Newfoundland and Labrador Offset System Design Report

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Executive Summary

In June 2016, the Government of Newfoundland and Labrador (NL) passed the *Management of Greenhouse Gas Act*. The *Act* requires all facilities emitting more than 15,000 tonnes of CO_2e per year to annually report their emissions; and industrial facilities in the manufacturing, oil and gas extraction, mining and electricity generation sectors emitting more than 25,000 tonnes of CO_2e per year to meet GHG reduction targets.[1] One way that regulated facilities can meet their emission reduction targets is by purchasing carbon offset credits from unregulated sectors. This report, commissioned by the Government of Newfoundland and Labrador, explores key aspects of managing and implementing a carbon offset system.

The report covers the roles and responsibilities of market stakeholders, offset system governance, management and development (including estimated costs associated with in-house versus out-sourced management), essential offset criteria (including the protocol development process), factors that influence market integrity (i.e. additionality, start date, leakage, permanence, verification, auditing, credit certification, validation, aggregation, credit ownership, data management systems) and methods of providing stability for project investment. For each topic, a set of recommendations on how the Government of Newfoundland and Labrador should move forward is provided. At a high level, the project team recommends that the Government and Newfoundland and Labrador develop a framework that:

- Allows offsets to be generated in a cost-effective manner – for both the project developer and the offset system administrator;
- Ensures protocols are economically viable and environmentally credible;
- Supports reasonable verification and registry costs; and
- Allows projects to be aggregated to increase the number of participants in the market.

In the absence of these characteristics, the market will be unlikely to flourish.

A total of 29 recommendations are provided in the report and are summarized below:

Topic	Recommendation
Framework	1. We recommend that Newfoundland and Labrador follow the approach of Alberta, British Columbia and Ontario to remain nimble and flexible based the framework outlined in Figure 2
Stakeholder engagement	2. We recommend that Newfoundland and Labrador take a three-part stakeholder engagement approach involving:

[1] Holyrood Generating Station is exempt at this time.

a. Annual Stakeholder Sessions – to communicate updates, discuss challenges and encourage continuous improvement;
b. Carbon Trading 101 Sessions – to help build understanding of regulatory requirements and project cycles; and
c. Buyers Workshops – to build understanding of carbon trading and associated risks.

3. To maximize outcomes from these recommended session and workshops, we recommend Newfoundland and Labrador consider bringing in individuals from regulated entities, verifiers, and project developers from other jurisdictions with regulated offsets systems in place to share lessons learned.

In-house management vs. outsourcing

Protocol Development:

4. We recommend that Newfoundland and Labrador take a blended approach, where the regulator seeds the initial development of protocols (using a third-party contractor) and then signals to the private sector that they can champion protocol development. The Government of Newfoundland and Labrador has already made a significant investment into the development of three energy efficiency and fuel switching protocols and is, therefore, committed to the first part of this approach. Following initial seeding, stakeholder led protocol development can save costs, while still broadening the market.

5. If this path is chosen, we also recommend that a protocol development guide be prepared by the regulator (using a third-party contractor) and that the regulator vets third party protocol ideas to help ensure the idea meets the requirements of the system, before the protocol developer invests substantial time in its development.

Offset System Guidance:

6. We recommend that Newfoundland and Labrador outsource the develop of offset system guidance, since this guidance is technical in nature and requires specific expertise.

Offset System Management:

7. We recommend that Newfoundland and Labrador provide market support in-house using existing staff where possible and develop its own website to save costs.

Market Oversight:

8. We recommend that Newfoundland and Labrador maintain the role of market oversight to ensure the requirements set out in the *Management of Greenhouse Gas Act* and subsequent regulations are met.

	Registry: 9. We recommend that Newfoundland and Labrador partner with an existing registry provider.
Additionality	10. We recommend that Newfoundland and Labrador require that all projects pass a regulatory additionality test (i.e. projects that are required by regulation or any other applicable laws are ineligible) based on the approaches used in regulated systems in other jurisdictions and, where possible and appropriate, that performance standard baselines be used.
Receipt of government incentives	11. We recommend that Newfoundland and Labrador adopt a pro-rata approach through which a project receives offset credits proportionate to the amount that was self-funded, unless the project developer can demonstrate that there is a specific contractual arrangement between the government funder and project proponent that allows the project to claim offsets using a non-pro rata formula.
Offset system start date	12. We recommend that Newfoundland and Labrador use an offset start date of January 1, 2017 (the start of the next calendar year after the date of first announcement of the approval of the legislation) for projects for which a corresponding protocol exists at the start of the offsets system, and, where an offsets protocol does not exist at the start of the offsets system, a start date no more than three calendar years prior to approval of a protocol by the regulator.
Leakage	13. We recommend that Newfoundland and Labrador require that protocols and project documents are developed in conformance with the ISO 14064:2 standard, including that the protocol development process include an analysis of potential leakage effects (activity shifting and market effects) due to the implementation of projects within the scope of the protocol.
Permanence	14. We recommend that Newfoundland and Labrador implement a program level buffer pool approach where deductions are based on the risk of reversal for the specific protocol. We also recommend that all reversals be quantified, verified and publicly displayed on the registry within a year of their occurrence.
Accreditation	15. We recommend that Newfoundland and Labrador require that organizations providing verification services be accredited to the ISO 14065 standard with an appropriate scope designation for the offset project type subject to the verification.
Reporting and verification frequency	16. We recommend that Newfoundland and Labrador not establish a requirement for the minimum length of the offset reporting period, but set a maximum reporting period of two years to provide flexibility for smaller

	projects while ensuring that projects are regularly reporting and subject to verification.
Maximum successive verifications	17. We recommend that Newfoundland and Labrador establish a limit on the frequency of verifications equal to a maximum of six of the most recent nine project reports to provide flexibility for project developers and manage conflict of interest due to familiarity.
Offset project auditing	18. We recommend that Newfoundland and Labrador retain the authority to audit any project for up to seven years after the project reporting period, that the audit process consist of a complete secondary verification conducted by an independent verification firm, that the costs associated with audits be paid for by the regulator, and that the regulator make a final determination of action required for any and each identified issue or conflict.
Offset certification	19. We recommend that Newfoundland and Labrador avoid assuming any liability for revocations or reversals of offset credits through certification of offset credits.
Validation	20. We recommend that Newfoundland and Labrador require project validation for all projects, that validation be conducted by an accredited validation body, that the requirement for an on-site visit be outlined in each offsets protocol that may be developed based on anticipated project types and complexity, and that a formal acceptance process be established to ensure that all required documentation has been submitted, a check that the validation body is in good standing with its accrediting organization and that the validation body has managed conflict of interest through the validation process.
Aggregation	21. We recommend that Newfoundland and Labrador ensure that the protocols that are developed, as well as the registry, enable aggregation. 22. In addition, we recommend that Newfoundland and Labrador work with project developers and aggregators to encourage them to engage in best management practices to minimize verification risks associated with aggregation.
Data management systems	23. We recommend that Newfoundland and Labrador work with project developers to set expectations regarding data management and ensure that data management systems maintained by project developers can accommodate the necessary information to implement projects in Newfoundland and Labrador (given the capital and operational requirements that may be present in local projects).

Credit ownership	24. We recommend that Newfoundland and Labrador include a section in a general guidance document for project developers that outlines ownership related benefits and complexities. 25. In addition, we recommend that Newfoundland and Labrador work with project developers to ensure that ownership issues are effectively addressed in contractual arrangements that may be established between parties in an offset project.
Registry Design and Administration	26. We recommend that Newfoundland and Labrador: • Pursue a ready-made approach by partnering with an existing service provider (e.g. APX or Markit, CSA). • Pursue a 'one stop compliance window' that would integrate an offset registry and performance credit registry. • Complete a technical and detailed risk assessment that considers e-commerce, cyber security and other property rights legislation (such a review is beyond the scope of this study), prior to entering into a service contract with a service provider
Project certainty and baseline stability	27. We recommend that Newfoundland and Labrador wait until the Pan-Canadian Framework Offset Initiative complete their work to assess the approach for project certainty and baseline stability. 28. We also recommend that Newfoundland and Labrador, with respect to sequestration projects, work with local experts in the province to determine the equilibration timeframe for each sequestration project type during protocol development processes.
Credit liability	29. We recommend that Newfoundland and Labrador place a limit of eight years on invalidation of offsets to provide project developers with more certainty and allow credits to hold their value. We also recommend that this values be reduced to three years if a project undergoes a second full verification.

1.0 Introduction

In June 2016, the Government of Newfoundland and Labrador (NL) passed the "*Management of Greenhouse Gas Act*" to regulate greenhouse gas (GHG) emissions.[2] The *Act* requires all facilities emitting more than 15,000 tonnes of CO_2e per year to annually report their emissions (except for the Holyrood Generating Station); and industrial facilities in the manufacturing, oil and gas extraction, mining and electricity generation sectors emitting more than 25,000 tonnes of CO_2e per year to meet GHG reduction targets. In Newfoundland and Labrador, industrial facilities include The Iron Ore Company of Canada (IOC)/Rio Tinto, North Atlantic Refining Ltd (NARL), Corner Brook Pulp & Paper Limited (CBPP)/Kruger Inc., Vale (two facilities), and any other current or future industrial facilities that meet or exceed the 15,000 and 25,000 tonnes of CO_2e thresholds, respectively, in the *Act*. Offshore petroleum facilities are outside the jurisdiction of the province to regulate.

The *Act* provides multiple compliance mechanisms including payment into a Greenhouse Gas Reduction Fund (like Alberta's Technology Fund), purchase of carbon offset credits and/or generation of emission reductions on site. Given this, the Government of Newfoundland and Labrador needs to design and develop a robust system to facilitate reduction activities that is cost competitive and practical.

In November 2016, the Government engaged Viresco Solutions, Brightspot Climate and the Climate Action Reserve to assist in this process by providing technical expertise based on experience designing and implementing offset systems in other jurisdictions. Specifically, the project team was asked to complete a scoping exercise and provide costed recommendations on optimal offset design elements, including the administration and management structure, to ensure Newfoundland and Labrador's offset system is robust, transparent, efficient and effective.

An offset credit or "offset" is an emission reduction generated by actions that occur beyond the boundaries of a regulated facility, allowing more cost-effective reductions to be obtained and encouraging non-regulated sectors to contribute to the emission reduction target. In Canadian regulated carbon offset markets[3], emitters who have a legal obligation to reduce their emissions may purchase regulatory compliant offsets to achieve their compliance obligations.

The following report outlines critical aspects of offset system design and presents recommendations for how Newfoundland and Labrador should move forward. The report starts by providing some background information on Newfoundland and Labrador's planned offset system and other comparable Canadian systems. It then outlines essential offset criteria as a foundation for all subsequent topics. Subsequently, the report looks at offset system development and management components, including the protocol development process, registry operations, technical guidance provisions and offset system

[2] A copy of the *Act* can be found at http://www.assembly.nl.ca/legislation/sr/statutes/m01-001.htm
[3] Quebec, Alberta, Ontario and British Columbia (Government Only).

oversight. These components can be managed either in-house or outsourced. There are pros and cons of both approaches, which are discussed. In addition, it is important to note that the Government of Newfoundland and Labrador will not directly fund offset projects; however, Government will fund administration functions and provide market regulatory oversight for private sector activities.

The next section of the report discusses the components of offset systems that help ensure market integrity, including additionality, leakage, permanence, regulator accreditation, certification, governmental audit, validation, start date, aggregation, ownership and data management systems. Each of these components is described in detail along with the project team's recommendation for the Government. Finally, the report concludes with a discussion on project certainty, offset certification, baseline stability and credit liability.

2.0 Background and Context: Newfoundland and Labrador

As stated above, in June 2016, the Government of Newfoundland and Labrador (NL) passed the *Management of Greenhouse Gas Act*. The *Act* requires all facilities emitting more than 15,000 tonnes of CO_2e per year to annually report their emissions and industrial facilities in the manufacturing, oil and gas extraction, mining and electricity generation sectors emitting more than 25,000 tonnes of CO_2e per year to meet GHG reduction targets.

Similar to GHG legislation in other jurisdictions (such as Quebec, Ontario and Alberta), regulated facilities have the flexibility to reach compliance using several different mechanisms. Specifically, regulated facilities can make on-site improvements (such as reducing stationary combustion, on-site transportation, venting, fugitive and flaring emissions), purchase carbon offset credits from unregulated sectors and/or pay into a greenhouse gas reduction fund (i.e. purchase "fund credits"). Furthermore, regulated facilities that exceed their targets through on-site improvements can generate "performance credits".

The Office of Climate Change within the Provincial Government is currently in the process of establishing standards for the development, quantification and verification of GHG emission reduction (offset) projects. In this process, it is important that unique aspects of Newfoundland and Labrador's local situation be considered. First, there are a limited number of regulated facilities (six or fewer are anticipated in the near term) in Newfoundland and Labrador that may seek offset credits for compliance. Given this and the fact that utilization may vary year to year, Newfoundland and Labrador's offset system must be set up, implemented and administered in a way that minimizes costs (mindful of existing fiscal challenges in the province), but does not compromise environmental integrity or the potential to link with other jurisdictions in the future. Second, although no formal studies have been completed, it is anticipated that the demand for offset credits may exceed available supply in the medium to long term. This may be the case due to Newfoundland and Labrador's previous actions that

have reduced emissions, such as shifting to electricity sources that will be 98% emissions-free by 2020 and deploying methane capture and destruction infrastructure at the province's largest landfill. Table 1 below summarizes some of the key components of Newfoundland and Labrador's planned offset system, in comparison to other Canadian offset systems.

Table 1: High Level Comparison of Canadian Offset Systems

System Component	Newfoundland and Labrador	British Columbia	Alberta	Ontario	Québec
Act(s)	• Management of Greenhouse Gas Act (2016)	• Greenhouse Gas Reduction Targets Act (GGRTA) (2007) • Carbon Tax Act (2008) • Greenhouse Gas Industrial Reporting and Control Act (2016)	• Climate Change and Emissions Management Act (2007) • Bill 20 - Climate Leadership Implementation Act (2016)	• Climate Change Mitigation and Low-carbon Economy Act (2016)	• Section 46.5 of the Environment Quality Act (2009-chapter Q-2)
Regulation(s)	• In development	• Emission Offsets Regulation (BC EOR) • Carbon Neutral Government Regulation	• Specified Gas Emitters Regulation (SGER) (2007)	• Regulation 144/16: The Cap and Trade Program (2017) • Regulation 143/16: Quantification, Reporting and Verification of Greenhouse Gas Emissions (2017)	• Regulation respecting a cap-and-trade system for greenhouse gas emission allowances
Description	An offset market requiring large emitters (emitting more than 25,000 tCO_2e/year) to reduce emissions (Government of Newfoundland and Labrador, 2016).	Offset market created to enable public service carbon neutrality and to develop offsets for a future industrial Cap and Trade program that would cover large greenhouse gas emitters (over 25,000 tCO_2e/year) in the province; coupled with a tax on certain fuels (Government of British Columbia, 2017).	An offset market that requires large final emitters (emitting more than 100,000 tCO_2e/year) to reduce emissions; coupled with a levy on certain fuels (Government of Alberta, 2007).	Western Climate Initiative cap and trade program that regulates emissions from facilities and natural gas distributors with emissions of 25,000 tCO_2e or more/year. In addition, fuel suppliers that sell more than 200 litres of fuel per year and electricity importers are required to	Western Climate Initiative cap and trade program that regulates emissions from facilities and natural gas distributors with emissions of 25,000 tCO_2e or more/year. In addition, fuel suppliers that sell more than 200 litres of fuel per year and electricity importers are required

System Component	Newfoundland and Labrador	British Columbia	Alberta	Ontario	Québec
				participate (Government of Ontario, 2017).	to participate (Government of Quebec, 2017).
Reduction Target	Economy wide target of 10% below 1990 levels by 2020.	Reduction of at least 33% below 2007 levels by 2020 and 80% below 2007 levels by 2050.	A reduction by December 31, 2020 of specified gas emissions relative to Gross Domestic Product to an amount that is equal to or less than 50% of 1990 levels.	A reduction of 15% below 1990 levels by the end of 2020, a reduction of 37% below 1990 levels by the end of 2030 and a reduction of 80% below 1990 levels by the end of 2050 (with a starting cap set at 142,332,000 tCO_2e in 2017).	A reduction of 20% below 1990 levels by 2020. A notice of the caps is published in the Gazette officielle du Québec each year. The cap is set to decrease annually at an average rate of 4% a year to help Quebec achieve its 2020 GHG emission reduction target (when the cap is set at 54.74 million tCO_2e).
Number of Regulated Facilities	Six or less in the near term	N/A – British Columbia's regulation only applies to government facilities at this time.	106	140 (Greenhouse Gas Emissions Reporting by Facility, 2017)	93 (EDF, CDC Climat Research, Caisse des Depots Group, & IETA, 2015)
Compliance Options	Internal reductions, performance credits, purchase of carbon offset credits or payment into a greenhouse gas reduction fund (i.e. fund credits).	Internal reductions and/or carbon offsets.	Internal reductions, performance credits, purchase of carbon offset credits or payment into the Technology Fund. During the early days of the system there was no limit of offset use. Starting in 2018, 30 per cent of a facility's	Internal reductions, purchase of carbon credits (including early reduction credits) or purchase of emission allowances. The total quantity of offset credits that the emitter may use to cover the GHG emissions of its covered	Internal reductions, purchase of carbon credits (including early reduction credits) or purchase of emission allowances. The total quantity of offset credits that the emitter may use to cover the GHG emissions of its covered establishment cannot exceed 8%

System Component	Newfoundland and Labrador	British Columbia	Alberta	Ontario	Québec
			compliance obligation can be met through the use of compliance credits (i.e., Emission Offsets and Emission Performance Credits).[4]	establishment cannot exceed 8% of the GHG emissions to be covered for the compliance period.	of the GHG emissions to be covered for the compliance period.
Start Date[5]	TBD (See Section 6.2)	Actions taken after November 29, 2007	Actions taken after January 1, 2002	Actions taken on or after January 1, 2007	Actions taken on or after January 1, 2007
Crediting Period	TBD (See Section 7.0)	Up to 25 years for sequestration projects and up to 10 years for other types of projects with the possibility of an additional 10-year extension.	Eight years with the possibility of an additional five-year extension.	Tentatively, up to 30 years for sequestration projects and up to 10 years for other project types (however, this could change).	10 years except where specified (Regulation section 70.2). Quebec ODS projects have a crediting period of 5 years.
Additionality Approach	TBD (See Section 6.1)	Barriers testing approach combined with an analysis of services provided by the baseline vs. the project. All baselines must reflect regulatory and other legal requirements.	Assessed at the protocol level. In some protocols, performance standard baselines are used to enable an activity (e.g. conservation cropping). All baselines must reflect regulatory and other legal requirements.	Offsets can only be created for the portion of GHG reductions, avoidances or removals that would not have happened under the baseline scenario. The method of determining the baseline is described in each protocol. All baselines must reflect regulatory and other legal requirements.	Offsets can only be created for the portion of GHG reductions, avoidances or removals that would not have happened under the baseline scenario. The method of determining the baseline is described in each protocol. All baselines must reflect regulatory and other legal requirements.

