state.

It should be noted that within private land offsets there may still be a requirement for some forms of development (e.g., a private land holder cannot prevent the drilling of an oil well on his/her property, or allow for sustainable levels of livestock grazing). As such, development may occur on an offset; however, the proponent creating the disturbance should be required to offset with double the required offset ratio for the disturbance.

We recommend that an offset system be designed and implemented in such a way as to ensure the integrity of the GHG removals, reductions or avoidances. We recommend the recognition of avoided conversion offsets. Failure to ensure integrity may undermine the objective of reducing greenhouse gases and preclude important political acceptability of the system. Lack of integrity increases the risk to buyers that the offsets will not be accepted by the offset regulator which inhibits the liquidity of the offset market, thereby reducing the compliance options available to regulated emitters and increasing their compliance costs. Lastly, failure to ensure the integrity may prevent acceptance by of offsets by external markets including those which the regulatory body may be trying to establish linkages.

CREDIT OWNERSHIP

Proving clear title and claim to carbon offsets is not always easily achieved. Aggregated projects where many players can be involved – the project developer, the aggregator, the landowner (which may be the government in the case of public lands) and the land manager (lessee) are even more complex. Sequestration projects involving soil or forest carbon can introduce additional risks since the liability for maintaining the carbon in the sink for the specified permanence period must be accountable by someone. As a result, a variety of methods to ensure clear title and claim to carbon offsets have emerged. The circumstances under which ownership can become unclear/contended include:

- an offset project that is operating on public land;
- a project that is implemented on leased land by a lessee and not the land owner;
- a technology service provider that is installing a unit that results in emission reductions (i.e.: energy efficiency gains from the installation of digital thermostats); and/or,
- multiple, unrelated entities that are involved in the lifecycle of the project (e.g. biomass energy generation from the combustion of residues from forest industry activities)

Typically, where two or more parties have claim to the offsets, ownership must be established through contractual agreement between the parties before verifiers in the system can sign off on the GHG claim. For aggregated projects, two models of contract ownership between the project developer or aggregator and the producer of the offsets (i.e. farmer, oil and gas company) can occur – direct purchase of offsets or the project developer or aggregator acting as an agent.

Option 1: Direct Purchase (The project developer or aggregator owns the credits)

In this scenario, the project developer or aggregator purchases the offset credits from the producer. The project developer or aggregator must be able to demonstrate to the satisfaction of the verifier and sometimes the regulator that ownership and title have transferred from the producer of the offsets (e.g., farmer, building owner, oil and Gas Company, etc.) to the aggregator at the time of verification.

Option 2: Agent (The project developer or aggregator acts as an agent)

The project developer or aggregator acts as an agent on behalf of the producer. In this case, the contractual agreement between the producer owner and project developer or aggregator must clearly stipulate the right of the project developer or aggregator to act as an agent on behalf of the credit producer. Title remains with the producer until the offsets are sold to a buyer. The contract should say when and how and by whom payment will be made.

Though these options are different, it is important to understand that credits cannot be bought and sold until after they are verified and serialized. Under Option 1, above, the project developer

or aggregator will purchase the credits at a specific price once they are created. Once sold to the developer the grower has no legal rights to the credits. As a result the project developer could 'flip' the credits to another buyer for a price significantly higher than what was paid for them. Under Option 1, there is a financial incentive for the project developer to purchase the offsets from the grower at a below market price.

Option 2 can be better for the producer as the project developer is usually motivated to sell the credits for the highest price possible in order to maximize their agency fee. Option 2 does have a much clearer ownership path so is often preferred by regulators.

ROLES AND RESPONSIBILITIES OF MARKET STAKEHOLDERS

REGULATOR RESPONSIBILITIES

The regulator develops the regulations and designs the system that enables the market. The regulator also makes key decisions such as the level of verification, registry design, and aggregation. In addition to enabling the market, the regulator is responsible for the development of guidance documents which are key to providing approved and consistent guidance to protocol developers, verifiers, auditors and project developers and are an important piece of information in project design, protocol development, verification and government audits. In order to provide consistency, it is important that these documents undergo minimal revisions over time. In order to provide even more certainty, the government may wish to develop protocol specific guidance, including verification guidance according to each protocol/project type.

GUIDANCE

The regulator is responsible for providing guidance to stakeholders in how to interpret approved materials in the market. Guidance documents are formal, legally binding documents that have been produced to assist stakeholders. Guidance documents typically cover many aspects of the market that are set at a finer level of detail than the regulations - such as, establishing protocols, verification, and project implementation. The guidance documents are intended to provide the operating rules for the market, tailored to specific circumstances (e.g. permanence periods, replacement mechanisms, policy coherence between offset credit generation and other complementary measures to the carbon pricing framework. Guidance documents are not usually enforceable rules or requirements by themselves; they often define standards or expectations which are part of a rule or requirement.