[4] http://aep.alberta.ca/climate-change/guidelines-legislation/specified-gas-emitters-regulation/documents/DMLetter-AllocationSystems-Mar03-2017.pdf

[5] Please note that start date should not be confused with crediting period. The start date is the date after which project activities are eligible for credit generation. Often the start date for crediting is earlier that the start date for the system to avoid penalizing early adopters.

System Component	Newfoundland and Labrador	British Columbia	Alberta	Ontario	Québec
Verification Requirements	TBD (See Sections 6.5-6.6)	Required – verification bodies follow the criteria established by the act, regulation and protocol to review a project.	Required – third party ex-post verification is completed by a qualified Professional Engineer or Accountant.	Required – Must be conducted by a verification organization accredited under ISO 14065 by a member of the International Accreditation Forum in Canada or the United States and according to an ISO 17011 program, with respect to the sector of activity for the project.	Required – Must be conducted by a verification organization accredited under ISO 14065 by a member of the International Accreditation Forum in Canada or the United States and according to an ISO 17011 program, with respect to the sector of activity for the project.
Validation Requirements	TBD (See Section 6.9)	Validation bodies follow criteria established in the act, regulation, and protocol to review the project. Successful validation provides assurance from an accredited third party that the project plan is fair and reasonable.	Not required	Required	Required
Offset System Administration	TBD (See Section 4.0)	In-house	Currently, managed in-house. Outsourced to Climate Change Central from 2007-2014.	In-house	In-house
Registry Operations	TBD (See Section 4.6)	BC Carbon Registry – (Public View:	Outsourced to a third party – CSA Group (https://www.csaregistries.ca/	Compliance Instrument Tracking System Service (CITSS)	Compliance Instrument Tracking System Service (CITSS)

System Component	Newfoundland and Labrador	British Columbia	Alberta	Ontario	Québec
		https://mer.markit.com/br-reg/public/bc/index.jsp)	albertacarbonregistries/eor_about.cfm)	(https://www.wci-citss.org/) combined with an online registry that will be developed by The Ministry of the Environment and Climate Change.[6]	(https://www.wci-citss.org/) combined with an online registry run by the Quebec Government (http://www.mddelcc.gouv.qc.ca/changements/carbone/credits-compensatoires/registre_creditscompensatoires-en.htm)
Notes:	Newfoundland and Labrador's offset system is in development. A set of protocols is currently being created.	British Columbia's offset system has been operating since 2008; however, the regulation currently only applies to public entities.	Alberta's offset system has been operating since 2007; however, is currently in the process of being reviewed.	Ontario's offset system is relatively new and still in development. Ontario intends to link with Québec and California.	Québec is linked with California and will be linked with Ontario in the future as part of the Western Climate Initiative.

[6] Please note that the difference between CITSS and a registry is CITSS is designed to facilitate the holding, transferring and retiring of compliance instruments (allowances) in WCI jurisdictions. The information in CITSS is considered market-sensitive and therefore is not publicly accessible. Given this, a public online registry specific to each province is also needed. These registries have public information on offset projects, credits issued, and entity-level reporting.

3.0 Roles and Responsibilities of Market Stakeholders

Prior to presenting the details of offset system development and management, it is important to define the various stakeholders involved. These stakeholders are as follows:

Project Developer - The project developer, as the name implies, is responsible for developing the offset project per an approved protocol. Project development includes: implementing measurement, monitoring and reporting systems, managing project documentation, engaging a validator (if needed), engaging a verifier, liaising with the registry, negotiating credit transactions and responding to government queries or audits. Currently, there are no known project developers in Newfoundland and Labrador or in Atlantic Canada. However, once the market is operational, project developers from other jurisdictions as well as Newfoundland and Labrador are expected to emerge, as they have in other markets.

Aggregator – An aggregator is an entity that acts as the project developer of an aggregate project and is responsible for the same activities outlined above in the project developer description. An aggregated project is a collection of several small-scale offset projects established under the same protocol. For example, several tillage reduction projects from multiple farms may be grouped to form an aggregate project. Aggregation, through contractual arrangement, enables small, geographically dispersed emission reduction projects to become feasible[7] by lowering the transaction costs associated with verification and generating emission reductions at a volume and price that will be of interest to regulated industrial facilities (i.e. buyers).

Validator – A validator is an independent third-party that reviews the offset project report to assess the project prior to its implementation. The validator evaluates the project plan for the emission sources, sinks and reservoirs; quantification methodologies; measurement and monitoring plan; and quality assurance/quality control plan. The criteria for this evaluation typically include the offset system requirements (regulation and guidance, if applicable), and approved protocol. The validator's opinion is detailed in a validation statement that de-risks the project for the project developer (see Section 6.9 for further information).

Verifier – A verifier is an independent third-party that reviews the validity of an offset project and its associated greenhouse gas assertions. The verifier assesses how well the project conforms to the programs verification criteria which include the regulation, regulatory guidance

[7] Please note: Newfoundland and Labrador is currently in the process of developing a set of energy efficiency and fuel switching protocols, for which aggregation will likely be needed.

and the protocol. Due to the importance of the role, regulations in other jurisdictions establish specific requirements, which may include specific professional qualifications for verifiers (Professional Engineers or Chartered Accountants) or accreditation of the verification body. Again, based on the best available information, there are currently no verification bodies based in Newfoundland and Labrador or Atlantic Canada. However, verification bodies typically travel to multiple jurisdictions to verify projects and as such availability of verification services is not anticipated to be an issue. Verification is discussed in more detail in Sections 5.5 and 5.6.

Auditor – Some offset programs audit projects in addition to the standard verification process. An auditor is a person or company hired by the regulator to conduct an independent review of an offset project verification on behalf of the regulator to provide assurance that the emission reductions are real. In other jurisdictions, auditors must meet the competence or professional designation requirements set out in the regulations (e.g. P.Eng or CA). Audits are discussed further in Section 5.7, including the potential costs to the regulator.

Regulator – Depending on the offset system design, the regulator may manage the provision of guidance, development of protocols and operation of the registry, among other tasks. Additional details on the potential roles of the regulator are provided in the section on Offset System Development and Management.

Figure 1 below provides a summary of regulator and stakeholder responsibilities.

Responsible Party	Regulator	Project Developer / Aggregator	Validator	Verifier	Auditor	Regulated Industrial Facilities
Activity	Approves protocol Serializes offset credits Respond to queries Build capacity amongst stakeholders Provide technical guidance	Develops project according to protocol Implements measurement, monitoring and reporting systems Gathers supporting documentation Develops project plan and compiles report Engages verifier Registers verified offsets Negotiates credit transactions Responds to government queries or audits	Assesses project against offset criteria, protocol methodology and system guidance to determine conformity	Verifies offset credits and project eligibility	Completes independent review on behalf of the Regulator	Purchases offsets

Figure 1: Summary of Stakeholder Responsibilities

4.0 Offset System Governance, Management and Development

A rigorous offset is created through an aligned relationship of *Acts*, regulations, protocols and technical guidance. Figure 2 illustrates this relationship. Most carbon offset programs, including regulatory systems in other provinces, follow the ISO process-based standard known as ISO 14064:2, which provides a set of tools for programs to quantify, monitor, report and verify greenhouse gas emissions. This standard can be customized to fit the Offset System requirements, defined in regulations and guidance (e.g. protocol documents and potentially a technical document to help interpret the regulations), that are unique to Newfoundland and Labrador. Alberta, British Columbia and Ontario retain flexibility in their systems by establishing authorities in regulation, but keeping precise parameters out of the regulations such as specific emission factors, crediting periods and protocols. Quebec embeds protocols within their regulation which has proved to make management of their system cumbersome when updates or revisions are needed, particularly now that they are aligning with Ontario and California.

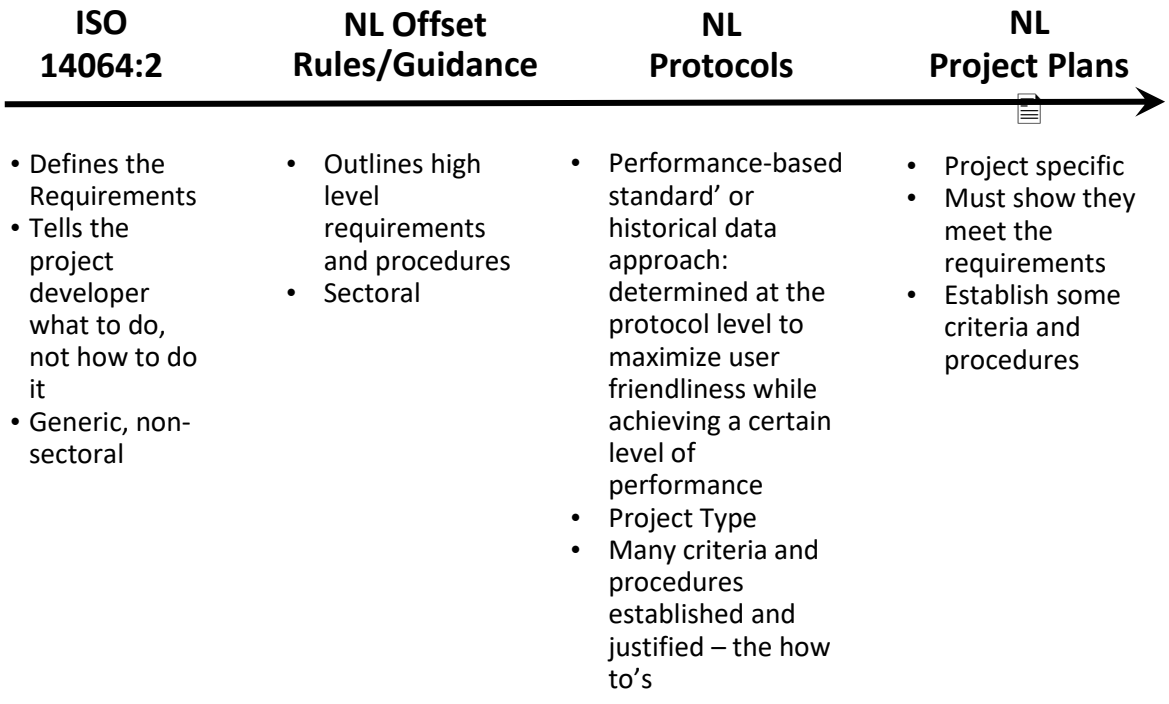


Figure 2: High Level Framework for Offset Development

As the components shown in Figure 2 are developed (from left to right), project developers will increasingly have clarity and alignment on the offset system. In addition, there will be complete

regulatory and technical documentation, leaving them only responsible for project documentation, monitoring and reporting. This will provide certainty and minimize risk in the offset system.

Guidance documents typically include protocols used by project developers. A separate guidance document may also be produced by the regulator to help stakeholders interpret offset system rules and regulations. Guidance documents aid users in understanding and implementing the regulations, but do not establish parameters beyond those stated in the regulations. Guidance documents, including protocols, typically outline the operating rules for the system, such as permanence periods, reversal replacement mechanisms (See Section 6.4), record storage, grid displacement factors, crediting period and other measures related to the offset system in a manner consistent with regulatory provisions. For example, regulations may provide authority for the minister to establish a grid displacement factor; however, because this factor may differ from location to location or over time, the regulation itself may not set out the precise grid displacement factor to be used. Table 2 below provides an overview of where details on key aspects of existing Canadian offset systems can be found (i.e. in an Act, Regulation or Guidance document).

Table 2: Location of Key Aspects of Existing Canadian Offset Systems (Act, Regulation or Guidance)

Offset Component	British Columbia	Alberta	Ontario	Québec
A = Act, R= Regulation and G = Guidance				
Economy Wide Emission Reduction Target	A	A	A	A, R (published in an Order)
Compliance Options	A	R	R	R
Start Date	A	R	G	R
Validation	A, R	NA	TBD	G
Verification Requirements	R	R	R	R
Additionality Approach	R	G	G	R
Audit Approach	R	R	R	R
Protocols	G	G	G	R
Credit Ownership	R	A	TBD	R

At the highest level, an offset system can be managed in one of two ways – it can be managed in-house or outsourced to a third party such as to another province or to a voluntary carbon offset vendor; however, before one can discuss the management of a system, it is vital to understand the components

of an offset system. This section describes key aspects of offset system governance and management prior to comparing the benefits and challenges of in-house management versus outsourcing. The section concludes with a set of recommendations for Newfoundland and Labrador that draws on lessons learned from past programs.

Recommendations:

1. ***We recommend that Newfoundland and Labrador follow the approach of Alberta, British Columbia and Ontario to remain nimble and flexible based the framework outlined in Figure 2.***

4.1 Offset System Oversight

The Regulator is responsible for overseeing the entire offset system, including ensuring offset projects conform with the regulation.[8] Thus, the Regulator should periodically review regulations and carry out regular audits to ensure offsets meet requirements. While not directly involved in the purchase or sale of credits, the Regulator is responsible for general oversight of offset credit transactions. In the case of Newfoundland and Labrador, an offset system will be established through regulations pursuant to the *Management of Greenhouse Gas Act.*

4.2 Provision of Ongoing Technical Guidance

Clear and ongoing communication with the offset community is necessary to ensure the smooth operation of the offset system. For example, the Regulator will be required to respond to technical and business inquiries in a timely manner on an ongoing basis. This may include responding to requests for flexibility in protocols, clarification of requirements (both system and project level), and participation in protocol development. Proactively reaching out to the offset community in the form of updates helps ensure transparency. To effectively address these inquiries, program staff will be needed. An estimate of the number of staff needed is provided in section 4.5 below.

4.3 Engaging with Stakeholders – Building Capacity

Lessons learned from other jurisdictions emphasize that when implementing an offset system, continual engagement by the Regulator with stakeholders is critical. In Alberta, after each compliance period is over and government audits on the verified projects are complete, the province holds major 'post mortem' one-day sessions where all stakeholders are invited to come and learn important updates and challenges occurring with all aspects of the system. These sessions are useful in that they provide an important two-way communication avenue that:

[8] The regulator is not responsible for determining the extent to which regulated industrial facilities use offsets, which projects are approved and the purchaser price for offsets. The regulator also does not receive offsets funding from regulated industrial companies to disperse.

- Shares what is working well, based on material findings from government audits (generalized so as not to identify a single project);
- Clarifies misinterpretation of guidance or protocols through open dialogue;
- Signals policy or technical changes to aspects of the offset system to give stakeholders enough lead time (e.g., a year in advance) and gain feedback; and
- Provides registry updates and notifications (Registry is further discussed in Section 4.6).

The focus of the post-mortems is largely regulatory in nature and organized by the regulator. Third party delivery agents are also invited to present on the challenges and opportunities encountered in the past year and gather feedback from stakeholders. When third party delivery agents are seen standing side by side with the regulatory team, addressing the audience, it solidifies their standing with the offset community. These regular sessions are an important aspect of the continual improvement cycle and help build resiliency into the market. We recommend that Newfoundland and Labrador commit to hold these important post-mortems.

Additionally, we also recommend a parallel initiative to build understanding within the offset community about the project cycle, including all aspects of timing, risk management, commissioning, legal, emission purchasing agreements, verification, etc. In Alberta, these sessions were called 'Carbon Trading 101' and over the first few years of the system, sister Departments, such as the Department of Agriculture or Department of Energy and third party delivery agents were involved in scheduling these training workshops throughout the province. Offset projects were a new undertaking that involved skillsets beyond regular project management cycles and it was important to build capacity and understanding. A mock trading exercise was incorporated into these Carbon 101 workshops so stakeholders could understand the regulatory requirements, potential offset yields[9], risk factors, term sheets[10], negotiations and other aspects, for the emerging commodity. After having gone through a workshop, most stakeholders thought that offsets were much like the traditional markets they operated in, 'demystifying' carbon offsets and carbon trading in general.

A third item that Newfoundland and Labrador could consider is 'Buyers Workshops'. These occurred about two years into the Alberta Offset System (circa 2009). The large final emitters in Alberta's regulatory market vary from large trans-national companies to smaller single facility installations across a variety of sectors. The larger corporations have teams of greenhouse gas management staff who understood the fundamentals of the offset system and due diligence processes; while many of the smaller companies struggled to understand aspects of carbon trading. In these smaller organizations, Environment, Health and Safety staff were often responsible for offsets. The buyer workshops were

[9] The volume or number of tonnes of CO_2e generated.

[10] A term sheet is negotiated between the seller and purchaser and defines the price and volume of the offsets being sold and any other deal considerations.

effective in building understanding of the offset project cycle, risks, etc. and the larger corporations were willing to share their expertise as speakers and lead break-out groups to help the smaller corporations. We recommend Newfoundland and Labrador consider bringing in officials from corporations in other jurisdictions to speak to some of the regulated facilities' key people to streamline the learning cycle.

Recommendations

2. ***We recommend Newfoundland and Labrador take a three-part stakeholder engagement approach involving:***
    a. ***Annual Stakeholder Sessions – to communicate updates, discuss challenges and encourage continuous improvement;***
    b. ***Carbon Trading 101 Sessions – to help build understanding of regulatory requirements and project cycles; and***
    c. ***Buyers Workshops – to build understanding of carbon trading and associated risks.***
3. ***To maximize outcomes from these recommended session and workshops, we recommend Newfoundland and Labrador consider bringing in individuals from regulated entities, verifiers, and project developers from other jurisdictions with regulated offsets systems in place to share lessons learned.***

4.4 In-house Management

Each of the offset system components described above can be completed in-house or outsourced. The balance between the two is typically decided based on the level of direct day-to-day control desired by the regulator, the level of anticipated activity (i.e. number of projects, anticipated number of user interactions), options to partner with other jurisdictions on certain administration aspects (e.g. registry operations), cost considerations and the openness of the potential third party delivery entity to accommodate Newfoundland and Labrador regulatory requirements within its existing structure. Regardless of the level of in-house management or outsourcing, the regulator is responsible for overall management and accountability of the offset system, limiting the degree to which out-sourcing can be used.

When Alberta's offset system launched, it outsourced much of the work to a trusted third party – Climate Change Central (C3). C3 was a non-profit organization that worked in partnership with the Government of Alberta at an arm's length to deliver Alberta's Offset System. C3 worked closely with the Regulator to develop protocols and other guidance and infrastructure, such as the registry, to support the offset system. For six years, C3 provided market support, website development and hosting, protocol facilitation and registry operations. In 2014, when C3 terminated, all market support and protocol work was brought back into the government and Registry operations were contracted to CSA. Similarly, in British Columbia in 2013, the PCT, which was a Crown Corporation established in 2008 and

ceased operation and transferred responsibilities to the Government of British Columbia's Climate Action Secretariat in 2014, was responsible for procuring offsets for British Columbia's "Carbon Neutral Government" regulation. The British Columbia government modified its legislative approach in 2014 and now requires the Director (appointed by the Minister of Environment) to establish emission reduction protocols that are to be used for regulatory purposes, including the government's continuing carbon neutral regulation. The Climate Action Secretariat is currently working to revise the protocols previously developed by the PCT to meet new legislative and regulatory requirements. No protocols have been approved by the Director to date. The Pacific Carbon Trust was eliminated and the province's greenhouse gas program brought back into the government fold.[11] Ontario will launch its offset system with 14 protocols, which are currently being developed by a third party.