PROTOCOLS

The regulator is responsible for enabling for the development of quantification protocols. Protocols ensure consistency, transparency and market certainty for aspects of GHG quantification, monitoring, reporting and verification. The identification of project types and/or development of approved protocols under Offset Systems provide a signal to project developers as to the eligibility of existing projects or those which may yield offset opportunities in the future.

The regulator may choose to enable the development of protocols by market players or chose to develop protocols itself. If the regulator wants to encourage private development they must have a formal system developed to collect notices of intent to develop methodologies from interested parties. This system is not dissimilar to that which is seen under the Clean Development Mechanism. Alternatively the regulator may choose to 'seed the system' and provide project developers with an initial set of priority protocols. Ontario, with it's Request for Bid released in October 2015 has signalled it will start the system with up to 13 protocols.

BASELINES

The regulator is responsible for determining the appropriate baseline. In quantifying emissions reductions, the baseline condition defines a reasonable representation of conditions that would likely have occurred in the absence of the proposed project. In other words, the baseline represents "business as usual" and the project represents a change from this practice. In order to determine if something is additional, it is necessary to determine what would happen in the absence of the project – the project baseline or business-as-usual.

Baselines can be standardized or specific to the project or a hybrid approach.

Standardized baseline assessments involve using a protocol that defines the baseline or business as usual (BAU) scenario. Assessments may use performance standards (such as, energy consumed per unit of production), emissions factors (i.e.: emissions per unit produced), or common practice (that is, the most commonly used technology or practice in the industry/sector) to identify the business-as-usual case. The recently released Request for Bids (RFB) indicates that Ontario will be developing protocols with standardized baselines.[2]

Project-specific baseline assessments involve the case-by-case examination of offset projects to deem whether a project is additional. Under this approach, a distinct project baseline scenario is identified and any emission reductions beyond the baseline are considered additional.

Adjusted and normalized baseline approaches are an important tool in recognizing activities which may be subject to eligibility constraints to ensure the environmental integrity of emissions

[2] OSS_00553940 Consulting Services – Offset ProtocolsAdaptation for Compliance Markets

reductions from these projects is maintained. In reality, most approaches to additionality assessments are a hybrid of a standardized and project-specific approach, (i.e.: where a project uses a standard baseline coefficient, but also requiring the project activity data to establish the magnitude of the baseline emissions.

PRICE STABILITY MECHANISMS

Through program design, the regulator can set a minimum or maximum price and in doing so has a tremendous amount of influence on the system, including offset supply. Setting a floor price, or a maximum price through policy such as a safety net or access to alternative compliance mechanisms impacts the both the type of offsets generated and the quantity. It is important to consider that setting a maximum price will have a significant impact on the economics of a project – if the cost of generating a tonne from an offset is above a maximum price –offsets will not be generated.

Another price stability mechanism is a strategic reserve where a percentage of total allowances from the cap each year are set aside by the province in a strategic reserve and made available to Ontario emitters at fixed prices to manage price impacts in the event there is high demand for allowances. Under the WCI, Ontario has signalled it will align its price tiers with the price in the joint Quebec-California market for 2017. For Quebec and California, these price tiers were set at $40, $45 and $50 per allowance in 2013, escalating annually at 5% plus inflation and converted to Canadian currency.

A final price stability mechanism can be obtained through limiting the use of offsets thus changing the demand for offsets. WCI recommends limiting the use of offsets for compliance in a cap and trade program and as such both California and Quebec have established an 8% limit on the use of offset credits (i.e., an entity can only use offset credits for up to 8% if its compliance obligation). Limiting the use is based on a WCI recommendation that offsets represent no more than 49% of emission reductions needed to achieve the cap. Ontario has proposed to limit the use of offsets to up to 8% of the total compliance obligation, similar to California and Quebec.

MARKET STAKEHOLDERS

A number of individuals are involved with getting a credit to the market including:

Project Developer - The project developer is responsible for bringing the project and associated reductions to market. The project developer must determine how the project will be implemented against an approved protocol. They are responsible for developing the project monitoring, measurement and reporting systems; project documentation; engaging a verifier, liaising with the registry; negotiating credit transactions and contact person for government

audits. An aggregator is considered to be the project developer for an aggregated project and is responsible for the same activities outlined above.

Aggregator – an aggregator is a person or company that, through contractual arrangement, works with suppliers of small volumes of offset credits established under the same protocol to pool these projects into a sufficiently large volume to manage verification and transaction costs.

Verifier – the verifier is an independent third party that meets the requirements stated in the regulations. The person(s) making up the team must have sufficient qualification to undertake a review of the offset project and associated greenhouse gas assertion. The verifier and their team are key to ensuring the validity of an offsets. Their role is providing independent thirty party review of an offset project including records and project documentation to assess the conformity with regulatory guidance and protocols.

Broker – a broker is an intermediate person that may buy or sell offsets, or bring together buyers and sellers within the offset market. Offset credits may be traded between one or two brokers before being sold to a regulated facility for the purpose of compliance.