Table 3 below summarizes the high-level information about Canadian registries.

Table 3: Canadian Registry Statistics

Registry Info	Alberta	British Columbia	Quebec	Ontario
Service Provider	CSA Group	Markit	in house	TBD
# of Accounts[12]	68	22	4	TBD
# of Projects	229	19	11	TBD
Linkage			Ontario, California	Quebec, California

The costs associated with implementing an offset system largely result from staffing requirements; however, if the regulator chooses to audit verified projects, this can further increase costs[13]. Estimated costs of in-house and outsourced management are presented in Tables 3 to7 below, including upfront costs, operating costs, administration costs and monitoring and enforcement costs. Upfront resources required for system development are anticipated to be significantly greater than those needed for longer term management of the system. Total in-house staffing for Newfoundland and Labrador's system is initially estimated to be 3.25 full time equivalent positions (FTEs) based on a one year development period prior to implementing the system, 2.5 FTEs in the second year and 1.95 FTEs in each subsequent year that the offsets system is operational, although these resource requirements could vary depending on decisions made the Regulator.[14] Total development costs, excluding the development of a public registry but including existing internal staffing resources, are estimated to be between $470,000 and $565,000 to set up the system, depending on whether further protocols are

[11] Only one protocol has been brought forward from the PCT and it still has not been approved by the Government of BC.
[12] Account holders may include regulated entities, project developers and aggregators. Regulated entities must hold an account to demonstrate ownership of an offset credit. I.e. a regulated entity has an account on a registry to publicly show the offsets they hold and transparently show offsets retired.
[13] Due to fees associated with contracting verification firms for government auditing. A government audit can cost approximately $20,000-$50,000 per audit depending on the complexity and size of the project.
[14] Please note that the cost of 1 FTE was estimated to be $100,000/year including employment related costs.

initially developed ($180,000 of this total has already been incurred), and total operational costs are estimated at $250,000 in the second year and $195,000 annually in subsequent years, largely due to projected incremental staffing resource requirements. Registry development costs are discussed in section 4.5. The annual operational cost estimate assumes three to five offsets projects are implemented annually. It should also be noted that the level of resources required during the operation of the system may vary significantly, depending on the actual level of demand for offsets versus projected demand, and may vary during the year, depending primarily on regulatory timelines and deadlines. This challenge may be addressed by employing external service providers that have greater flexibility to manage resources, especially if the external provider is contracted to manage multiple greenhouse gas programs.

Table 4: Estimated In-House Management Costs of Offset System Operation (excluding registry development costs)

Market Element	Activities	Development Costs	Annual Operational Resources
Fixed Set Up Costs	Establishing market design and rules; infrastructure and protocol development. Includes internal staffing as well as contracts related to offset system development, offset system guidance, protocol development and protocol guidance.	Offset system development review (contract): $50,000 (already incurred) Offsets system guidance to stakeholders (contract): $40,000 Protocol guidance (contract): $25,000 Energy-related protocols $80,000 (already incurred) Further Initial protocols (contracts): $100,000[15] (pending available funding) 1.5 FTE (internal cost): $150,000 (33% already incurred)	0.5 FTE (continuous improvement to guidance) $50,000

[15] Please note that the cost of developing protocols varies significantly depending on the protocol type and whether a similar protocol already exists that can be adapted. The range in cost can be $20,000 to $250,000. However, on average it is approximately $100,000. For reference, energy protocols are amongst the most straightforward and lowest cost to develop.

Market Element	Activities	Development Costs	Annual Operational Resources
Administration	Reporting, databases and internal reviews	0.5 FTE (internal cost) $50,000	0.5 FTE $50,000
Monitoring and Evaluation[16]	Reviewing compliance obligations and submissions	0.5 FTE $50,000	0.25 FTE $25,000
Enforcement	Implementing audit program	N/A	0.5 FTE in first year and 0.2 FTE in subsequent years $50,000, followed by $20,000/year
Operating Costs – Market Support and Facilitating Infrastructure	Providing the tools and information necessary for delivering ongoing guidance and outreach, capacity building and providing clarification as needed	0.25 FTE (internal cost) $25,000 Plus, internal costs (if any) of website development[17]	0.25 FTE[18] $25,000
Registry	Registry development and operation	0.5 FTE (internal cost) $50,000	0.5 FTE (internal cost) $50,000
Total FTE		**2.75 FTE (in-kind)**	**2.5 FTE, followed by 1.95 FTE**
Total Labour Cost		**$275,000 (internal)**	**2nd year - $250,000 Subsequent Years - $195,000 (includes internal costs of up to $75,000)**
Total Cost		**$470-565,000**	**2nd year - $250,000 Subsequent Years - $195,000**
Development Costs Already Incurred		**$180,000**	**$0**
Development Costs to be Incurred in Future		**$340-435,000**	

[16] Staff time is required to review submissions by regulated entities to ensure compliance obligations have been met.
[17] Website development refers to the development and maintenance of a website that provides stakeholders with the most up-to-date information. This may include publishing protocols and providing information on provincial and national policy frameworks (including policy updates). It does not include costs associated with development or operations of a registry.
[18] Please note: these costs could potentially be absorbed into existing budgets. However, an internal cost is assumed here.

The following sections outline the cost of outsourcing specific offset functions identified in Table 4 through a contractual arrangement with a service provider, including market support and website development.

Out-Sourcing Market Support

Market support includes time spent responding to phone calls and emails and assisting offset stakeholders in navigating through the offset system. Support includes responding to inquiries including general offset questions regarding the offset systems rules, guidance and protocols through e-mail, telephone or in person. Estimated costs of outsourcing market support are provided in Table 4. The expected labour needs associated with market support are small and therefore the costs are relatively low. These costs should be viewed as initial approximations, subject to the ability of Newfoundland and Labrador to identify and contract with a qualified service provider, and decisions made regarding system design.

Table 5: Estimated Costs of Outsourcing Market Support

	EXPECTED TIME RANGE AND BUDGET	
	Anticipated Scope	Exceptional*
TASKS		
Labour Hours per Month	4	6
Total Hours per Year	48	54
Total Annual Cost[19]	**$5,760**	**$6,480**

*Exceptional implies a higher than average month – such as during months leading up to the compliance deadline. Annual exceptional scenario is assumed to be three months at 6 hours per month and 9 months at 4 hours per month.

Out-Sourcing Website Development and Maintenance

This function includes developing and maintaining a website that provides stakeholders with the most up-to-date information. This may include publishing protocols under development or already approved by the government, and providing information on provincial and national policy frameworks (including policy updates). It does not include costs associated with development or operations of a registry. Table 5 summarizes the estimated costs of outsourcing website development and maintenance.

[19] Outsourcing fees based on a $120 per hour consulting fee.

Table 6: Estimated Cost of Outsourcing Website Development and Hosting

	EXPECTED TIME RANGE AND BUDGET	
	Anticipated Scope	Exceptional*
TASKS: Web Updates		
Website Development (one time cost)	$15,000	$25,000
Labour Hours per Month		
Updated or new protocols	1	1
Policy frameworks & updates	2	2
Ensuring all links are 'live'	1	1
Continuous improvement	1	1
Hours per month	5	5
Total Hours per year	60	60
Year One Total Cost[18]	**$22,200**	**$32,200**
Annual Costs Years 2+	**$7,200**	**$7,200**

*Exception implies a higher cost of website development

4.5 Partnering with an Existing System

Section 4.4 explored the cost of developing a system internally. Another alternative to developing an offset system is to partner with an existing system (i.e. Quebec, Ontario, Alberta, British Columbia or one of the nongovernmental entities working in voluntary markets) or service provider that offers services to these systems, in part or in whole. Partnering with other systems may be attractive to Newfoundland and Labrador given its small size, both in terms of regulated facilities and expected activity level. In doing so, the regulator may have to agree to adopt some of the existing set of rules from the other system (depending on the system it decided to partner with), while maintaining responsibility for overall accountability of the offset system. For example, the Western Climate Initiative has specific guidelines for full partnership; however, if Newfoundland and Labrador was only interested in a partnership arrangement, whereby outsourced resources are shared (for example registry services with Alberta), there would be greater flexibility. While this is an emerging policy area in Canada, when contracting out administration and management to an existing regulatory system in full, it would be expected that the existing offset system administrator would be responsible for setting the rules, reviewing and approving project types, issuing credits, and oversight and enforcement of the program while accommodating for any specific Newfoundland and Labrador regulatory requirements that may be established. Given the importance of this role, if this route were taken, it is vital to ensure the potential partner organization is well vetted. Things to consider include:

- Alignment of core principles (additionality, baseline, quantification, etc.) and process based standards (e.g. ISO 14064 Part 2 and 3);

- The existing "pipeline" of projects in the partner jurisdiction (A high project count provides stability);
- Existing infrastructure in the partner jurisdiction (e.g. partner jurisdiction has the staff, IT, etc. necessary to support the system);
- Scope of system and protocol methodologies;
- Transaction costs; and
- Type of registry.

Comparison of Management Costs

Outsourcing the management of an offset system can potentially be completed at a lower cost; however, not all tasks can be outsourced – there is still a need for in-house regulatory oversight, including administration, monitoring and enforcement. There are minimal savings associated with out-sourcing infrastructure-related operational costs. Table 8 below compares in-house vs. out-sourced offset system management costs. With respect to out-sourcing, Table 8 does not include any management fees that may be charged by a partnering jurisdiction for delivery of Newfoundland and Labrador's offset system.

Table 7: Comparison of In-House vs. Out-Sourced Offset System Management Costs (Excluding Fixed Set Up Costs)

Market Element	**Description**	**Annual Operational Resources**	
Continuous Improvement	Continuous improvement to guidance	0.5 FTE $50,000	
Administration	Reporting, databases and internal reviews	0.5 FTE $50,000	
Monitoring and Evaluation	Reviewing compliance obligations and submissions	0.25 FTE $25,000	
Enforcement	Implementing audit program	0.5 FTE in first year and 0.2 FTE in subsequent years $50,000, followed by $20,000/year	
Total In-House (note: the above items should not be outsourced)		**2nd year - $175,000 (1.75 FTE)** **Subsequent Years - $145,000 (1.45 FTE)**	
		In-House Operation	**Out-Sourcing Operation**
Operating Costs – Facilitating Infrastructure	Market support and website development and hosting	0.25 FTE $25,000	$12,960-$15,840*
Total Cost **(note: annual cost of items that may be out-sourced)**		**$25,000**	**$12,960-$15,840**

* Based on the anticipated scope scenarios presented above

Recommendations: In-House Management versus Outsourcing
Recommendations on in-house management versus outsourcing are as follows:

4. ***Protocol Development: We recommend that Newfoundland and Labrador take a blended approach, where the regulator seeds the initial development of protocols (using a third-party contractor) and then signals to the private sector that they can champion protocol development. The Government of Newfoundland and Labrador has already made a significant investment into the development of three energy efficiency and fuel switching protocols and is, therefore, committed to the first part of this approach. Following initial seeding, stakeholder led protocol development can save costs, while still broadening the market.***
5. ***If this path is chosen, we also recommend that a protocol development guide be prepared by the regulator (using a third-party contractor) and that the regulator vets third party protocol ideas to help ensure the idea meets the requirements of the system, before the protocol developer invests substantial time in its development.***
6. ***Offset System Guidance: We recommend that Newfoundland and Labrador outsource the develop of offset system guidance, since this guidance is technical in nature and requires specific expertise.***
7. ***Offset System Management: We recommend that Newfoundland and Labrador provide market support in-house and develop its own website.***
8. ***Market Oversight: We recommend that Newfoundland and Labrador maintain the role of market oversight to ensure the requirements set out in the Management of Greenhouse Gas Act and subsequent regulations are met.***
9. ***Registry: We recommend that Newfoundland and Labrador contract with an existing registry provider.***

4.6 Registry Support

This section addresses the costs of developing and administrating a registry, including developing and maintaining IT infrastructure, staffing and ongoing operational costs. It also addresses the potential for cost recovery of registry operations, which is typical in offset systems, through which offset project developers would be required to pay fees for different types of transactions such as project registration and credit serialization. In other jurisdictions, cost recovery has been shown to be easier from a logistical and public perception standpoint for an external service provider than a government department.

IT Infrastructure Costs

IT infrastructure is the largest cost component for a registry. Table 6 below outlines the range of IT infrastructure costs that may be incurred for a design-build registry. The cost of the IT infrastructure for an offset registry is directly related to the level of security built into the system. A security risk

assessment should be conducted early in the system design stage to identify potential risks and to establish a feasible mitigation strategy. Typical system and security risks include financial risk (e.g. theft of credits), reputational risk (e.g. following errors by the administrator) and operational errors.

A typical offset registry IT risk mitigation strategy likely includes:

- Fixed IP addresses
- Use of SSL to protect communications
- Database and application backup
- Disaster recovery plan
- Security plan
- Application logging documentation
- Time validation plan
- Version change management
- Open source code (can be vulnerable to hackers)

The cost of each risk mitigation item should be balanced with its associated risk. The lifespan of the offset registry should also be considered in this analysis.

The development of the IT component of a registry includes:

- A work plan and user focus groups to identifying desired functions and workflow. Developers must work closely with the Regulator to ensure that expectations and requirement are met.
- Substantial programming, including:
    - Development of serialization engine;
    - Development of database to house user accounts and projects; and
    - Development of database to track and display credits and other project information
- The establishment of a secure e-commerce website, accessible 24/7
- Beta testing and launching the system

Staffing Costs

After the development cost, staff costs represent the second highest cost component of a registry. Figure 3 below illustrates the complex nature of general registry administration.[20] Management of a registry includes the operational management (delivering the tasks required to display and track information) and the business management (revenue, contracting, etc.) as well as supporting processes such as IT, legal and finance. Operational processes can be outsourced to qualified third parties including customer support and oversight and system operations.

[20] Figure reproduced from Partnership for Market Readiness, 2016 represents general registry function.

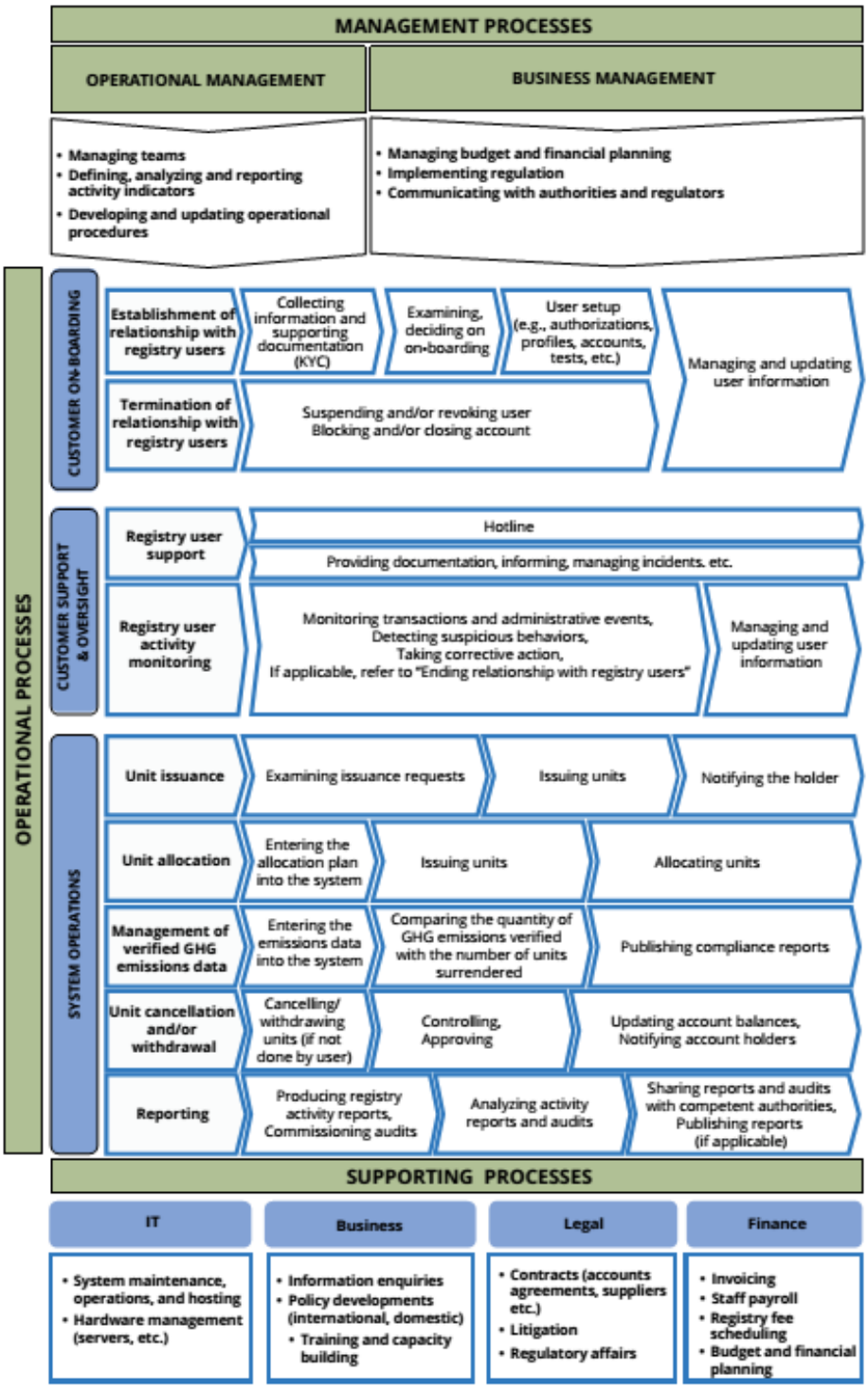


Figure 3: Registry Administration

Registry duties outlined in Figure 3 are completed by the registry operator. These duties can be contracted to a third party or completed in-house. It should be noted Department support is still needed even if registry duties are contracted to a third party – including contract administration, legal, oversight.

Trained staff must be available to respond to requests. Staffing duties consist of:

- Managing day-to-day operations of the registry, including supporting stakeholders and addressing questions related to project processes, such as registry operation, account creation and project registration;
- Screening project submissions for completeness (all required components are completed)
- Assessing project information submissions for alignment with system rules (submitted document meet the expectations of the system – e.g. sufficient and complete information);
- Executing requests as required (e.g. credit serialization, transfer, retirement); and
- Compiling statistics as required.

Registry staff are expected to demonstrate the following competencies:

- Good interpersonal skills
- Organizational skills
- Knowledgeable of regulatory systems, offsets and protocols
- IT competencies

Operational Costs

Additional operational costs associated with registry development and operation include licensing fees and website hosting.

Registry Costs Comparison

A comparison of the cost associated with a ground up build and the costs associated with partnering with an existing service provider are explored in Table 8. Total fees associated with ground up development range from $345,000 to $620,000 for the development of IT infrastructure. Additional operational fees include $10,000 per year for a website (licensing fees) plus additional 0.5 FTE (estimated at $50,000) to host and administer the registry.[21] Staffing requirement for a registry with limited activity would be limited.

The cost of contracting with an existing registry is likely to be substantially less than developing a new unique registry system. Contracting with an existing registry service provider will expedite the launch of the registry and reduce overall operating costs. Unfortunately, costs cannot be estimated as they depend on the service provider, customization, contractual arrangements, regulatory requirements and

[21] Suggest administrative duties be assigned to an existing staff member.

tonnage serialized. Contractual arrangements are usually based on a revenue sharing premise. Namely the partnering registry receives a share (typically between 5-10%) of registry fees. However, if the expected size of the offset market is small, a flat fee may be required by the Registry service provider. Full time staff may not be required, as a contracting organization can provide staffing. If a flat fee is required, then it would be payable by the Government through the contractual arrangement.

Table 8: Comparison of Registry Costs

	Tasks	Fees Associated with Ground Up Development and Administration of Registry	Fees Associated with Registry Development and Administration through contract with Service Provider
Set-up costs (e.g., software development and hardware)	Work Planning (Identifying desired functions and workflow)	$50,000-$100,000	Customization Fee unknown. *Costs will depend on the service provider, customization, contractual arrangements, regulatory requirements and tonnage serialized*
	Development of Serialization Engine	$25,000-$50,000	NA
	Development of Database to house Projects	$100,000-$200,000	NA
	Development of Database to Track Credits	$100,000-$200,000	NA
	Set up of secure e-commerce website accessible 24/7	$50,000	NA
	Beta Testing & Launch	$20,000	NA
Staffing	Outlined Above	0.5 FTE ($50,000)	FTE may not be required as staffing can be provided by contracting organization and remunerated through registry fees
Operational	Licensing Fees	NA	5 – 10% of registry services revenue (credit issuance fees, etc.), may entail additional flat rate if offset system is expected to be very small. User fees and revenues are discussed below.
	Website Hosting	10,000	

Tasks	Fees Associated with Ground Up Development and Administration of Registry	Fees Associated with Registry Development and Administration through contract with Service Provider
Total	**$405,000 to $680,000**	**Unknown**

4.7 Out-Sourcing Protocol Development Support

Protocol development is a task that can be separated from the overall management of a system as well as registry. Protocol development is a task that can easily be contracted to a third party, not unlike the current contract to develop 4 protocols. This task presumes that protocol development continues to occur after the initial development period for the offsets system. As such, the costs outlined in this Section are not included in Table 3 above. It also presumes that stakeholder groups initiate protocol development processes and provide funding for core tasks such as provision of technical expertise. This task involves supporting third party working groups by facilitating meetings and providing context and comments on draft documents. This assists the regulator by ensuring the development of a rigorous, regulatory compliant protocol while minimizing costs. Skilled facilitation of working group meetings and documenting discussions will enhance transparency. These tasks can be contracted on a protocol by protocol basis to ensure wise use of resources. It should be noted that Newfoundland and Labrador does not expect to engage in significant protocol development; and interest by stakeholder groups will be dependent on the identification of offset opportunities by these groups. Estimated costs of protocol facilitation are included in Table 9.

Table 9: Estimated Costs of Outsourcing Protocol Facilitation

TASKS	EXPECTED TIME RANGE AND BUDGET Per protocol	 Exceptional*
PROTOCOL REVIEW – Labour Hours		
Identifying & contacting working groups members	2	4
Organizing working group meetings and conference calls as necessary	1	2
Facilitating working group meetings	4	30
Documenting meeting notes	5	35
Preparing summary documents of discussions, decisions and assumptions to provide a foundation for protocol revisions	6	15
Posting documents on website	2	4
Hosting and holding stakeholder review meetings	$6,000	$6,000
Documenting review meeting notes	5	35
Preparing summary documents of review discussions, decisions and assumptions to provide a foundation for protocol revisions	6	15
Hours per protocol[18]	31	140
Cost	**$9,720**	**$22,800**

* Exceptional protocols may require extensive pre-work and sub working group meetings and reviews. Each protocol is different and there are exceptions to the average time. In some cases, there may be additional pre-meeting preparation required, and multiple meetings of working, and sub-working groups.

5.0 Essential Offset Criteria

Offset systems stimulate sustainable development by providing a financial incentive to reduce emissions, while also providing a mechanism to generate greenhouse gas reductions at a lower cost. With appropriate rules and guidance, offsets can make a meaningful contribution towards reducing a jurisdiction's emissions[22]. For an emission reduction to be recognized as an offset, the reduction must meet several eligibility criteria to ensure its integrity. These criteria are foundational aspects of any offset program and, therefore, set the context for the remainder of the report. The most common general eligibility requirements are described in Table 10 below. At a high level, GHG reductions and/or removals must be quantified using accurate and conservative methodologies that account for all relevant GHG sources, sinks and reservoirs. This is discussed in more detail later in the report.

Table 10: Offset Eligibility Requirements (Adapted from ISO 14064)

Eligibility Requirement	Description
Real	All reductions and removals require sufficient and appropriate evidence to 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; they must account for uncertainty, consider local conditions and be current at the time of quantification. The methodology must also yield accurate and reproducible results. The principle of conservativeness must be applied when uncertainty is above the defined threshold.
Permanent	In practice, permanence refers to the risk that a carbon removal is reversed later (in part or in full). Reversals are relevant only to carbon sequestration and storage projects, both geological (e.g. carbon capture and storage) and biological (e.g. agricultural tillage and forestry projects). Note: Projects that are based on a reduction of emissions (e.g. energy efficiency improvements, renewable energy, changes in fertilizer application, etc.) rather

[22] Please note that the Government of Newfoundland and Labrador will fund the administration of the offset system. The government will not identify, approve or manage projects. Instead its role is to provide market regulatory oversight for private sector activities. Therefore, it is up to regulated facilities to determine the level of funding for offset projects.

Eligibility Requirement	Description
	than the storage of carbon are always permanent and therefore permanence is not a factor. Offset projects that are based on sequestration or storage of greenhouse gases (GHGs) 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. A permanence period is established by the greenhouse gas program. Various reversal and replacement mechanisms have been developed to address this risk and are explored later in this paper.
Third Party Verification	Third party verification is essential to demonstrate the validity of the offset and is integral to all offset programs. Sufficient and appropriate data must be available to ensure an independent auditor can review the emission reduction against an established protocol or methodology.
Enforceable	Enforcement mechanisms ensure that program rules are followed to maintain program integrity. Clear ownership of offsets is required.
Additional	Offsets must represent emission reductions that result from activities or actions that are beyond regulatory requirements and business-as-usual practices. In other words, the reductions achieved by a project need to be "additional" to what would have happened if the project had not been implemented. Further information on additionality and additionality tests is provided in Section 6.1.

5.1 Protocol Development

An offset project protocol is a standardized document that defines project conditions and activities. These include the baseline and project scenarios, greenhouse gas emission sources, sinks and reservoirs, quantification methodology, eligibility requirements, monitoring requirements, record keeping and documentation, and quality assurance/quality control (QA/QC) processes. Each offset system defines and approves a separate protocol for each distinct project type. Examples of protocol types are included in Table 10 below. Standardized protocols ensure consistency, increase transparency, reduce project

development costs and provide market certainty for aspects of GHG quantification, monitoring, reporting and verification. Once a protocol is approved by the regulator, project developers have greater certainty on the eligibility of the project type that they have identified and/or are pursuing. At the time of writing this report, there are 37 approved and planned protocols in Alberta[23], 22 in British Columbia, five in Quebec[24], and 13 in Ontario[25]. In regulated markets in the United States, there are six Regional Greenhouse Gas Initiative (RGGI) and six California protocols.

Table 11: Example Protocol Types[26]

Example Protocol Types	
Reductions	
Agriculture	• Agricultural Nitrous Oxide Emission Reductions • Emissions Reductions in Dairy Cattle • Reducing Greenhouse Gas emissions from Fed Cattle • Aerobic Composting Projects
Energy	• Acid Gas Injection • Biofuel Production and Usage • Energy Efficiency in Commercial and Institutional Buildings • Diversion of Biomass to Energy from Biomass Combustion Facilities • Energy Efficiency Projects • Engine Fuel Management • Enhanced Oil Recovery • Wind-Powered Electricity Generation • Waste Heat Recovery Projects • Solar Electricity Generation • Low-Retention, Water-Powered Electricity Generation as Run-of-River or on an Existing Reservoir • Non-Incineration Thermal Waste Conversion
Transportation	• Gravel and Lightly Surfaced Road Rehabilitation Projects • Freight Modal Shifting • Substitution of Bitumen Binder in Hot Mix Asphalt Production and Usage
Waste Management	• The Anaerobic Decomposition of Agricultural Materials • Anaerobic Treatment of Wastewater Projects • Landfill Gas Capture and Combustion

[23] http://aep.alberta.ca/climate-change/guidelines-legislation/specified-gas-emitters-regulation/offset-credit-system-protocols.aspx

[24] http://www.mddelcc.gouv.qc.ca/changements/carbone/credits-compensatoires/index-en.htm#current-offset

[25] https://www.ontario.ca/page/cap-and-trade-offset-credits-and-protocols#section-1

[26] Note: The list provided is just a list of potential example protocols. It is important to note that some of these project types would not qualify in certain jurisdictions due to the coverage and/or design of the jurisdictions emission reduction regulations.

Example Protocol Types	
Reductions	
	• Aerobic Landfill Bioreactor Projects
Sequestration	
Forestry	• Afforestation Projects • Forest Carbon Management
Wetlands	• Wetlands Restoration
Agriculture	• Conservation Cropping (no-till)

Principles of Protocol Development

The protocol development and review process should be designed to produce robust and transparent protocols. The process typically involves engagement of subject matter experts and stakeholders, a review of the science and technical methodologies, the development of best practice guidance, public comment periods, final approval by the Regulator, and, most importantly, thorough documentation of the entire process. Detailed records of discussions and protocol versions should be documented throughout the development process in written minutes. Minutes, decisions and discussion papers should all be posted on-line for full transparency. For public posting of draft protocols that have gone through the review process, comments are tracked and responses are generated by the regulator and posted on-line. An approach for documenting comments received throughout the consultation process is presented in Table 12 below.

Table 12: Template for Documenting Feedback and Comments During the Consultation Process

#	Clause / Section Number	Type of Comment (General, Technical, Editorial, Policy)	Comment or Justification for Proposed Wording Change	Regulator Comment / Proposed Change
Technical Review Date and Version of Document				
Stakeholder Review Date and Version of Document				
Public Review Date and Version of Document				

In general, protocols are developed based on the core principles defined in the ISO 14064-2 standard: relevance, completeness, consistency, accuracy, transparency and conservativeness (Table 13). To ensure the implementation of offset projects, protocols should also meet the following criteria (although these are not explicitly required under ISO processes):

- Be scientifically sound;
- Include monitoring, measurement, quantification and reporting requirements that are both practical[27] and economically viable;
- Be prescriptive, yet provide sufficient flexibility to account for special circumstances[28]; and
- Provide concise requirements that facilitate consistent implementation and verification.

[27] For example, in Alberta the Nitrous Oxide Emission Reductions Protocol (NERP) is based on suites of management practices, streamlining the quantification, monitoring and verification of the protocol.

[28] For example, in Alberta implementation of the Nitrous Oxide Emission Reductions Protocol (NERP) allows project developers to use one of three baseline approaches, some of which use default data. This gives farms lacking three years of historical data the opportunity to participate.

*Table 13: ISO 14064-2 Core Principles**

Core Principle	Description
Relevance	The sources, sinks and reservoirs identified for the GHG quantification methodology (project and baseline scenarios) are relevant to the intended user and activity. A lifecycle approach can be used in the identification of GHG sources, sinks and reservoirs that are considered for quantification, monitoring and reporting.
Completeness	The GHG quantification methodology must include all relevant GHG emissions and removals. Information to support criteria and procedures for including or excluding sources, sinks and reservoirs must also be documented.
Consistency	Consistency between GHG quantification methodologies aims to enable meaningful comparisons in GHG-related information, either between projects of a similar nature, or between projects of a different nature.
Accuracy	The GHG quantification methodology must reduce bias and uncertainties to the extent that is practical.
Transparency	Sufficient and appropriate GHG-related information is disclosed to allow the intended user to make decisions with reasonable confidence.
Conservativeness	The assumptions, values and procedures within the GHG quantification methodology ensure that the emission reductions or removal enhancements are not over-estimated by ensuring methods are conservative.

*Adapted from Greenhouse gases - Part 2: Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements (2006).

The Protocol Development Process

A lack of a timely protocol development and approval process has been a large criticism of many offset systems, including Alberta's and California's. The protocol development process is lengthy and expensive. For example, while the cost for protocols can range from $20,000 to $250,000 per protocol (depending on the state of the science and whether an existing protocol can be adapted); on average, they cost approximately $100,000 per protocol. This makes it increasingly important to give protocol developers confidence in the development process. The following components of the protocol development process need to be determined and defined:

- **Development:** The regulator may choose to coordinate protocol development from within government departments or open the process to the private sector. Examples of privately sponsored protocols within a compliance based system are Alberta, and, in 2008-2009,

Environment Canada under the Turning the Corner Policy[29]. The Clean Development Mechanism (CDM), established through the Kyoto Protocol, also welcomes privately sponsored protocols/methodologies as do the Verified Carbon Standard and American Carbon Registry in the voluntary market.

- **Review Process Coordination:** The review process may be coordinated by the regulator, or alternatively, it may be outsourced to a designated entity that is neutral in the marketplace (as with Alberta's outsourcing to Climate Change Central). Ontario and Quebec have engaged the Climate Action Reserve, Viresco Solutions, Brightspot Climate, Cap-Op, Eco-Resources and Green Analytics to adapt protocols and coordinate the review process.

- **Timelines:** Timelines for protocol development must be clearly established, defined and communicated. Protocol development timelines must outline when developers must (1) submit protocol documentation, (2) conduct technical reviews/public consultations and (3) receive responses from the Regulator. This process may range from as low as three months to as high as one year, depending on complexity, stakeholder input and other factors. Timelines should be established to ensure an adequate period for development and review. Regulators also need time to ensure necessary resources are addressed. Final approval of protocols by the regulator requires discretion with respect to time, particularly if there are outstanding policy issues that need clarification (e.g. seeking clarification on existing or developing policy; coordination and review with sister departments depending on the project type).

- **Technical Review Process:** Technical reviews are important to ensure subject matter experts (SMEs) are consulted on protocol scope, applicability, accuracy, relevance, robustness and conservativeness. Given this, a process for completing technical reviews must be established by the regulator. To encourage expert participation, regulators may exercise several strategies, including compensating the technical expert's time, providing resources to the protocol working groups (e.g. webinar access, conference call or online document editing) or having a cadre of SMEs.[30] To ensure expert availability, the CDM process, for example, maintains a rotating panel of individuals with expertise in the review of proposed protocols. Common practice in most regulated systems in Canada is to not compensate subject matter experts. The timelines for completing such work are included in the timelines bullet above.

[29] Teams of working groups were adapting protocols; Environment Canada had issued a list of possible protocols that were to be adapted.

[30] Compensation for experts may include both professional fees and travel; and depending on the extent of consultation it may exceed to $5000 per expert. This cost is not included in the previous estimate of the cost as it is optional.

- **Stakeholder Review Process:** All levels of official market stakeholders[31] should review the technical document to ensure the verifier community, project developer community, potential purchasers and other technical experts can understand and apply the protocol. Most systems use web-based tools like webinars, wiki sites and other online collaboration tools to help facilitate broad scale stakeholder participation and reduce costs.

- **Public Review Process:** All Canadian offset systems have held public review periods for regulatory documents, despite the potential challenges associated with doing this.[32] Stakeholder mailing lists, web-based meetings and on-line posting have been the preferred method to engage the public. Typically, the public review/comment period is 30 to 45 days. The timeframe is decided by the regulator and not specified in ISO guidelines.

- **Regulatory Participation:** To ensure a streamlined protocol development process, the regulator actively participates in the development and technical review of offset project protocols. Active participation ensures the regulator is aware of protocol developer decisions and facilitates opportunities for feedback during the development process.

- **Revision Process and Timeline:** Offset project protocols are organic, continuously evolving documents that may require revisions as the regulatory context changes, scientific updates occur or protocol application unveils project-specific requests for deviation. As such, protocols written as static documents may inhibit future potential projects from being able to quantify emission reductions. A formal, scheduled review process may benefit long term protocol and project development. Changing market and regulatory conditions may impact projects, so periodic review processes are an essential way to ensure protocols remain true to the key principles of the offset system. In addition, several systems (such as Alberta) have a policy whereby external entities can champion protocol revisions. Interested organizations typically initiate this process by submitting an intent to modify a protocol document to the Regulator. Any organization can submit an intent to modify protocol document. In other words, the process is not restricted to the organization that initially developed the protocol.

- **Documented Transparency:** A transparent review process that documents who was involved and what decisions were made is helpful in gaining public acceptance and increasing protocol credibility (see Table 11 above). It also enables the regulator to make clear decisions and minimizes accusations of favoritism or industry pressure.

[31] Stakeholders may include producer associations, industry associations, NGO's, ENGO's, academics, verifiers, technology service providers, industry experts, legal representatives and other government officials, amongst others.

[32] Given the broad nature of opportunities and the financial implications of decisions, it is difficult to please all parties. Criticism of decisions and policies will likely be received.

5.2 Protocol Development Decisions

A robust protocol development process is vital to ensure protocols meet the requirements of the system. Protocol development/authoring and facilitation (process) can be handled in-house or contracted out to qualified third parties. Several decisions must be made regarding how protocol development is handled. Two important approaches are outlined below.