Auditor – the auditor is a person or company hired by the regulator to conduct an independent review of the offset project on behalf of the regulator. Auditors must meet the requirements set out in regulations and guidance documents.

RECOMMENDATIONS FOR MARKET INTEGRITY

It is crucial that an offset system be designed and implemented in such a way as to ensure the integrity of the GHG removals, reductions or avoidances. Failure to ensure integrity may undermine the objective of reducing greenhouse gases and preclude important political acceptability of the system. Failure to ensure the integrity may prevent acceptance of offsets by external markets including those with which the regulatory body may be trying to establish linkages.

It is vital to develop a market framework that will allow offsets to be generated in a cost-effective manner. Quite simply, an offset market will not flourish if development costs are too high or opportunity too limited. Protocols need to be economically viable, environmentally credible, verification and registry costs must be reasonable, and aggregated project development must be allowed in order to increase the number of participants in the market.

ADDITIONALITY - START DATE

The start date and the crediting period must be justified and sufficient justification should be provided to ensure the integrity of the offset system and the emissions cap. Identification of a start date must take into account other significant factors such as:

- previous announcements from government of plans to put a price on carbon, and implement an offset system; and/or
- Intention to reward early adopters.

Ontario has announced a start date of January 1, 2017 for the carbon pricing mechanism.

Start dates will affect the ability of parties to participate in the market. Protocol specific adjusted baselines can mitigate the risk of early adopters from being excluded from the market. Penalizing early adopter by failing to recognize the emission reductions from early actions can result in perverse actions.

The use of an adjusted or normalized baseline approach takes into account the current practice levels of a particular project. Based on the practice level, the baseline scenario is "adjusted" or "normalized" to reflect the current level of practice so that emissions reductions which go above and beyond the practice level, or are surplus to the business as usual scenario, can be quantified. For example, an adjusted baseline can be applied to quantify emissions reduction from no-till and reduced-till projects. In this case, the adjusted baseline is applied to all tillage management projects to adjust for the existing level of the various practices.

For example, Alberta's Conservation Cropping Protocol's baseline is developed using sector level performance in 2011 census data and known levels of adoption of reduced and no till agriculture practices. This approach allows all farm operators practicing conservation tillage farming to participate irrespective of the adoption date of the practice change. It does this by assuming all carbon stored prior to 2001 is discounted from 2011 levels and only the new, incrementally stored carbon is eligible for offset credits. This approach means that as adoption levels rise the potential for new carbon sequestration is reduced and the associated emission reduction coefficient and resulting offset credit opportunities are also reduced.

We recommend adjusted baselines be used, where practicable, to enable broader participation and maintain the emission reduction activities being done early adopters.

SURPLUS TO REGULATION & INCENTIVES

If an action is required by law, then it is not eligible to generate a carbon offset. Further, in some systems, if a project developer receives a government grant or incentive, the project offsets are considered non-additional and can be deemed ineligible. We recommend that a distinction on

the type of incentive should be used to clarify whether or not the offsets are eligible in the system. More specifically, a climate change incentive should be defined as those government programs which clearly indicate that the government is providing funding to secure the GHG environmental attributes of the projects. Even those projects receiving climate change incentive should still have the ability to qualify as an offset project; however, the volume of offsets provided to the project would not be the full amount as calculated under the relevant protocol. A pro-rata approach can be taken where by the incentive is compared with the overall cost of the project with the project receiving offset credits relative to the portion of the project that was self-financed with the remaining environmental benefits held by the government. If an incentive is provided and it was not a climate change incentive, then the project should be able to qualify for the full amount of offsets generated by the relevant protocol, assuming the project meets all other criteria.

MATERIALITY

Under the WCI the term "materiality" refers to a threshold beyond which differences in reported emissions/reductions are deemed unacceptable. Material misstatement means that errors, omissions or an aggregation of both in the reported GHG reductions or assertion exceeds a +5% threshold. We recommend for an offset, the verifier must be able to state with reasonable assurance the total reported reductions or removals are free of material misstatement.

It should be noted that one can define material misstatement as errors or emissions resulting in significant overestimates (e.g., +5% only, not ±5%) since underestimates of emission reductions do not harm environmental integrity of the overall program.

FREQUENCY AND TIMING OF VERIFICATION

We recommend the frequency and timing of the verification should be left to the project developer as verification is a substantial cost of emission offsets. The Project Developer should be able to determine when they are ready to make a GHG assertion and claim offsets. It is not practical for all projects to verify annually, and projects may wish to claim offsets every 5 years - this is especially true during the early years of the project.