1. *Regulator or Third Party Protocol Development* - Protocols can be brought forward and championed by the regulator or by third parties such as a regulated facility, industry association or community group. Protocol champions are the sponsor of the protocol. They 'hold the pen' and pay for the development of the protocol and prepare the associated required documents. Often, allowing the private sector to bring forward protocol ideas results in much greater innovation and attracts investment to the province.
    a. In-house: When the regulator is the champion, they decide which project types to develop protocols for. In-house protocol development is costly and involves facilitation staff as well as subject matter experts to compile and analyze information and draft the associated protocol. As noted above, the cost may range from $20,000 to over $250,000 per protocol; however, generally averages approximately $100,000.
    b. Third Party: When protocols are brought forward and championed by third-parties, the cost to the regulator is greatly reduced. Newfoundland and Labrador may consider following the California Air Resources Board model of only allowing an existing voluntary or compliance-based protocol to be brought into the system to save costs. Either way, having a third-party gather the information and science; and justify and record the process through transparent documents saves costs. The regulator only needs to participate during appropriate points in the review process such as the stakeholder, interdepartmental and public posting review stages. It is critical that the regulator communicates protocol development expectations and vets' ideas early to ensure that neither time nor assets are wasted. Given this, the regulator should develop a protocol development guide to outline expectations. As noted above, the cost of developing a protocol development guide to the regulator would be approximately $25,000.
2. *Regulator or Third-Party Protocol Facilitation* - Protocol facilitation can be handled in-house by the Regulator or outsourced to qualified third-parties. Protocol facilitation ensures that the protocol development or adaptation process is followed and well documented.
    a. In-house: When the regulator is responsible for facilitation, they need to ensure they have the required staff to facilitate the process in a timely manner. Staffing requirements, however, may be inconsistent throughout the year.
    b. Third Party: Unless qualified internal staff are available, third-party outsourcing may reduce the cost associated with facilitating the protocol development process (opposed to hiring additional staff to facilitate the process). While the regulator may be responsible for funding this role, they are not directly responsible for the staffing of it

and can often transfer costs to the private sector. The reduction in costs is achieved at the expense of direct involvement in the process, but the regulator will retain final approval of the protocol. Moreover, third party actions can serve as an "idea incubator" for the regulator, encouraging new ideas that might not have otherwise come to its attention.

It is also possible to have a combined approach, as in Alberta. The first series of quantification protocols (10 protocols) in Alberta were funded by the Regulator based on previous protocol work coordinated by federal-provincial and territorial governments from 2003 to 2006. The protocol development process was outsourced to a third party which facilitated the development according to guidance. As part of the Alberta Government's policy of adaptive management within the Greenhouse Gas Regulatory Framework, the Alberta Protocol Development Process was modified in 2007 to encourage industry and other interested stakeholders to bring forward new protocols and share in development costs. Stakeholders in Alberta have supported this approach, and privately sponsored the development of 17 protocols in the agriculture, oil and gas, construction and waste sectors.

In British Columbia, several protocols were initially developed by the Pacific Carbon Trust (PCT).

6.0 Ensuring Market Integrity

It is crucial that regulation be structured so that an offset system ensures the integrity of the GHG removals, reductions or avoidances. Failure to ensure integrity may undermine political and public acceptance of the system and prevent external markets from accepting offsets (including those with which the regulator may potentially seek to establish links in the future), a term known as 'fungibility'. Currently, Quebec and Ontario allow for some (limited) fungibility within their systems, but Alberta and British Columbia are in-province systems only. In other words, they do not contemplate opening their borders to other systems offsets. Further, it is the intent of Ontario, Quebec and California to align their systems, but this will depend on the results of the currently ongoing protocol development and adaptation process. Inevitably, as offset systems develop and emerge and mature in Canada, particularly in provinces with limited offsets supply relative to demand over the longer term, integrity may become more important (especially for biosequestration). The following section outlines a variety of considerations related to integrity. Specifically, additionality, offset start date, leakage, permanence, verification body accreditation, certification and audit, validation, aggregation, data management and ownership are introduced and discussed.

6.1 Additionality

Additionality refers to the concept that a greenhouse gas emission reduction or removal arises from an activity or action that is beyond legal requirements and business-as-usual (BAU) activity. Making sure

carbon offsets are generated from projects that provide 'additional' emission reductions and not emission reductions from legal requirements or BAU activities, or those that would have occurred in the absence of the project, is a fundamental policy requirement of all offset systems. A complete discussion on additionality is provided below, starting with a brief overview of the relationship between baselines and additionality.

Baselines and Additionality

When quantifying emission reductions, the baseline condition represents the conditions that would likely have occurred in the absence of the proposed project. In other words, the baseline represents the "business as usual" and/or legally required practice and the project activity represents a change from this practice. Examples of baseline considerations include examining all local, provincial, and national requirements for reforestation activities on certain landholdings when determining the baseline for afforestation or reforestation projects; assessing landfill odor mitigation requirements when assessing landfill gas capture projects; or assessing market penetration of an agricultural or other activity in a region (e.g., percentage of landfills capacity implementing methane capture).

Baselines can be standardized or specific to the individual project. Standardized baseline assessments involve using a project protocol that defines the baseline, usually based on the applicable laws and practices in a geographical area or a technology performance standard (e.g. the Alberta Conservation Cropping Protocol sets a regional baseline that considers the level of adoption of conservation tillage in a region). Project-specific baseline assessments involve a case-by-case examination of offset projects to deem whether the project activity is additional. Under a project-specific approach, a distinct project baseline scenario is identified and quantified. In both approaches, any emission reductions beyond the baseline are considered additional. Typical ranges for gathering the data and records to establish a baseline range from 3 to 5 years prior to the start of the project (e.g. Alberta Offset System).

Regulators are responsible for determining the appropriate baseline approach, and typically this is part of the protocol development process. Most offset systems approach baselines and additionality using a standardized approach for most protocols, where a project uses a standard baseline coefficient, but also requires project activity data to establish the magnitude of the baseline emissions.

Common Additionality Approaches

At the highest level, most existing and proposed regulatory systems have some programmatic level additionality criteria. For example, most specify that project activities must start after a certain date and be surplus to regulatory requirements (considerations on start dates are outlined below). In other words, an offset cannot be generated from an action that is already required by law[33].

[33] Federal, provincial and/or municipal laws, regulations, directives and by-laws all apply.

At a more granular level, offset systems generally assess additionality at either the project (e.g. CDM) or protocol (system) level (Alberta, Quebec, BC, Ontario). The former involves assessing whether the project is additional on a case-by-case basis. Under this approach, a distinct project baseline scenario is identified and any emission reductions beyond the baseline are considered additional. When a validation is required it's the validators role to evaluate additionality however when validation is not required this role falls to the verifier. In contrast, standardized tests typically have been created by the protocol developer/program manager and results of the testing are built into a performance standard and legal requirement check within the protocol. Examples are Livestock Digester protocols in Quebec and Ontario – the baseline condition is "no digester"; the project activity is "operating a digester". This is based on the common practice test and technology benchmarks, since less than 5% of hog and dairy farms have digesters in those provinces.

Additionality assessments can take one or more of the forms outlined below. Ultimately, the chosen approach will influence protocol design and the range of projects that will be allowed for use in the system.

Common Practice Tests

Common Practice Tests can take several forms. The Alberta offset system employs a common practice performance benchmark, applied to most protocols, where a project does not qualify for offset credits once there is 40% market penetration of the project activity or technology within the sector. For example, when an activity (e.g. no till practices) is taken up by more than 40% of the sector (e.g. cropping sector) it is no longer considered additional. Similarly, the Climate Action Reserve and Verified Carbon Standard (the former a North American voluntary program and the latter a globally applicable voluntary program) employ a 5% limit on sector uptake before other additionality metrics are reviewed to ascertain if project activity implementation is deemed common practice.[34] The level of market penetration representing common practice can differ between sectors and geographic areas but is widely used in offset systems.

Barriers Tests/ Positive List

The barriers test (or positive list method of assessing additionality) asks the project developer several questions to ascertain if the project would have occurred whether carbon offset credits were available or not. Essentially, barriers tests/positive lists aim to demonstrate that the generation of emission reduction credits will help overcome barriers to the implementation of the project. Barriers or questions may refer to:

- Regulatory or legal requirements;

[34] Note: Voluntary standards typically have a lower threshold since they are subject to scrutiny from environmental non-governmental organizations.

- Investment/financial benefits of the project;
- Implementation barriers such as technology risk or lack of information/new technology; and/or
- Social opposition and institutional barriers.

A good example of the positive list method for assessing additionality is offered in the Alberta Offset System's Guide to Protocol Developers and the American Carbon Registry (a voluntary US based program). To prove additionality, a project must prove that there is no regulatory or legal requirement to undertake the proposed activity, the activity is not employed as common practice in the field or industry/sector in the geographic area, and that there is at least one barrier to implementation. Table 14 below provides a more thorough description of possible barriers that can be considered in barrier/positive list tests.

Table 14: Potential Barriers Examined in Barriers Tests/ Positive Lists

Barrier Type	Description
Financial	Financial additionality assessments may disqualify commercially attractive projects that produce profit independent from the sale of offsets as they would have likely occurred without the existence of the offset system. If a project-level financial additionality test is required by the rules of an offset system, a standardized set of assumptions (e.g. discount rate, payback period) should be established by the regulator to ensure consistency of the test between projects. In practice, there may be projects whose financial statements may seem to disqualify them, yet other, non-monetary barriers, such as technological or social barriers, are sufficient justification for the project to be considered additional. Financial additionality is not typically a feature of regulated offset systems.
Technological	Technologies that are readily available and economic to install are generally not considered additional. However, if a technology is not available or requires significant financial investment to install, it is considered to have a barrier impeding its use and is therefore additional (e.g. anaerobic digesters). Other technological barriers may include research and development deployment risk, lack of trained personnel and supporting infrastructure for technology implementation, and lack of knowledge amongst offset system participants on the practice/activity.
Institutional	Institutional barriers can include institutional opposition to technology implementation, limited capacity for technology implementation, lack of management consensus, aversion to upfront costs and lack of awareness of benefits (e.g. for Newfoundland and Labrador, there may not be enough energy efficiency and renewable energy service providers or extension activities to facilitate implementation without financial incentives).
Social	Social barriers assess public perception and understanding of the new technology/practice. Often a lack of understanding can impede adoption of a new practice, which generates a barrier. For example, the average age of the target population for sophisticated technology uptake or level of education can be a barrier. A protocol can help create understanding of a practice and advance its implementation.

Performance Standards and Proportional Additionality

A Performance Standard is an alternative approach to additionality and baselines. It does not attempt to undertake a project-specific inquiry into a project's additionality, or to determine the specific baseline scenario for each project. Rather, it takes an approximate, sectoral approach by establishing a generic baseline scenario against which all projects (of a given type) are assessed. Performance standards prevent early adopters from being penalized, while also enabling broad participation. This mitigates the risk of incentivizing perverse outcomes such as clearing forests to plant trees for an afforestation or reforestation project. Furthermore, a performance standard baseline, set by the regulator, gives more certainty to project developers and market participants. They also minimize risk to the regulator by eliminating the need for project-level baselines, which rely on large amounts of project-specific data that increase the likelihood of inaccuracy. However, performance standards require that sufficient data and information be available against which to set the performance standard.

This baseline can take the form of a quantitative performance standard – or "benchmark" carbon intensity per unit of output – specific to a given sector, e.g. an electricity carbon intensity in $kgCO_2/kWh$. Any project with emissions that do not meet this pre-defined benchmark is automatically deemed additional, and offsets are awarded based on the difference between the project emissions rate and the benchmark emissions rate (proportional additionality). An example of this approach can be found in Alberta's Conservation Cropping Protocol and may be used in Ontario's Conservation Cropping Protocol.[35]A performance standard baseline can also take the form of a technology benchmark where a specific technology is assumed as a baseline (e.g. anaerobic digesters or pneumatic controllers on oil and gas wells).

The advantage of benchmark approaches is that they are simpler and more transparent to apply. They shift the workload from individual project developers to the protocol developer or regulator that collects the necessary sector-specific data and decides the level at which to set the benchmark. However, establishing a benchmark requires comprehensive data collection and verification, as well as regular updates. Furthermore, the political process to approve a benchmark may take a long time and it may only be feasible for certain industries. Another problem with performance and technology benchmarks is that they can be viewed as too simple since all activities whose emissions fall below the benchmark emissions are awarded credits, regardless of whether they would have taken place in the absence of the offset system.

As a word of caution, the more additionality testing is moved from the project level to the aggregate sectoral levels, one needs to carefully assess whether non-additional projects are more likely to enter the market. The question, then, is to what degree does the simplicity of performance standard

[35] Alberta's Conservation Cropping Protocol takes into account the adoption of practices in 2011 and adjusts the baseline to account for this. This approach allows credits to be generated for the additional carbon sequestered.

approaches outweigh the potential for more non-additional projects to participate? Project-level additionality tests, on the other hand, often rely on information that is inherently difficult or impossible to confirm. Therefore, in general, the most practical and viable (lowest transaction cost) option for additionality testing is often a performance standard approach.

No matter how quantitative and objective, all additionality tests will create some false positives (i.e. projects that appear additional even though they are not) and false negatives (i.e. projects that appear non-additional even though they are). The design of the test determines if it will err on the side of false positives or false negatives. Deciding which is more acceptable must be determined through a political process. It is important to understand that while false positives and false negatives both impair economic efficiency, only false positives undermine the environmental integrity of offsets. In other words, it is the false positives – offsets from non-additional projects – that lead to increases in emissions and therefore hamper climate protection goals.

Additionality tests can be cumbersome and time consuming. They are however, necessary, because carbon offsets from non-additional projects sold into the market could lead to an increase in the buyer's emissions, with no corresponding decrease in emissions from the seller; and hence a net *increase* in greenhouse gas emissions. Standardized baselines reduce how cumbersome and time consuming additionality tests can be for an individual project.

Impacts of Grants and Financial Incentives on Additionality

In some offset programs including the formerly proposed Federal Offset System (2008), the receipt of government incentives such as grants, tax rebates, deductions and low interest loans can render a project non-additional. The rationale for this is that the incentives change the economics of the project. However, since most programs, including all regulated markets in Canada, do not consider financial additionality, the receipt of incentives can be viewed as an ownership issue that is subject to the contractual arrangement between the government incentive provider and the project proponent. Ownership options and associated contractual arrangements, however, are not typically outlined in regulation or guidance. In other words, if a government has provided incentives toward a project but those incentives comprise a share of lifetime capital and operational costs for the project, a pro-rata adjustment to reduce available offset credits for the project, based on the financial contribution of the government, could be made to allow the project developer to maintain the right to generate and own credits within the offset system. In the case of the Bioenergy program in Alberta, for example, the contribution agreements between the government and the bioenergy developer explicitly stated that the government had no ownership stake in carbon offset credits. However, under the 2008 federal agriculture policy framework, the "Greencover Program" that provided incentives to ranchers to convert to perennial cover stated in the contract that if the ranchers sold offset credits, they would have to pay back monies that were provided to them.

Recommendation: Additionality

10. ***We recommend that Newfoundland and Labrador require that all projects pass a regulatory additionality test (i.e. projects that are required by regulation or any other applicable laws are ineligible) based on the approaches used in regulated systems in other jurisdictions and, where possible and appropriate, that performance standard baselines be used.***

Recommendation: Receipt of Government Incentives

11. ***We recommend that Newfoundland and Labrador adopt a pro-rata approach through which a project receives offset credit proportionate to the amount that was self-funded, unless the project developer can demonstrate that there is a specific contractual arrangement between the government funder and project proponent that allows the project to claim offsets using a non-pro rata formula.***

6.2 Offset Start Date

Offset systems must have a defined start date, after which offset projects are considered additional. This typically is part of the way that regulated systems in other provinces define additionality. Projects that were implemented prior to the allowable start date, which is defined in regulation in other provinces, are not eligible to generate offset credits since the activity was implemented in the absence of an offset system. The start date selected for the offset system should consider the date of any formal government announcements to develop an offset system. Consistent with other regulated systems, Newfoundland and Labrador could consider recognizing some projects that were initiated before the official start date and accept them as "early actors".

Start dates vary by system and are chosen by the regulator. For example, Alberta's start date is January 1, 2002 indicating that any action occurring on or after January 1 could generate a credit. Ontario has announced a start date of January 1, 2007 while BC has established January 1, 2014 under the regulations of the new Greenhouse Gas Industrial Reporting and Control Act.

Recommendation: Offset System Start Date

12. ***We recommend that Newfoundland and Labrador use an offset start date of January 1, 2017 (the start of the next calendar year after the date of first announcement of the approval of the legislation) for projects for which a corresponding protocol exists at the start of the offsets system, and, where an offsets protocol does not exist at the start of the offsets system, a start date no more than three calendar years prior to approval of a protocol by the regulator.***

6.3 Leakage

Leakage is a two-fold phenomenon: (1) activity shifting - greenhouse gas emissions shift to another region as a result of the implementation of a project, undermining the greenhouse gas emission

reductions associated with the project; and (2) market effects - the displacement of economic activities and/or a change in investment patterns that results in greenhouse gas emissions being displaced from a jurisdiction with greenhouse gas constraints to another with no or fewer greenhouse gas constraints. Ultimately, leakage is caused by asymmetrical climate policies across jurisdictions that can reduce and or even reverse the environmental outcomes that a program seeks to achieve through the imposition of a carbon price in the first place. The biggest challenge associated with quantifying leakage is it can be difficult to separate the influence of a climate policy from other drivers such as changes in fuel prices.

To minimize and/or control potential activity shifting due to activities undertaken in an offset project, it is important to follow the ISO 14064:2 Process-based Standard which applies a systematic approach to identifying sources, sinks and reservoirs (SSRs) in the project and baseline. Alberta and Ontario both follow this process. First, a streamlined life cycle assessment, typically based on material and energy flows, is applied to identify those SSRs that are in three scope categories - controlled, related or affected.[36] Typically, affected SSRs are those which are related to leakage (either activity shifting or market impacts). The greenhouse gas impact of the three types of SSRs are then assessed with a view to minimizing leakage. Using this approach, the project boundary is defined by the SSRs that are deemed relevant to quantify, and, the project accounts for any emissions generated by a relevant related or affected source. This approach may be applied to any project type. For example, a fuel switching project would include "related" SSRs associated with on-site combustion of fuel and would seek to quantify changes in emissions from this SSR, but would also include the "affected" upstream changes on energy production, transmission and distribution although greenhouse gas changes from these SSRs would generally not be quantified as they are outside the boundaries of the project.

Furthermore, the ISO 14064:2 standard applies functional equivalence as a key requirement for quantifying GHG differences between baseline to project. For a project-baseline comparison to be meaningful, the service provided by the project must compare in quantity and quality to the same areas in the baseline (i.e. GJ of energy consumed or produced and not liters or cubic meters replaced). The application of functional equivalence with a systematic assessment of relevant controlled, related and affected SSRs, that are informed by analysis of material and energy flows in baseline and project, minimizes the risk of activity-shifting leakage occurring in project types covered by the methodology.

[36] Definitions for these terms, as extracted from the ISO 14064-2 standard, include:
Controlled greenhouse gas source, sink or reservoir: GHG source, sink or reservoir whose operation is under the direction and influence of the greenhouse gas project proponent through financial, policy, management or other instruments
Related greenhouse gas source, sink or reservoir: GHG source, sink or reservoir that has material or energy flows into, out of, or within the project
Affected greenhouse gas source, sink or reservoir: GHG source, sink or reservoir influenced by a project activity, through changes in market demand or supply for associated products or services, or through physical displacement

Recommendation: Leakage

13. ***We recommend that Newfoundland and Labrador require that protocols and project documents are developed in conformance with the ISO 14064:2 standard, including that the protocol development process include an analysis of potential leakage effects (activity shifting and market effects) due to the implementation of projects with the scope of the protocol.***

6.4 Permanence

Emission reductions and removals from project activities must be permanent. For project activities that reduce GHG emissions through destruction (e.g., methane destruction at landfills), efficiency improvements, or other means, this is not an issue since once the emission reduction has occurred it cannot be reversed. For example, a project that switches fuel between a higher and lower emitting/renewable fuel type achieves an emission reduction relative to the baseline that cannot be undone. Even if the fuel is later switched back to the higher emitting fuel, the reduction that occurred is a historical fact. However, projects that remove greenhouse gases from the atmosphere by sequestering carbon in biological or geological sinks are subject to the risk that the carbon is released from the sink at some point in the future. Therefore, to be credible, projects based on sequestration activities (e.g. an agricultural no-till project) 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 (e.g. renewable energy projects). In practice, many programs/registries (e.g. CDM or California), including the WCI criteria, place a liability or permanence period under which the carbon must be monitored and any reversals addressed. In most cases, this period is based on the United Nations Framework Convention on Climate Change (UNFCCC), which sets the current standard of 100 years for sequestration projects to essentially have the same atmospheric effect as non-sequestration reduction projects (IPCC 2007, WCI 2010). British Columbia, Quebec and Ontario all follow WCI criteria and will harmonize on the 100-year permanence period. Alberta has a 20-year permanence period in the Conservation Cropping Protocol.[37]

There are two types of reversals: intentional and unintentional. Intentional reversals occur when the actions of the manager of the carbon sink result in the release of carbon sequestered by the project. Examples of intentional reversals include plowing land within the project boundary to replace perennial grasses with row crops, or overgrazing pasture land resulting in degraded pasture grasses. Unintentional reversals occur when sequestered carbon is released despite the best efforts of the carbon sink manager. Examples of unintentional reversals include forest fire or a leak from a geological sink.

Other programs and registries have rules in place, generally through guidance documents and protocols, to assure permanence of sequestration reductions either at the program or protocol level. Table 15 below summarizes these approaches and provides examples of programs using them. These rules are

[37] The twenty year crediting period reflects the sequestration rate reaching a equilibrium where soil organic carbon is no longer building nor is it degrading.

designed based on the estimated risk of a reversal occurring. Some are applied at the program level, while others require third-party providers. Others place responsibility with the project developer. Offset systems tend to handle reversals differently based on the cause and whether it was intentional or accidental.

Table 15: Policy Approaches for Managing the Risk of Reversal

Policy Approach	Description	Examples of Programs Using the Approach
Buffer Pool	A fixed percentage of the offsets are set aside and placed in a reserve account. The percent allocated to the reserve is established based on a risk assessment of the project. In some cases, the risk reserve is held by the program authority in perpetuity; in others, a sliding buffer reserve factor is applied based on successful verifications and no reversals. In the latter case, some offsets are returned to the project developer. This approach is used to address accidental (unintentional) reversals; intentional reversals are compensated via account and replace.	Verified Carbon Standard (VCS), Gold Standard, California Air Resource Board (ARB), American Carbon Registry (ACR), Climate Action Reserve and WCI Offset Recommendations (2010) (which means that BC, ON, Quebec will follow this approach).
Assurance Factor / Discount	A fixed percentage of the offsets are discounted from the total emission removal claim and permanently retired[38] (often 8% to 10%). The percentage is based on an estimated risk of reversal and is determined at the program level.	Alberta Offset System (AOS)
Temporary Credits / Leasing	Credits are temporary reductions or rental of carbon storage abilities. These credits must be replaced with	Clean Development Mechanism - afforestation/reforestation. This approach is currently not used in any regulated carbon offset systems in Canada.

[38] Carbon offset credits that are retired are considered sold or used against a reduction target and therefore are no longer available. When retired the name of the user is recorded on the registry.

Policy Approach	Description	Examples of Programs Using the Approach
	'permanent reductions' after a period of time. [39]	
Account and Replace	Quantification and verification of the reversals is completed and lost tonnes replaced by the project developer using tonnes from another project within the program or market place.	Australia CFI/ERF; WCI Offset Recommendations (2010)
Year-tonne method	Credits are issued only when they are deemed permanent on a radiative forcing basis. Credits for a removal in a given year accumulate over time and approach the full reduction quantity at the end of the permanence timeframe.	Quebec – Reforestation/Afforestation Protocol; Ontario (proposed, protocols currently in development); Climate Action Reserve – Mexico Forest Protocol.
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. Since this approach is not currently being used in any system it is unclear who pays the insurance premiums.	American Carbon Registry. This approach is currently not used in any regulated carbon offset system.

To determine the level of risk associated with a reversal, several tools are available through the Clean Development Mechanism or Verified Carbon Standard. Once the reversal risk deductions are determined by the protocol, the buffer pool approach is relatively easy to implement. Furthermore, it is a conservative approach that has credibility and is (or will be) used by the other systems in Canada. Transparency will assist the regulator in demonstrating the conservativeness of the offset system and gaining credibility.

Recommendation: Permanence

[39] 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.

14. ***We recommend that Newfoundland and Labrador implement a program level buffer pool approach where deductions are based on the risk of reversal for the specific protocol. We also recommend that all reversals be quantified, verified and publicly displayed on the registry within a year of their occurrence.***

6.5 Verification Body Accreditation

Greenhouse gas programs establish requirements for organizations and individuals that provide independent verifications of offset project reports. These program requirements range from membership in professional organizations to accreditation of the verification body. Accreditation formally recognizes that the verification body has implemented the processes and procedures required to conduct a verification.

Verification bodies achieve accreditation according to an established standard such as *ISO 14065—Requirements for Greenhouse Gas Validation and Verification Bodies for Use in Accreditation and Others Forms of Recognition*. Accreditation standards often outline not only how verification bodies must execute a verification, but also how they administer themselves as entities. North American offset systems typically use the ISO 14065 standard, though some, such as California, design their own.

An authorized, independent organization confirms standard requirements have been met, thereby granting accredited status to the verification body. In North America, the Standards Council of Canada (SCC) and the American National Standards Institute (ANSI) are independent organizations that are authorized to grant ISO 14065 accreditation. In California, the California Environmental Protection Agency's Air Resources Board (ARB) provides accreditation of verification bodies.

Once given, accredited status must also be maintained. Verification bodies must successfully pass an annual audit by the accreditation body. During the annual audit, the accrediting body often observes a verification conducted by the verification body.

Accreditation bodies tend to issue accreditation for specific emission types or industrial activities. For example, ANSI issues verification body accreditation for ten scopes at the organization-level and six at the project-level,[40] which include activities such as stationary combustion, metals production and waste management.

[40] The ANSI organization-level scopes are general, manufacturing, power generation, electric power transactions, mining and mineral production, metal production, chemical production, oil and gas extraction/production/refining including petrochemicals, waste, and agriculture/forestry/other land use. The ANSI project-level scopes are fuel combustion, industrial processes, land use and forestry, carbon capture and storage, livestock, and waste handling/disposal.

British Columbia, Ontario and Quebec require that all verifications of offset projects are conducted by verification bodies accredited to the ISO 14065 standard. The American Carbon Registry also requires accreditation to the ISO 14065 standard or recognition within the UNFCCC offset programs (Joint Implementation or Clean Development Mechanism).

In addition to the accreditation of verification bodies, California also requires the accreditation of individuals on the verification team. Verification training, which is offered by ARB, is required for the accreditation of individual verifiers. Initially, a five-day training program is required with additional training programs for sector specializations. Accreditation of individual verifiers is not required under the ISO 14065 standard, which is the standard for accreditation of verification bodies applied in British Columbia, Ontario and Quebec. Therefore, these jurisdictions do not require accreditation of individual verifiers.

Alberta does not require accreditation of verification bodies under the ISO 14065 standard. Instead, Alberta requires professional designations. "Designated Signing Authorities" (i.e. individuals that execute a verification statement) must be either registered Professional Engineers or Chartered Accountants (or equivalent) with training in the ISO 14064-3 standard.

Internationally, organizations providing validation and verification services under the CDM must achieve "Designated Operational Entity" status from the CDM Executive Board. A similar designation has been contemplated within the UNFCCC Paris Agreement. This status is internally managed by the CDM and does not include ISO 14065 accreditation.

Benefits and Challenges

The primary benefit of accreditation is its impact on the creditability of the verification process. Accreditation requirements standardize the verification process between verifiers and provide independent oversight of the verification process's execution. Except for the California system, which provides its own accreditation, greenhouse gas reporting and/or carbon offset programs are not typically involved in the ongoing process of monitoring the accreditation of individual verification bodies.

One of the main challenges to requiring accreditation is its cost to verification bodies. Accreditation is costly to achieve: approximately $20,000 for initial accreditation and $10,000 for annual maintenance[41]. Small verification bodies may not be able to amortize this cost across only a small number of verification engagements. Therefore, small verification companies may not be able to provide services in programs that require accreditation, which could reduce the number of verification service providers available. For

[41] Based on information provided by the Standards Council of Canada and estimates of travel costs for accreditation activities.

instance, some verification bodies have opted to drop their costly ISO 14065 accreditation and focus their work in the California system, which has a much less costly accreditation system.

There are currently four verification bodies with ISO 14065 accreditation through SCC and 20 verification bodies with ISO 14065 accreditation through ANSI (five of which are Canadian-based verification bodies). Once accredited, verification bodies may provide verification services within any greenhouse gas program that requires ISO 14065 accreditation, provided the verification body meets any other additional local requirements that may apply.

Based on informal conversations with several Canadian verification bodies, the cost of providing verification services has declined over the past ten years. This indicates that there are generally sufficient organizations providing verification services in the market to meet current demand. This trend could be expected to continue as more offsets systems emerge and more offset projects are funded.

Alternatives to Accreditation

Requirements for the lead verifier, such as those in the Alberta Offset System, are a less expensive alternative to accreditation. This alternative, however, fails to standardize the verification process and does not provide independent oversight.

We believe that there are sufficient verification bodies in North America to provide services to offset project developers in Newfoundland and Labrador. Travel costs to attend site visits could be mitigated by establishing the requirement for the frequency of site visits at a level appropriate to balance cost and rigour (see the "Verification Frequency" section below for further discussion on this topic).

Recommendation: Accreditation

15. ***We recommend that Newfoundland and Labrador require that organizations providing verification services be accredited to the ISO 14065 standard with an appropriate scope designation for the offset project type subject to the verification.***

6.6 Reporting Periods and Verification Frequency

The reporting period is the length of time over which a project's GHG emission reductions/removals occurs. The offset program in British Columbia specifies a one year reporting period, while Alberta's program does not specify a minimum or maximum project reporting period length and associated verification frequency. Project proponents with projects that generate a small amount of annual credits may wish to conduct verification only annually or biennially. For example, California projects that generate less than 25,000 metric tons of CO_2e annually can delay verification for one year and verify two reporting periods at once (for example, California and British Columbia's regulations specify a 12-month reporting period; Alberta has no set reporting period length). Conversely, project proponents with

projects that generate relatively large quantities of offsets, such as mine methane or large landfills that generate hundreds of thousands of emission reductions per year, may wish to verify multiple times annually to commoditize credits and achieve a more consistent cash flow from commoditization of offset credits. It is not expected that this will be the case in Newfoundland and Labrador as projects are expected to be much smaller.

Offset programs may set a maximum number of successive verifications that may be conducted by a verifier or verification body. This policy is used to manage potential verifier conflict of interest due to familiarity with the project. British Columbia has a policy that a verification body may provide verification services for a maximum of six of the most recent nine project reports. The policy in the Alberta Offset System is a maximum of five successive verifications, unless multiple project reports are issued each year, in which case the maximum is eight successive verifications (within a five-year period).

Verification costs are paid for by the project developer. While this cost varies, a reasonable range for projects typical of what may be implemented in Newfoundland and Labrador would be $5,000 to $15,000. The cost to perform a verification is typically lower if a project has already been validated because several of the review activities that occur during a verification would have already been performed during the validation. See Section 6.9 for further details regarding project validation.

Recommendation: Reporting and Verification Frequency

16. ***We recommend that Newfoundland and Labrador not establish a requirement for the minimum length of the offset reporting period, but set a maximum reporting period of two years to provide flexibility for smaller projects while ensuring that projects are regularly reporting and subject to verification.***

Recommendation: Maximum Successive Verifications

17. ***We recommend that Newfoundland and Labrador establish a limit on the frequency of verifications equal to a maximum of six of the most recent nine project reports to provide flexibility for project developers and manage conflict of interest due to familiarity.***

6.7 Offset Project Auditing

Offset credits that have been issued pursuant to a verification process, but subsequently found to be invalid through an independent audit are typically removed from the offset system (often called "revocation of credits"). This situation may occur when information has been discovered after the verification and serialization of offsets have been completed. Revocation of credits should not be confused with reversals associated with sequestration projects, which is discussed in Section 6.4.

If offset credits have been used for regulatory compliance purposes, the regulated entity that retired the credits to meet a regulatory obligation is responsible for replacing the credits in some means. For

example, in Alberta, if offset credits that have been used for compliance purposes are subsequently revoked, the regulated entity must make an immediate contribution into the province's greenhouse gas technology fund equivalent to the number of credits revoked.

The application of rigorous quality controls and the requirement for independent verification are two systems that reduce the probability of error in greenhouse gas emission reduction projects. These systems were discussed above in Sections 6.1 to 6.5.

Many offset systems also use secondary auditing as a means of further reducing the risk of errors or omissions that result in invalid offsets. The diversity of projects, project developers and verifiers in the offset system will likely lead to situations, over time, where the regulator needs the ability to investigate. Auditing provides the regulator with general oversight of not only the program, but also its project proponents and verifiers. Moreover, the results of audits provide invaluable information that can be applied in a framework of continuous improvement with a regulatory greenhouse gas program. If an independent verification company performs the audit, the company should have, at minimum, the same qualifications and accreditations as those required for a primary verifier in the system.

Both the Alberta and the California ARB offset systems use audits to monitor and oversee the offset system, verifiers and project proponents. The structure of the Alberta and California audits differ slightly as illustrated in Table 16.

British Columbia does not currently have a structure for auditing offset projects in their system; however, the applicable regulation provides the Director within the Ministry of Environment with the authority to investigate individual projects and project developers.

Table 16: Alberta vs. California Audit Structure

Audit Component	Alberta	California
Audit Oversight	Alberta Environment and Parks (AEP)	Air Resources Board (ARB) or Offset Project Registry
Audit Leader	AEP contracts with third-party verification bodies. AEP directs auditor's focus and may attend site visits.	ARB or Offset Project Registry conduct the audit.
Involvement of Initial Verifier	Only if audit discovers material findings.	Requests for information from verifier through course of audit; feedback provided following the audit.

Audit Component	Alberta	California
Audit Structure	ISO 14064-3 conformant verification.	Audit scope may focus on specific aspects of the initial verification or may re-conduct verification in full.
Selection of Projects to Audit	Risk based and random.	Not disclosed, but 10% of all projects must be audited per calendar year.
Cost of Audit Borne By	Regulatory authority; project developer must assume any costs associated with corrective actions.	Regulatory authority; project developer must assume any costs associated with corrective actions.

Audit programs require funding to be provided by the regulator; the level of funding required is directly correlated to the level of audit rigour and complexity of the projects to be audited. Audits that consist of a complete second project verification have costs similar to the original verification. Using external independent verification firms to conduct investigations obviates the need for the GHG regulator to maintain in-house expertise for this function. As outlined in Table 3, this cost could reasonably be assumed to be in the range of $20,000 per audit.

Alberta's audit framework does not require a significant time investment from the regulator unless issues are discovered during the audit. If the verification conclusions of the original verifier and the Alberta Environment and Parks (AEP) auditor differ, then AEP must apply the final determination for the specific issue.

Alternatives: Offset Project Audit

One alternative to an audit is to require the project developer to complete verification by two independent verifiers. Two independent verification statements that state the same verification conclusion engenders a higher level of confidence than a single verification statement. However, requiring this type of "double verification" would double the cost of verification for project developers.

A more cost-effective variation of this alternative is to require a "double verification" for the first reporting period, followed by a single verification for each subsequent reporting period. Allowing the second verification to be a desktop review rather than requiring a second site visit is another way to keep costs down. However, double verification has not been implemented in any North American regulatory offset system, likely due to the associated cost, which would create a market barrier for many project developers.

Recommendation: Offset Project Auditing

18. ***We recommend that Newfoundland and Labrador retain the authority to audit any project for up to seven years after the project reporting period, that the audit process consist of a complete secondary verification conducted by an independent verification firm, that the costs associated with audits be paid for by the regulator, and that the regulator make a final determination of action required for any and each identified issue or conflict.***[42]

6.8 Certification of Credits

Certification of offsets is a process by which the regulator (or an approved third-party representative, such as the registry operator) issues a guarantee on verified emission reductions. The type 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 or revocation of the GHG reduction, removal, or avoidance represented by said credit (i.e. permanence of credits from biological or geological sequestration projects).

The process of certification involves a cursory review of project quantification and verification documentation. A more comprehensive review may be conducted for higher-risk projects to ensure liability concerns are addressed. For example, aggregated projects may pose more of a risk than non-aggregated projects due to additional information and data required.

The certification of offset credits may provide project developers a valuable level of assurance in an often-challenging carbon offset 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.

None of the North American regulatory programs assume any risk of reversal of credits through certification. However, offset buyers and sellers often consider offset credits resulting from projects that have been successfully audited as having a lower risk of revocation. In California, the invalidation (revocation) timeframe of issued credits is reduced from eight years to three years if the project reporting period undergoes a second regulatory verification. Credits with three-year invalidation periods are much more desirable to buyers and command a higher market price, since the risk of invalidation is mitigated by the shorter statute of limitations.

Some voluntary greenhouse gas programs assume some revocation risk by certifying the registered credits within their programs. For example, Green-e, a popular US-based voluntary certification

[42] Seven years aligns with the tax systems, most systems use 7 years.

program, offers renewable energy and greenhouse gas mitigation product certification in the retail market. The program has established a standard above the standards established by its four member programs, including standards for additionality, eligibility, documentation and quantification methods. Additionally, the Green-e program is a chain-of-custody certification for carbon offsets. The program provides oversight for voluntary offset transactions and advertises in the retail market.

In the absence of certification, parties to offset credit transactions manage the risk of credit revocation through commercial terms in their offset sales agreement. The risk of revocation of credits is factored into the negotiation of the offset credit price. Liability associated with offset credit revocation is also managed through commercial offset sales terms.

Recommendation: Offset Certification

19. ***We recommend that Newfoundland and Labrador avoid assuming any liability for revocations or reversals of offset credits through certification of offset credits.***

6.9 Offset Project Validation

Validation is an independent third-party assessment of the project before it starts, against offset criteria, protocol methodology and system guidance to determine conformity within the system. Figure 4 provides a snapshot of the differences between validation and verification. To provide assurance on the feasibility of an offset project at the project design stage, the regulator may mandate a validation, or the project developer/aggregator may voluntarily choose to conduct a validation of the project. The WCI's Offset Systems Essential Elements Final Recommendations states that validation is a required review by an accredited third-party or WCI Partner Jurisdiction to assess the likely result of reductions or sequestration from a proposed project and that on-site visits occur as a component of validation processes (Western Climate Initiative, 2010). Validation is a required element of BC, Ontario and Quebec's systems, and validators must be accredited in the same manner as verifiers within these systems. In Alberta, validation is optional.