ENSURING PERMANACE - MANAGING REVERSALS

Sequestration projects must be designed so that the net atmospheric effect of their greenhouse gas removal is comparable to the atmospheric effect achieved by non-sequestration projects. The atmospheric effect will be based on the current international standard established by the UNFCCC, which is currently 100 years. With sequestration projects it is not possible to say with 100% certainty that offsets will be permanently removed from the atmosphere. Therefore a widely adopted mechanism for ensuring permanence of offsets is to monitor for reversals and

replace any reversals. A risk based assurance factor, not unlike Alberta's, is a transparent way of ensuring and demonstrating the permanence of reductions. However, unlike Alberta, it is recommended that these offsets be publically tracked and display the 'pool' of offsets. This will allow the regulator to publically demonstrate the conservativeness of the offset system. It will also enable the regulator to publically correct reversals.

There are two types of reversals: intentional and unintentional. Intentional reversals are actions taken by a landowner or land manager that result in the release of carbon sequestered by the project. Examples of actions that would constitute deliberate reversals are plowing of land to replace perennial grasses with row crops or overgrazing pasture land resulting in degraded pasture grasses. Unintentional reversals are reversals that occur where the land owner or manager could not reasonably be expected to prevent release of sequestered carbon. Examples of unintentional reversals include extreme weather events or fire. Pasture projects present challenges because weather events like extended drought can make pastures more susceptible to overgrazing.

Recommendations by the WCI Offset Committee to ensure offset integrity suggest that with emission reduction reversals after offsets are issued, the project developer must either replace offsets representing reversed reductions with other compliance units from within the system (i.e. if a buffer reserve has been established at the program/policy level, as in Alberta's offset system) or return offsets that were issued to the project (e.g. from their own buffer reserve, or purchase offsets in the market to replace the reversed ones). The number required to be replaced or returned will, at a minimum, be the difference between the atmospheric benefit the sequestration project until it was reversed and the total sequestration for which offsets were issued. Applicable approaches to assuring permanence for a project type will be included in the appropriate WCI offset protocol.

Aligning with WCI recommendations we recommend project developers follow or establish effective (i) monitoring systems, (ii) risk mitigation approaches, and (iii) contingency plans which address how, in the event of a reversal that is the result of proponent intention or negligence, any affected offsets will be replaced. The contingency plan should include specific mechanisms that are exercisable at the time a reversal is identified whether or not the proponent is solvent, exists in its original form, and/or has ownership of or responsibility for the project.

A number of policy approaches have been used in different markets to manage the risk of reversal. Table 2 below presents the most common of these approaches –some applied at the program level through the protocol; others requiring third party providers and others laying the responsibility and risk with the project developer. Often the policy of handling reversals differ based on if the release was intentional or accidental. It might be that an intentional reversal is

handled with a strict financial penalty and repayment of tonnage whereas an unintentional reversal might be accounted for through a buffer pool.

Table 2 Policy Approaches for Managing the Risk of Reversal

Policy Approach	Description	
Account and Replace	Quantification and verification of the reversals is completed; and lost tons replaced by the project developer (e.g. Temporary Offsets)[3].	Clean Development Mechanism (CDM) (Afforestation Methodology)
Buffer Reserve/ Discount Factor	A fixed percentage of the offsets (discount factor to the GHG claim) are set aside and put into a reserve account. The percent allocated to the reserve is established based on a risk assessment for the project. In some cases the risk reserve is held by the regulator in perpetuity; in others a sliding buffer reserve factor is applied based on successful verifications and no reversals and some offsets are returned to the project developer.	Verified Carbon Standard (VCS), Gold Standard, California Air Resource Board (ARB), Alberta Offset System (AOS), American Carbon Registry (ACR),
Insurance	A private insurance carrier insures a project for any reversal events that may occur. Unlike conventional insurance schemes, the sequestered carbon is insured with other carbon credits, not financial capital.	American Carbon Registry

OWNERSHIP TRANSPARENCY

An offset project developer must have legal ownership of the greenhouse gas emission reduction or removal resulting from the offset project. The offset project developer is the party responsible for all statements and information provided to the regulator issuing the offset certificate during the creation of the offset certificate and verification of the reduction or removal. Offsets must also be registered and serialized on a public registry which will allow for transparently tracking ownership.

PROTECTING THE PRIVACY OF PARTICIPANTS

Registration is a key step in developing and maintaining integrity in an offset system. The ability to track ownership is vital to a regulatory carbon market and transparency is key. It is however important to balance the needs of the regulator with the privacy needs of the participants. Therefore not all information should be publically displayed on a registry. For example, aggregated tillage projects require the collection and reporting of substantial personal data including producer name, crop type, acres, legal land location and other information. This data

[3] Temporary offsets are issued and must be re-verified every five years for the credit to remain valid, and when the project ends, or in case of premature losses, these credits need to be replaced by other types of emissions allowances. Because of the complexity and cost associated with this approach, little uptake in projects using Temporary Offsets has occurred.

can be collected by the registry to be available to the regulator and the verifier, but does not need to be displayed. Instead, aggregate data such as acres of production, crop types, etc. should be reported publically for each project. In order to ensure no double selling of offsets, we strongly recommend that the Registry be able to serialize offset credits from sub-quarter section parcels of land. The registry should perform cross-referencing of tonnes of specific vintages from parcels entered into the Registry from multiple project developers to ensure that no double selling has occurred.