The cost of a validation varies depending on the complexity of the project. Based on feedback from project developers in British Columbia and Alberta, validation costs range from $3,000 to $15,000 with the lower end of the scale representing validations that are performed voluntarily, such as in Alberta where the Regulation does not mandate project validations. This is similar to the range of verification costs outlined in Section 6.6, keeping in mind that the verification cost will likely be greater if no validation is performed. Invariably, if a validation is required by the rules of an offset system, the costs will likely be higher as the regulator will establish specific criteria for the validation and may require specific training and accreditation for the verification body.

Regardless if validation is required, it is an important risk management strategy for project developers and the overall offset system because it is an independent project review that is conducted before a project begins generating credits.

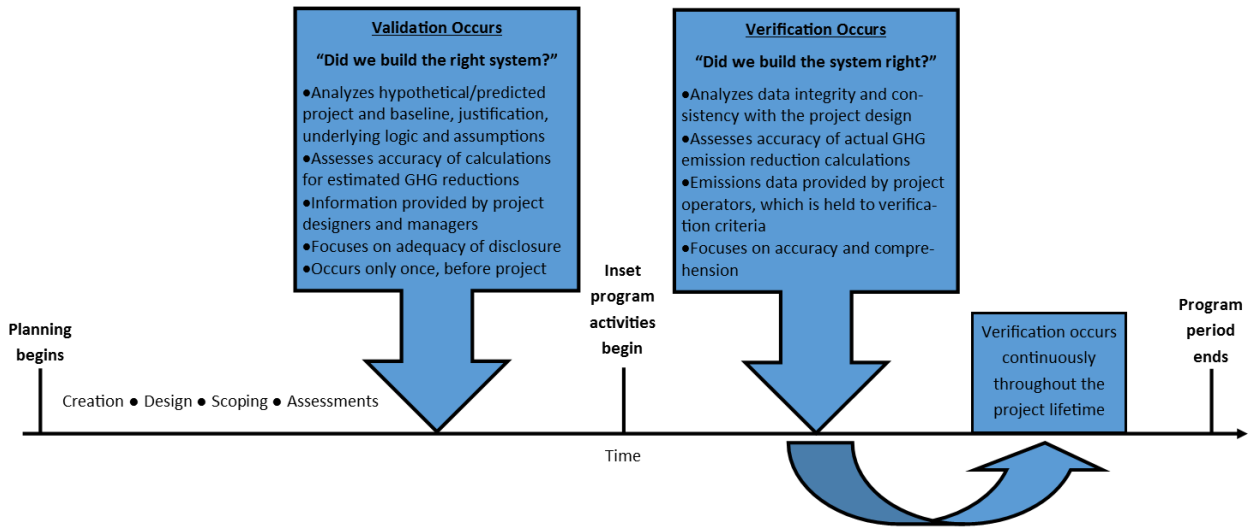


Figure 4: Differences between Verification and Validation

Benefits and Challenges

Requiring validation provides benefits to project developers in terms of confidence in the investment opportunity. The validation process may reveal issues with the project that may be corrected before the project begins, thus avoiding challenges in the initial reporting period and verification process. For example, the validator and project developer may determine during a validation that a quantification variable requires measurement in a location that was not contemplated. For example, installation of a meter at a location before the project begins may be vital to the emission reductions quantification. Validated projects may increase buyer confidence in offsets since a validated project has been subject to two independent reviews (validation and verification). However, the validation process imposes an additional cost on the project developer, as well as an administrative burden on the project developer and the registry operator associated with the submission of a validated project plan to the regulator[43].

Project approval by the regulator inevitably adds time to the project timeline. Although the regulator may accept a validated project, this does not guarantee or certify that the project, once implemented, will produce offset credits that are automatically approved within the system. The project must still be

[43] Validation of aggregated projects likely have a similar scope and cost as validations of projects with a single installation.

verified by an independent third-party and may also be subject to additional scrutiny by the regulator, such as further audit (see the "Offset Project Auditing" section for further discussion).

Recommendation: Validation

20. ***We recommend that Newfoundland and Labrador require project validation for all projects, that validation be conducted by an accredited validation body, that the requirement for an on-site visit be outlined in each offsets protocol that may be developed based on anticipated project types and complexity, and that a formal acceptance process be established to ensure that all required documentation has been submitted, a check that the validation body is in good standing with its accrediting organization and that the validation body has managed conflict of interest through the validation process.***

6.10 Aggregation[44]

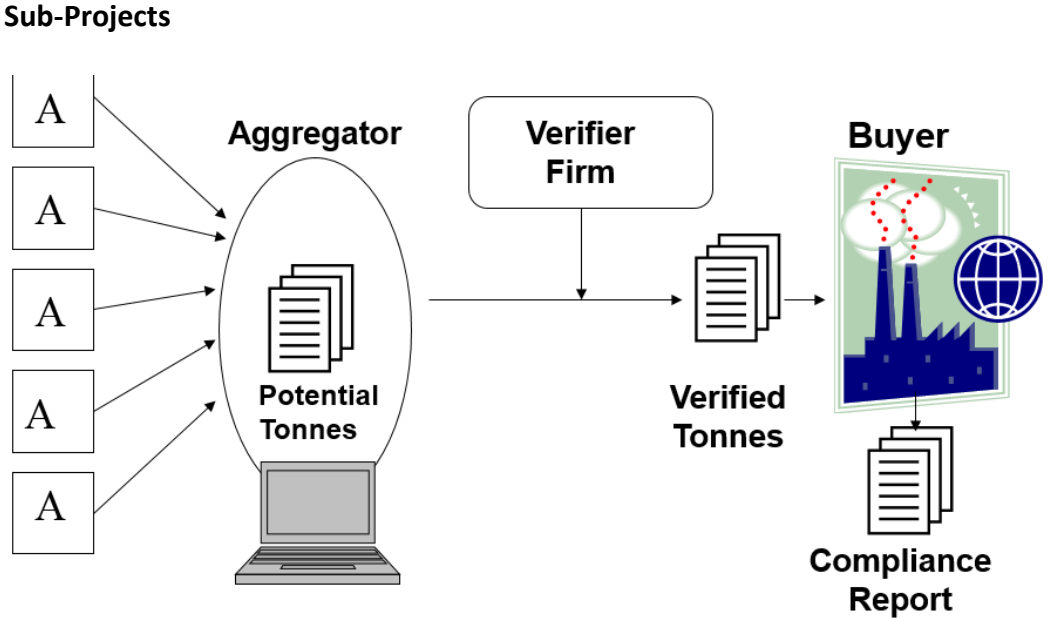
An aggregate project is a collection of projects grouped together by a project developer to reduce transaction costs and achieve economies of scale for marketing, verification and registration purposes. For example, many smaller energy efficiency projects can be grouped together in one aggregated project (See Figure 5 below for an example). Presently, the project-specific requirements and associated costs of most offset systems (both voluntary and regulatory) make it difficult for emission reductions to be achieved from a single small-scale project. This is particularly relevant to forestry, agricultural, energy efficiency and microgeneration projects. Aggregation overcomes this challenge by grouping multiple small and often geographically and temporally dispersed projects together to achieve economies of scale. This practice may not be appropriate or feasible for every project type, and should be carefully considered during the protocol development process.

Validation of aggregated projects is not necessarily more complex than non-aggregated projects because the review activities that are conducted during a validation are focused on the primary data management and monitoring systems. However, if there are significant differences between sub-projects, the validator may need to apply different review activities to each sub-project, which could substantially increase the level of effort required to conduct the validation.

Similarly, verification of aggregated projects may be streamlined if there is consistency in the technologies, data collection and data management between sub-projects. Verifiers may apply a sampling approach if the sub-projects are sufficiently similar in these aspects, which should reduce the overall cost of the verification.

[44] Aggregation refers to the grouping of sub-projects and does not imply a certain model of aggregation (see Table 17)

Figure 5: Aggregated Approach



A wide range of aggregation approaches have been adopted by offset programs. A summary of some of these approaches is provided in Table 17 below. Ideally, aggregation should be considered at the outset of an offset project's planning as it can fundamentally change the approach used to qualify (i.e. ensure eligibility) and quantify emission reductions. In general, in aggregated projects, verifications are performed on a subset of the projects in the aggregate and all projects in the aggregate share the same baseline.

Table 17: Examples of Aggregation Approaches

Program	Approach Description
Alberta Offset System	Aggregators can develop projects. As project developers, they are responsible for originating new projects, registering them, arranging verification and commercializing credits. New projects cannot be added to an existing aggregated project once registered. Verifications require sampling of a subset of projects in the aggregated project.
British Columbia	Requirements for project aggregation are provided within individual protocols, if applicable.
Ontario	The proposed approach in Ontario would allow an Offset Initiative project developer to carry out aggregation on behalf of a group of Offset Initiative Operators if the same protocol applies. All offset initiatives in the aggregation must use the same baseline and calculation methodologies. All Offset Initiative Operators must sign a

Program	Approach Description
	declaration attesting that the Offset Initiative Sponsor is designated to carry out the offset initiative on their behalf.
Clean Development Mechanism Programme of Activities (CDM PoA)	Under the CDM PoA, each individual project is called a CDM Programme Activity (CPA). New CPAs can be added to a PoA at any time during the PoA's 28-year crediting period, once verified by a verifier that the new CPA meets the criteria of the PoA's design document[45] (called a Designated Operating Entity in the CDM program), without additional approval by the CDM. The PoA approach reduces transaction costs, investment risks and uncertainty for individual CPAs. It also enables smaller projects to access the CDM and to be continuously scaled up (since additional CPAs can be added). There are no registration fees for each CPA. Instead, registration fees are based on "expected average emission reductions of the 'actual case' CPAs submitted at the PoA registration" (CDM Programmes of Activities, 2015)
Verified Carbon Standard (VCS) Grouped Projects	Multiple projects can be aggregated to form a "grouped project"; however, all projects must share the same baseline and crediting period. The geographic area of a grouped project must have similar regulations, practices and quantification criteria. New project activities can be added to a grouped project with verifier approval if they are within the pre-defined geographic area. Any project added after the start date, is only credited for the remaining time associated with the initial project's crediting period (Diamant et al., 2011).
Climate Action Reserve (CAR) Forestry Aggregation and Grassland Cooperative Guidelines	Forestry projects on land parcels smaller than 5,000 acres can be aggregated. Half of the projects within an aggregate must be verified by site visits every six years, and all of the projects every 12 years. Offset credits can be issued based on desk verification of a monitoring report between on-site verifications (note: unaggregated projects have to individually undergo verification every time they want to register offsets). Each project does not have to individually sample their plots, instead a sampling error approach is taken. This has substantially lowered verification costs (Diamant et al., 2011). Grassland projects of any size and in any eligible location can join a cooperative that is managed by a cooperative developer.

[45] Note: Verifiers are assigned liability for "erroneous inclusion". In other words, if they approve the inclusion of a new CPA within a PoA and the CDM EB or the Designated National Authority later finds that an included CPA does not meet the requirement of the PoA's design document, the verification organization can be required to purchase replacement credits for all certified emission reductions (CERs) that were erroneously included. This poses a financial and reputational risk to verification firms.

Program	Approach Description
	Cooperatives can submit a single set of reporting documents, and cooperative participants are subject to reduced administrative fees. The projects within a cooperative undergo a joint verification and credits are issued to the project owner rather than the cooperative developer.
American Carbon Registry (ACR) Forest Carbon Project Standard Guidelines for Aggregated Projects	Aggregated projects share a common baseline. At the time of verification, the verifier choses a sampling approach to ensure issued credits achieve the required level of assurance under ACR's statistical certainty requirements. Field visits are required every five years; however, each parcel of land does not need to be visited (Diamant et al., 2011).
Chicago Climate Exchange (CCX)[46]	Offset projects that sequestered less than 12,500 $mtCO_2e$/year had to be aggregated. Ten percent of the contracts in the aggregation program were randomly selected annually for on-site verification. If a verifier found a noncompliance rate greater than 3%, then offsets issued from the entire pool were reduced by the rate of error.

Benefits and Challenges of Aggregation

Aggregation is essential to achieving the economies of scale needed to cost-effectively implement energy efficiency and other small scale offset projects. Key benefits of aggregation include:

1. *Reduced transaction costs* – emission reduction registration, quantification, monitoring, additionality assessments and verification (amongst other items) are streamlined, lowering the cost per tonne of emission reductions.
2. *Enabling geographically and temporally dispersed reductions.*
3. *Reduced risk to aggregators and buyers* – the diversity of participants involved in an aggregated project can reduce risk to the aggregator and the offset credit buyers.
4. *Enabling 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.
5. *Preventing commercially sensitive information from being tied to a specific sub-project supplier.*
6. *Greater social impact* - In many cases, collections of small projects have a greater social impact than large projects, as more people share in the benefits. Aggregated projects enable broader participation in sectors that may not be economical without aggregated projects.

[46] Please note that the CCX no longer exists.

Aggregation System Requirements

Generating large volumes of offset credits from multiple aggregated projects (e.g. energy efficiency projects in multiple locations) can be complex, and if not properly managed, it may open the door to errors and omissions that risk credit invalidation due to lack of evidence, double counting or inability to manage the number of data points. Effective use of technology and proven business processes; however, can mitigate the risks associated with credit generation.

Project developers must be able to collect, review and track data from every participant in the project and this information must be made available to validators, verifiers, auditors and regulators. This means that a project developer will be working with hundreds, if not thousands, of participants at any given time. Therefore, best practices dictate that systems and processes adopted by an aggregator be designed so that they:

- Ensure that credits are generated in a consistent manner while adhering to the protocol requirements;
- Lower data processing costs through technological efficiencies (e.g. expanding existing databases to accommodate additional data requirements);
- Allow for controls-based verification rather than a file based verification[47]; and,
- Provide project transparency to participants, verifiers, offset buyers and the regulatory authorities and/or registries.

Best practices for aggregation dictate that large-scale aggregation projects should not be managed by project developers with simple data solutions, e.g., spreadsheets or word documents. Large scale aggregation systems should be built on a relational database such as MySQL, Oracle or a MS SQL Server. Sophisticated systems may include workflow management and document management tools. In addition to a data management system, it is imperative that the project developer has security and back up plans.

Recommendation: Aggregation

[47] Projects that have robust data management systems, with documented and prescribed control processes and procedures, enable the verifier to examine the controls placed on the data; rather than examining individual files for consistency and alignment.

21. ***We recommend that Newfoundland and Labrador ensure that the protocols that are developed, as well as the registry, enable aggregation.***

22. ***In addition, we recommend that Newfoundland and Labrador work with project developers and aggregators to encourage them to engage in best management practices to minimize verification risks associated with aggregation.***

6.11 Data Management Systems

Although Data Management Systems (DMS) are developed and paid for by project developers, it is important that expectations of the regulator are clear. For the purposes of this document, DMS means the software systems and databases that are used by project developers to collect, store, and manage data used to develop offsets. It includes all business logic and data logic used to calculate the final emission reductions.

In addition to managing the data that is required to demonstrate that an actual emission reduction has occurred, an effective DMS may also manage:

- Contracts
- Payments
- Documents
- Sales
- Client communications
- Client specific data
- Field agent information
- Workflow processes
- Verifications
- Transaction history (who entered or edited data)

Early offset system programs have learned that the development of robust data management systems takes time and may not be clear to project developers. Several platforms have developed and are commercially available that can be leveraged; however, clear expectations on the part of the regulator can help educate potential project developers on what is needed to meet the requirements of compliance-based offset markets. Best practice guides, seminars or webinars with project developers would help manage expectations.

Given the market expectations for Newfoundland and Labrador, it is expected that project developers will have experience in other markets and will likely have existing data management systems. Further,

several platforms have been developed by early actors in the offset markets and can be purchased in today's marketplace.

Benefits and Challenges

Data management is key component of ensuring integrity of all projects - especially in aggregated projects. A robust DMS will streamline the reporting, verification and audit processes for project developers as well as audit processes for the regulator, saving time and resources. Data management systems can be complex and expensive to build; however, a market is emerging for off the shelf platforms. At the start of an offset system, new project developers may not realize how robust their DMS needs to be. Extending 'Best Practice' on the part of the regulator may need to be part of the initiation for prospective project developers.

Recommendation: Data Management Systems

23. ***We recommend that Newfoundland and Labrador work with project developers to set expectations regarding data management and ensure that data management systems maintained by project developers can accommodate the necessary information to implement projects in Newfoundland and Labrador (given the capital and operational requirements that may be present in local projects).***

6.12 Credit Ownership

Proving clear title and claim to carbon offsets can be fraught with risks if not handled appropriately. Complexities are introduced in aggregated projects where many players are involved – the project developer, the aggregator, the technology provider (see examples below), the landowner or facility owner (which may be the government in the case of public lands) and the land manager (lessee). Further, additional risks are introduced in projects involving sequestered soil or forest carbon, since someone must be liable for maintaining the carbon sink for the specified permanence period, and the management of the lands may change over time. The circumstances under which ownership can become unclear/contended include:

- An offset project that is operating on public land (e.g. reforestation project on crown lands) or a project that is implemented on leased land by a lessee and not the land owner (e.g. leased lands that are managed by someone other than the individual who owns the land);
- A technology service provider that is installing a unit that results in emission reductions who may think they have a claim to the offsets rather than the investor (e.g. energy efficiency gains from the installation of digital thermostats; or landfill gas collection technology on landfills); and/or,
- When multiple, unrelated facilities are involved in the lifecycle of the project (e.g. biomass energy generation from the combustion of residues from forest industry activities).

As a result, a variety of methods to ensure clear title and claim to carbon offsets have emerged in regulated markets in Canada. For Newfoundland and Labrador, several examples of unclear ownership may arise such as energy projects involving renewable/efficiency technologies and technologies installed on buildings or lands owned by another entity (e.g., wind farms). Typically, where two or more parties have claim to the offsets, ownership must be established through a contractual agreement between the parties before verifiers in the system can sign off on the offset claim. For aggregated projects in regulated Canadian markets, one of two models of contract ownership between the project developer or aggregator and the producer of the offsets (i.e. wind farm developer or a fuel oil heated building owner) can be used. The options below consider the wind farm developer as an example:

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 wind farm developer. 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 wind farm developer 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 wind farm developer. In this case, the contractual agreement between the wind farm developer 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 wind farm developer. Title remains with the wind farm developer until the offsets are sold by the project developer to a buyer (a regulated industrial company, or another entity if the regulations allow). The contract should say when and how and by whom payment will be made. The verifier will want to see the contract in this case.

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 One, the project developer or aggregator will purchase the credits at a specific price once they are created. Once sold to the project developer, the credit supplier, in the case above, the wind farm developer, has no legal rights to the credits. Thus, the project developer could sell the credits to another buyer for a price higher than what was paid for them.