LEAKAGE

Leakage occurs when production shifts to a jurisdiction with a less stringent carbon pricing policy and is an important concept of ensuring a real and permanent reduction and must be assessed during protocol development. Offset protocols must evaluate functional equivalence for each project. It is a means of addressing activity-shifting and market leakage by ensuring functional equivalence has been maintained within projects. The regulator should require that offset protocols include methods for leakage assessments. We recommend a quantitative assessment of leakage be performed whenever possible. When a quantitative assessment is not feasible, a qualitative risk assessment will determine whether the risk of systematic leakage is significant or not. If leakage is found to be above the threshold, the quantification methodologies can include a factor to account for leakage.

To address activity-shifting and market leakage, WCI requires assessments of whether functional equivalence has been maintained within projects and require that protocols include methods for leakage assessments. WCI offset protocols follow the ISO 14064:2 approach of evaluating functional equivalence for each project. WCI offset protocols will also require an assessment of potential leakage associated with each project type. We recommend the following as methods to review leakage risk:

- A quantitative assessment of leakage will be performed whenever possible.
- When a quantitative assessment is not feasible, a qualitative risk assessment will determine whether the risk of systematic leakage is significant or not.
- Offset protocols will include a threshold to identify significant leakage. If leakage is found to be above the threshold, the offset protocol quantification methodology should include a factor to account for leakage.

WCI DESIGN ELEMENTS

WCI has developed a number of design features to mitigate market manipulation, reduce administrative costs, support market certainty, and promote transparency for which Ontario will have to comply including:

- **Registration requirements**: Entities covered by the program must submit detailed registration information, including corporate affiliations
- **Auction rules**: Outlines the format of auction process
- **Trade rules**: Provides rules regarding the transfer of allowances between entities
- **Market rules**: Outlines system requirements of purchase limit (total number of allowances that entity can acquire in any one auction) and holding limit (amount of allowances that entity can hold)
- **Strategic Reserve Sales**: Describes how allowances from strategic reserve will become available

MINIMIZING UNCERTAINTY BY PROVIDING STABILITY

The agriculture sector has the potential to make tremendous contributions to reducing greenhouse gases however reducing greenhouse gases will involve investments. Offsets is a way to incent the adoption of new technologies, management practices, activities, etc. and 'offset' the cost. Often the financial benefits associated with an offset are considered in the investment decision. While producers may want to do the right thing and take action it is difficult to justify investments in an uncertain environment. Commitment to activities that reduce greenhouse gases are difficult to justify when there is no long term continuity. Consequently, it is desirable to provide long term certainty to enable investment because short term programs produce short term results – not meaningful change.

Prior to making an investment decision it is necessary to understand the timeframe of the investment and payback. Stability enables project developers to forecast and determine offset yields for a set period of time. To enable a robust market it is necessary to provide project developers with both baseline stability as well as stability of the system. This will provide project developers, investors and purchasers with a project life which will enable them to run a more fulsome analysis of the opportunity. Uncertainty will undermine the system by creating doubt.

PROJECT CERTAINTY AND BASELINE STABILITY

The regulator must consider the business investment side of offset projects. The regulator should set a length of time over which a project developer may apply a given quantification approach to provide some certainty of investment. The regulator may explore providing a guarantee, in the form of baseline stability period, to project developers on the rate of offset creation for a project

over a given time period. This certainty would provide the stability necessary for developers to acquire and retain project financing.

CREDIT LIABILITY MUST BE LIMITED

We recommend placing a limit on invalidation of offsets providing project developers with more certainty and allow credits to hold their value. There needs to be a mechanism to provide certainty to buyers by limiting the timeframe for which offsets may be revoked. California's system has a finite liability on offsets of either 3 years or 7 years however it is not a perfect system. California's system is not conducive to developing offsets from the agricultural sector because of the breadth and depth of the associated policies that have been overlain on carbon offset projects. For example, offsets can be invalidated for OH&S violations including no toilet paper in the outhouse. Project developers in the California system are tasked with ensuring that no laws were violated when the credits were generated. This is an impossible task and verifiers cannot be trained in all aspects of environmental and criminal law.

One method of limiting liability is to certify the offsets.

OFFSET CERTIFICATION

Certification of offsets is based on a number of different activities, similar to a project validation process, by which the regulator (or an approved third-party representative) issues a guarantee on verified emissions reductions. The level of assurance associated with this guarantee may vary, depending on the liabilities which the regulator may or may not want to accrue. For example, the issuance of a certification of a credit as real and compliance worthy by the regulator may result in a transfer of the long term liability of the offset credit, even in the event of a reversal of the GHG reduction, removal, or avoidance represented by said credit (i.e.: permanence of credits from biological or geological sequestration projects).

Certification may provide offset project developers and compliance purchasers with an added level of assurance as to the nature of an offset credit. Certification is associated with a greater level of administrative complexity and a may also lead to implications in regards to liabilities taken on by the regulator. Government certification involves a cursory review of project quantification and verification documentation should the liability risk be assessed as low. A comprehensive review may be conducted for higher-risk projects to ensure liability concerns are addressed.

The certification of offset credits may provide project developers a valuable level of assurance in an often challenging carbon marketplace. Added levels of assurance on the integrity of offsets may promote truer offset commodity pricing to project developers in exchange for reduced risks to offset compliance purchasers.

Although the regulator is faced with an increased liability risk related to the issuance of certified credits, such issues may be overcome by the establishment of a carbon reserve fund to account for potential shortfalls or reversals. Also, the regulator may wish to implement penalty clauses, where project developers, in cases of delinquency or purposefully inaccurate reporting, are fined for their actions.

Reticence on part of Regulators to 'certify' offsets (guarantee them) introduces uncertainty into the market. Market players need assurance that the commodity bought and traded is of value and will not be revoked at a later time. We recommend acceptance of offsets that have received 3rd party verification, undergone a government audit and have been used for compliance as 'certified' – all in the year in which this takes place (i.e. the coincidence of the extra assurance activities occurring all in the same year should provide increased comfort to the regulator). We also recommend that when a project has a positive audit statement by a government auditor, that tonnes be deemed certified.

CONTINUOUS IMPROVEMENT

It is critical that all market stakeholders adopt a philosophy of continuous improvement. Lessons learned must be shared so that the market can learn collectively. It is also important that quantification protocols, relevant emissions factors, and applicable performance standards be review and updated periodically for the following:

- new best practice guidance or scientific information becomes available; or
- New regulations or legislation are implemented which would impact offset eligibility.

We recommend that protocols and projects are locked in for a specified term/crediting period.

OFFSET PROJECT VALIDATION

Validation is a step where an independent third party assesses the project against offset criteria, protocol methodology and system guidance to determine conformity with a system. It can be either required (such as WCI) or optional (such as Alberta's Offset System). According to the WCI Offset Systems Essential Elements Final Recommendations Paper, validation is a required review by an accredited independent third party or WCI Partner jurisdiction to assess the likely result of reductions or sequestration from a proposed project that would use a WCI offset protocol prior to project registration.

An offset project approval process may be implemented by the regulatory agency as an initial screening of projects to provide a level of comfort to project developers and minimize liability to the regulatory authority as to the eligibility of offset quantification from these projects. A validation of project eligibility provides a number of benefits to project developers in terms of

greater confidence in the offset opportunity, however, imposes costs and a number of administrative burdens on the project developer.

Finally, to provide assurance on the feasibility of an offset project at the project design stage, the program or registry may mandate a validation be undertaken[4,] or if not mandated, the project developer/aggregator may voluntarily choose to hire a validator to assess conformance to the protocol and meet the requirements of the GHG Program. Oftentimes, buyers will require that a validation be done as part of their due diligence. In any case, it can be an important risk management strategy for project developers to undergo validation to ensure the methodological, quantification, records and ownership requirements are addressed (See the section below for more information).

The establishment of a validation process, although associated with an increase in cost and administrative complexity in the offset generation process, would provide project developers with an added level of certainty in regards to offset eligibility. An added level of certainty will benefit offset project developers in ensuring the quantification process is correctly applied from the protocol and avoids the expenditure of time and capital when offset eligibility is in fact limited. Also, validation could provide the certainty necessary for the sale of offset futures.

In lieu of risking time delays and added costs of mandating validation we recommend that project developers obtain protocol specific training and certification before they can register a project. Verification would be required to ensure that this certification exists and is valid. See next section.

ACCREDITATION

It is vital that project developers, verifiers and auditors are knowledgeable in the system, verification standards, protocol and subject matter. Standardizing the knowledge base/experience of project developers, verifiers and government auditors as to what sufficient and appropriate evidence is for each protocol will ensure more consistent outcomes. As a result, introducing protocol specific training would improve the knowledge sets that are applied to the verifications and government audits

Accreditation is a means of building confidence in the marketplace by identifying participants who have completed training and have demonstrated competency in the subject matter. In the offset market accreditation builds confidence with all parties that rely upon a GHG assertion or claim (for example, regulators or investors) that the responsible party has the systems in place to manage impartiality and to provide the required level of assurance on a consistent basis.

[4] Validation occurs during the planning stages before the project begins. Often completed by a 3rd party, it assesses the technical calculations for potential GHG reductions and removals, if policy criteria have been followed (permanence, uncertainty, leakage etc.) and whether the necessary data management systems and records requirements are in place for conformance to the protocol.

Accreditation of verifiers and project developers on specific protocols will result in a basic understanding of the protocol and more consistent verification outcomes.

Accrediting Verifiers: Show demonstrated competency in the subject and have systems in place to manage impartiality and provide the required independent level of assurance on a consistent basis. The regulator would be required to release project specific verification guides for each protocol/project type (similar to the information presented in Best Practice Guides) and would publish a list of trained or "preferred" verifiers to the offset community.

Accrediting the Auditors: Show demonstrated competency in the subject and have systems in place to manage impartiality and to provide the required level of assurance on a consistent basis.

The regulator should maintain a publically available list of all accredited verifiers and project developers.

Additionally, project developers can be accredited to demonstrate competency in the subject matter and help ensure they have the appropriate systems in place to provide the required level of assurance on a consistent basis.

In addition to protocol specific training it is critical that verifier firms be accredited to the ISO 14065 standard. Maintenance of this accreditation through the Standards Council of Canada (SCC) or the American National Standards Institute (ANSI) requires verification firms to implement and demonstrate that they are completing and adhering to all ISO 14064-3 requirements as well as the requirements set forth by the greenhouse gas program. The regulator should define specific, minimum requirements for verification and technical expertise that must demonstrated by the verification team. This information would be included in the "Statement of Qualifications", which is currently a generic statement appended to the verification report.

The following five examples of minimum requirements that might be implemented to demonstrate the four areas of technical expertise:

- Data audit practices and data verification standards: the lead verifier must demonstrate audit work conducted for at least ten engagements under two provincial greenhouse gas or air emissions regulatory programs.
- Detailed knowledge of the regulations and associated requirements: the lead verifier must complete verification training developed by the regulator.
- Verification criteria and their appropriate application within the defined scope of the verification: the lead verifier must demonstrate audit work conducted for at least ten engagements under the regulation and have completed verification training developed by the regulator. Additionally, the verification firm must maintain accreditation under ISO 14065, which requires that verification firms maintain systems

- Document the application of verification criteria through documentation of verification risk assessments and verification plans.
- Technical expertise for the sector the audit team plans to operate: The lead verifier must complete the offset project type specific verification training developed by the regulator. Additionally, the verification team must include at least one technical expert who can demonstrate specific technical knowledge related to the offset project activity. This technical expertise should be specified in the offset protocol and may include certification by an industry association such as the Professional Agrologists' practice standards for greenhouse gases or certification as a Certified Energy Manager (CEM) for energy efficiency projects

TIMING OF GOVERNMENT AUDITS

An audit is an additional step that the regulator takes to assess the validity of an offset claim. Audits are important as they give project developers direct feedback on systems and processes that they can improve and let project developers know if they are on track. Information identified in an audit can be used by the regulator to assess performance and identify areas for improvement.

In Alberta's system 3rd party verifications are conducted before offsets are registered. Once registered and serialized, the project developer may sell them and given the short market, buyers are willing to purchase to secure compliance units. Government audits of projects are triggered only after credits have been used to meet compliance obligations and retired from the system. As a result government audits typically take place several years after the project was verified. As there is no obligation for a compliance entity to retire credits within a specified timeframe, there is no limit when an audit might occur. This introduces uncertainty in Alberta's system and changes have been suggested.

The timing and timeliness of audits has direct impacts on the economics of a project. As such we recommend all verifications and audits should occur prior to credit serialization.

Stakeholders identified the following alternative scenarios of audits to be considered to improve the timing of Alberta's government audits and reduce risk to the system. The following should be considered when designing the timing of audits in a regulatory system.

- Require government audits take place concurrently with project verification. Under this scenario a project developer would provide the Regulator with the dates of planned verifications and the government could then assign an auditor to review the project at the same time.

- Give the regulator the authority to conduct an audit once credits are registered as opposed to a system where audits can only be triggered when offsets are used for compliance
- Provide a fixed time frame for government audits (i.e. a project can be subject to a government audit for up to 7 years from the date of project registration)
- Provide a shorter time frame if a project under goes double verification. (I.e. if a project undergoes two third party verifications, the project will be subject to a government audit for up to 3 years from the project registration date.
- Skip 3rd party verifications and go straight to a government audit. This could be done by having the government select the verifier/auditor that a project developer must use.
- Require a second 3rd party verification by a different verification firm for the first project registered by an offset project developer under each protocol. Require that both verifications reach a positive conclusion in order for the project developer to serialize offsets from the project (Double verification is required in some systems such as VCS).

AGGREGATION

There are substantial costs associated with bringing a project to market including validation, registration, serialization, verification – all in addition to project implementation. Aggregation helps overcome this challenge by grouping multiple small and often geographically and temporally dispersed projects together to achieve economies of scale. An aggregated offset project is a collection of small projects that have been grouped together and are using the same protocol to reduce transaction costs and achieve economies of scale for marketing, verification and registration purposes.

The nature of most agricultural offsets (small tonnage) requires aggregation of many small 'activities' into one 'project'. For example, the financial costs associated registering a project for a producer who undertakes no till practices on their operation will not make sense. To reduce the administration costs associated with registering a project, it is often necessary to aggregate many small activities together to reduce the cost per tonne

A wide range of aggregation approaches have been adopted by various markets. Ideally, aggregation should be considered upfront in the design of an offset project since it can fundamentally change the approaches used to qualify and quantify emissions reductions.

Historically, GHG emissions reductions have been generated from large projects that reduce emissions from a single source such as a landfill or large wind farm. Projects like these are critical as they provide significant reductions; however, the number of large projects that can create emission reductions is limited. Nevertheless, there are many small projects and simple activities that can be done by individuals or companies that result in equally important emissions

reductions, albeit on a smaller scale. In many cases these small projects have greater social impact than large projects as more people share in the benefits. Aggregation is the process that allows smaller projects to participate in carbon offset markets and is essential to achieving the economies of scale needed to cost-effectively implement agricultural offset projects. Key benefits of aggregation include the following:

- Aggregation reduces transaction costs – emission reduction registration, quantification, monitoring, additionality assessments and verification (amongst other items) are streamlined, lowering the cost of producing a single ton of emission reductions.
- Geographically and temporally dispersed reductions are enabled – coordinating neighboring farmers/households to participate in an offset project starting and finishing at the same time is impractical. Flexible aggregation programs enable project developers to realize offsets from geographically dispersed farms over time. This removes the barrier of having to know the identity of all the participants before registering an aggregated offset program (Benefits, Existing Methods and Key Challenges to Aggregating Greenhouse Gas Emissions Offsets, 2012).
- The risk to aggregators and their financiers is reduced – the diversity of participants involved in an aggregated project can reduce risk to the aggregator and their financier. For example, under the Clean Development Mechanism (CDM) Programme of Activities (PoA) system, once an aggregation program is created and implemented, additional activities added to the program do not require approval from the CDM Executive Board. Consequently, the regulatory risk that new activities will be delayed, rejected or improperly implemented is reduced, which may create opportunities for project developers to borrow funds against future carbon revenues (Benefits, Existing Methods and Key Challenges to Aggregating Greenhouse Gas Emissions Offsets, 2012). Therefore, aggregation can help reduce financial and other risk to project participants and can help aggregators finance capital costs associated with their offset activities (Diamant, Weisberg, & Zakreski, 2011).
- Aggregation enables new, innovative methods for quantifying offsets and assessing additionality – aggregation can change the way protocols quantify emission reductions and assess additionality. These methods may be more accurate and cost-effective than traditional project-by-project approaches. For example, the inherent structural uncertainty present in biogeochemical process models (which some protocols depend on rather than on-site measurement) can be mitigated. The variability between individual sites is hard to capture in these models and therefore they are not designed for accurately measuring emissions from a single site. Through aggregation certain sources of quantification uncertainty decrease as the number of fields or total acres increase. Furthermore, as done in Alberta, aggregation could enable proportional additionality.

Proportional additionality discounts the amount of offsets based on the project type's level of practice.

- Aggregation helps prevent commercially sensitive information from being tied to a specific producer or field. This is an important consideration in agriculture, where confidential business information requires appropriate protections.

DATA MANAGEMENT SYSTEMS

For the purposes of this document Data Management System (DMS) means the software systems and databases that are used to collect, store, manage data used to develop emissions offsets. It includes all business logic and data logic used to calculate the final emission reductions. Credit creation is an extremely complicated process. A sophisticated data management system is required to generate reductions from projects. In addition to managing the data that is required to demonstrate that an actual emission reduction has occurred, an effective data management system may also manages contracts, distribution of payments, documents, evidence, sales calls, client communications, client specific data, and field agent information, workflow processes, verification, and transaction history (who changed the data).

RECOMMENDATIONS

- Aggregation is considered superior to consolidation. California has a system of consolidation where each farm must have a plan and subsequently hundreds of verifications. Aggregation requires one plan and one verification due to sophisticated data management on the part of the project developer. Aggregation is much more economic.
- Data management is key to ensuring integrity in an aggregated project.
    - Data management systems can be extremely expensive to build. Though stand-alone systems can be done, other options, such as using or leveraging existing systems should be explored.
    - All data should be stored in commercial grade relational databases such as Oracle, SQL Server or MySQL. Servers should be stored in secure data bunkers and must have redundant back-ups and fail over processes. This is also true for all software related to the user interface and automated data collection tools.
    - Business logic and user interfaces should be developed using proven standard technologies and programming languages. Where possible development should make use of existing frameworks to speed development costs and provide certainty in the framework.
    - Systems should be developed using a test driven development processes. Though fairly standard this development process is not followed by everyone. Bug tracking, version control and software versioning must be part of the development processes.

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