Option Two can be better for the credit supplier as the project developer is usually motivated to sell the credits for the highest price possible to maximize their agency fee. Option Two does have a much clearer ownership path and is therefore often preferred in practice by regulators.

Some markets go so far as to assign the rights to sequestered carbon to the landowner. In the Alberta Offset System, the soil carbon accrues to the current landowner and is transferred upon sale of the property, unless explicitly identified in the sale. The landowner must give written consent to the land

lessee for the rights to the carbon being sequestered on his/her land. Land titles are used to determine and prove land ownership for each farmer enrolled in the project to mitigate this risk.

Recommendation: Ownership

24. ***We recommend that Newfoundland and Labrador include a section in a general guidance document for project developers that outlines ownership related benefits and complexities.***

25. ***In addition, we recommend that Newfoundland and Labrador work with project developers to ensure that ownership issues are effectively addressed in contractual arrangements that may be established between parties in an offset project.***

6.13 Building Capacity and Continuous Improvement

Early stakeholder engagement is essential to successfully launching a new offset system. Knowledge sharing is key to keeping stakeholders informed, building capacity and enabling stakeholders to make well informed business decisions. On-demand support is necessary in the form of a website as well as knowledgeable staff. This is vital to addressing questions and concerns raised by stakeholders.

In the early days of Alberta's market, Climate Change Central developed and facilitated a series of Carbon Trading 101 workshops across the province to engage the stakeholder community. While these workshops were targeted at the agricultural community, the model could successfully be applied to any sector. As mentioned previously, Alberta also hosts an annual "Post-Mortem" to share information, provide updates of proposed changes and gather feedback on Alberta's Offset System. These meetings are an opportunity for offset system stakeholders (verifiers, project developers, aggregators, buyers, etc.) and regulated entities to learn as well as share their experiences for the betterment of the system. Webinars are another method of sharing information and building capacity. Webinars are especially effective when the audience is located across a large area. The costs to implement these activities will vary depending on frequency, range of participants and mode of meeting (webinar, in-person, etc.), but are not likely to be substantive. These costs are not included in Table 3.

Building capacity and gathering feedback are vital to the long-term function of an offset system and are vital to enabling continuous improvement of the system. Figure 6 illustrates the continuous nature of improvement. Quantification protocols, relevant emissions factors, and applicable performance standards must be reviewed and updated periodically as new best practice guidance or scientific information becomes available; or new regulations or legislation are implemented which would impact offset eligibility. Audits also are in important opportunity to gather feedback on how the system is working.

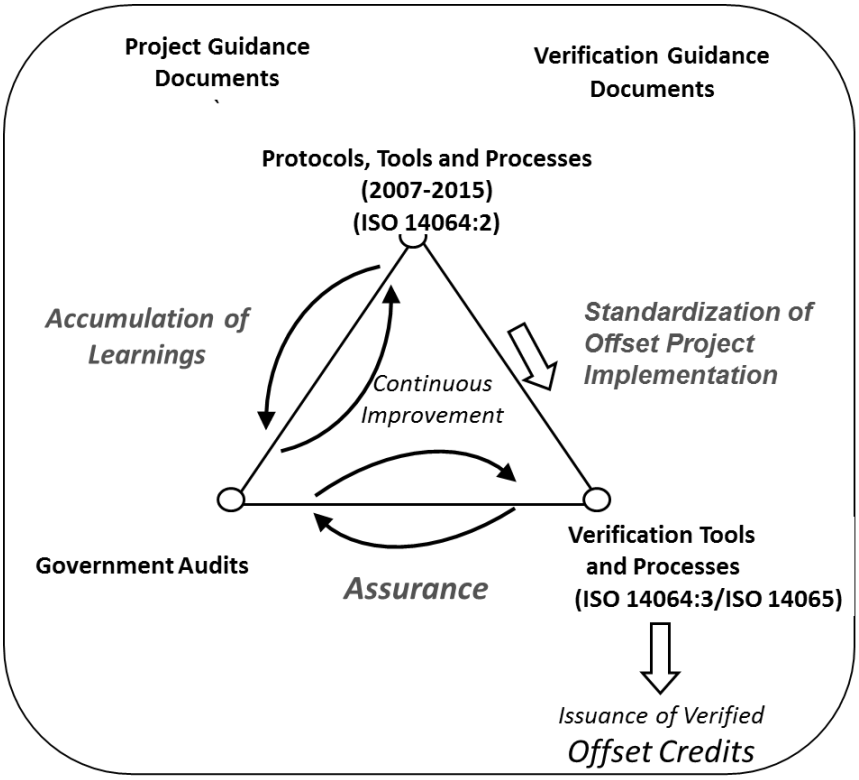


Figure 6: Continuous Improvement Framework

6.14 The Registry – Tracking Throughout Project and Credit Life

An offsets trading registry is an online database that issues, records and tracks carbon offsets exchanged within a carbon market or financed through Results-Based Climate Finance (RBCF) programs. Establishing a registry is the responsibility of the regulator, who may choose to partner with an existing service provider or construct a new build. Administration of the offsets trading registry may also be outsourced, with the option to recover administrative costs through the collection of user fees. In any case, the registry, as an important piece of an offset system's infrastructure, is required to demonstrate the uniqueness, transparency and accountability of project-based offsets throughout the project's lifecycle. A registry enables stakeholders to access required information. Failure to publicly list project information undermines the system. The registry is maintained so that verifiers, regulated entities and others can access information as required (as permissible by privacy regulations). For example, verifiers can access information required to complete their verification report. Similarly, regulators can access information to complete their compliance review. The government does not approve or reject a project on the basis on the amount or rigour of information provided in the registry.

It should be noted that the registry performs a completeness check on all documents submitted, the registry does not certify or validate any offsets posted on the site. Final acceptance of offset credits submitted for compliance is determined by the regulator. Table 18 below outlines some key registry terms used in this section.

Table 18: Registry Terminology

Removed	Part of a credit lifecycle. Voluntary removal of a serialized tonne from a registry. Reasons for removal include removal to list on another registry or issue identified with offset following serialization.[48]
Retired (Retirement)	Part of a credit lifecycle. The permanent removal of tonnes from a registry following the use of tonnes by a Regulated facility to meet obligations (regulatory or voluntary). It should be noted that offset credit can permanently be removed from a registry and retired voluntarily.
Revoked	Part of an offset credit lifecycle. Government initiated removal of a serialized tonne from an offset registry following audit.
Serialized	The issuance of a unique number to track all offsets associated with a project. Project serialization indicates that all required reporting is submitted and meets the needs of the system.
Serialization Engine	The portion of the registry that assigns unique identifiers to each offset.
Sub Project	An individual project which, when combined with other projects, forms an aggregated project. For example, a single wind turbine which is combined with other wind turbines to create an aggregated project.
Transfer	The transfer of tonnes from one party to another on a registry. This involves an ownership change on the registry. This could include transferring from project developer to aggregator to regulated facility upon sale of the credit.
Vintage Year	The year in which an offset (reduction or removal) was generated.

Figure 7 below outlines the four stages of an offsets project lifecycle. A project is displayed on a registry throughout the project life.

[48] An example of an issue could be an incorrect calculation that was not caught in initial project reporting or verification.

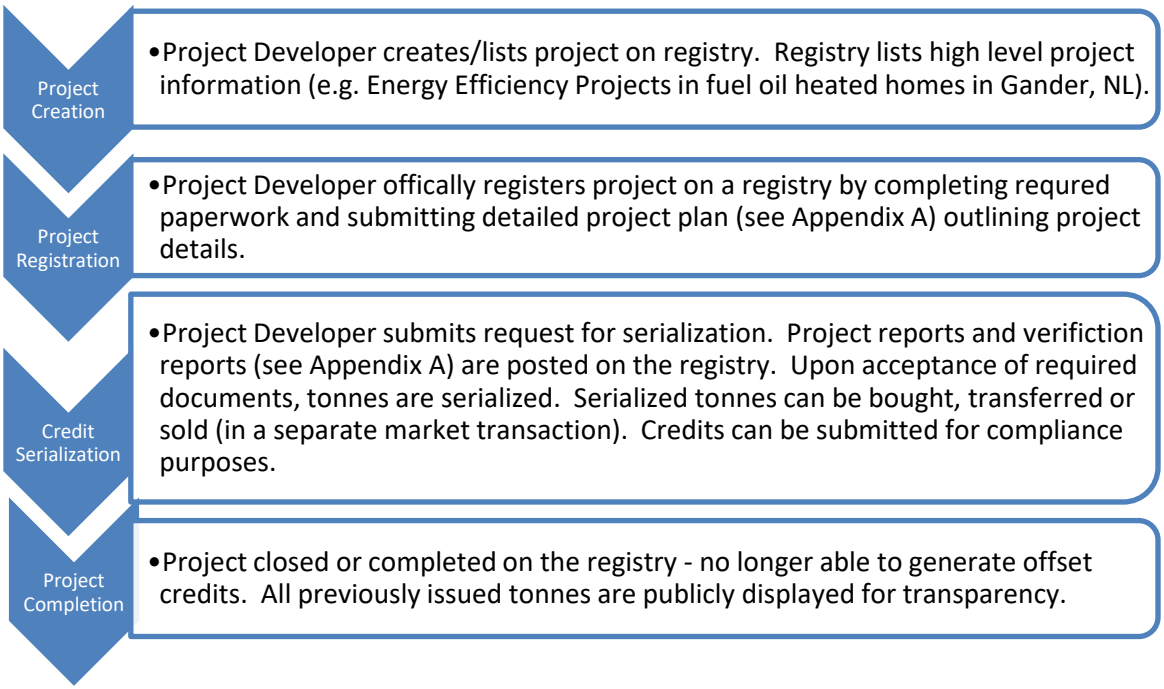


Figure 7: Project Lifecycle

Similar to the project lifecycle, an offset credit has several stages of life – all of which must be publicly tracked on a registry. Failure to transparently track credits throughout their life via a registry will undermine the integrity of the entire offset system. Figure 8 below illustrates the lifecycle stages of a credit.

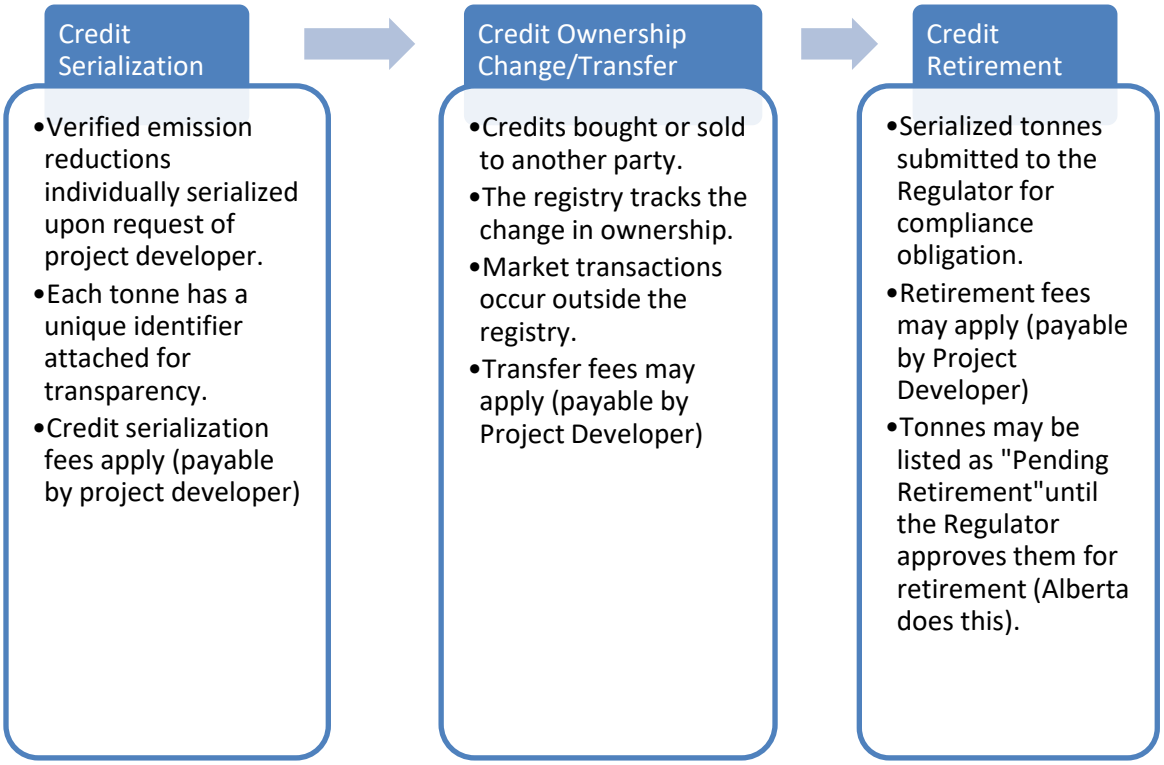


Figure 8: Credit Lifecycle

*The registry can remove (voluntarily) or revoke (regulated) tonnes at any stage of the credit's lifecycle. The Project Developer may request a removal to, for instance, serialize tonnes in another system. See definitions.

A well-functioning registry provides a secure, transparent, auditable and informative system on which all users can depend. While a registry can be developed to transparently track different credits (e.g. emission performance credits), the focus of this section is on carbon offset credits.

An offset registry is comprised of a project database and a credit issuance and tracking system. Table 18 below describes at a high level how project databases and tracking systems operate and outlines the expected roles of the Offset System Administrator. Table 19 provides an overview of Canadian registry statistics.

Table 19: Registry Components

Component	Description	The offset program administrator establishes rules, operating procedures, and requirements for:
Project Database	A project database contains all the information relevant to an offset project throughout its lifecycle. The project database includes basic identifying information, project plans, project reports, GHG assertions, project registration documents and validation and verification reports.	• Required information and documentation[49] • Data accessibility • Project document submission and housing • Project lifecycle phases[50] (listed, serialized, verified, retired, etc.)
Credit Issuance and Tracking System	A credit issuance and tracking system enables the generation and tracking of each offset credit through its credit lifecycle (serialization, transfer, retirement, cancellation).	• Credit issuance and serialization • Credit transfers initiation and completion • Credit retirements • Credit cancellation/revocations

Registry User Needs

When developing a registry, it is important to identify the variety of users and their needs. Although the primary goals of a regulatory registry are accountability and transparency, the needs of each user vary. Users of the registry can be classified into different categories: Government Regulator, Administrator (may be the Regulator or a third party), Project Developers, Verification Bodies, Regulated Entities, Brokers and the public/observers. Registry design should incorporate the needs of each user category. A brief overview of each user group's needs is provided in Table 20 below.

[49] A number of documents may be required to support the generation of an offset including greenhouse gas assertion, offset project report, offset project plan, spatial locator template (if applicable), verification report, a statement of qualifications, conflict of interest and/or Statutory Declaration. If required validation reporting can also be posted.

[50] Project Cycle Phases are specific to registry operation and refer to the stage of the project. See Definition.

Table 20: Registry User Needs

User	Rationale	Need	Consideration
Government Regulator	**Auditability** *The ability to effectively oversee, monitor and be accountable for the offset system.*	• Reporting of audit trail on a project detailing all transactions/requests (tracking a credit through its lifecycle). • Ability to search the registry.	• The ability to search based on several criteria including: serial number, vintage year, location, project type, project developer and offset status. • Ensure all government regulations are observed.
Administrator	**Traceability** *The ability to track and generate an audit trail.*	• Provide date/time stamp on all uploaded documents. [51] • Secure document retention for projects.	• Collect registry user fees, if fees are established (paid by project developers).
Project Developers	**Functionality** *Designed with ease of use in mind.*	• Processes to register and submit project documentation and conduct change of status transactions.	• Minimize duplication of work and streamline processes associated with creating and transacting an offset credit.
Validation and Verification Bodies	**Functionality** *Designed to facilitate ease of use in the verification of projects.*	• Ability to access project information and documentation uploaded by the project developer. • Processes to submit validation and verification documentation.	• Interface that allows easy access to project information. • Required submission of necessary documentation before the validation or verification can be completed in the system.
Regulated Entities	**Transparency;** *The ability to research and ensure compliance with Regulation.*	• Ability to view information on offsets (complete due diligence). • Ability to initiate retirement of a set of credits (request initiation	• Regulated entities must complete due diligence and access necessary information from the registry. • Serialized tonnes appearing on a registry are assumed to meet regulatory standards.

[51] Date stamps can be important to ensure timelines set out in regulations are met.

User	Rationale	Need	Consideration
		of retirement confirmation from registry).	
Brokers	**Functionality** *Designed to facilitate ease of use in the sale of offsets.*	• Ability to initiate change ownership of credits and see all credits in their name.	• While broker activity is limited in many markets, they may play a role in the future.
Public/Observer (including sub-project participant (e.g. individual farmers)	**Transparency** *Designed to publicly display information in a manner that the public can access and understand.*	• Review the project documentation. • Visual assessment of whether offset credits have been serialized on more than one registry. • Access to general reporting of offset projects and/or offset credits.	• The public may want to review the project documentation and how the GHG emission reductions occurred. • Duplication checks between registries (regardless of linkages) are part of due diligence. • Several registries will allow projects to be posted on multiple sites, but will only allow serialization on one. For example, a wind project could be listed on both the Newfoundland and Labrador Regulatory offset registry and a voluntary registry; however tonnes may only be serialized on one registry. • Registry must respect Access to Information and Protection of Privacy Act (ATIPP). http://www.assembly.nl.ca/legislation/sr/statutes/a01-2.htm Specific sections that may be of interest include: Sections 31, 33, 36, 38, 39 and 40.

Design Elements of a Central Registry

Registries are complex – they involve a significant amount of management, operational and supporting processes. High level characteristics (discussed in detail below) of registry design include:

(1) **Trustworthiness, Accuracy and Reliability**: providing a secure, transparent, auditable and informative system ensuring all relevant players, from the regulator to project developers, buyers, sellers and verifiers, can depend on the system to provide accurate information;
(2) **Flexibility and Workflow-driven**: Designing and developing a flexible system that can be easily modified as appropriate over time in response to user needs and feedback in a manner that ensures consistent and timely access to registry operations (i.e. allows continuous improvement);
(3) **Aggregation Enabling**: enabling the aggregation of projects in a manner that ensures integrity is key to stimulating investment in projects. While substantial data is collected in aggregated projects, only aggregated project data is displayed on the registry. The nature of information collected varies by project type. Enabling aggregation is discussed further below.

A more detailed description of specific design elements relevant to Newfoundland and Labrador is provided below. The various costs required to develop and maintain a registry are detailed in Section 4.

Trustworthiness, Accuracy and Reliability

Transparency, security and auditability are essential to the design of a robust registry system which is trusted, accurate and reliable. Without access to accurate and up-to-date information, it is difficult to determine if regulatory requirements and standards have been met. A registry provides a logical, systematic approach to ensure system quality, responsiveness and ease of use.

A trustworthy system is based on:

- **Security**: the system is protected, both logically and physically, against unauthorized access[52];
- **Availability**: if administration functions are out-sourced, the system is available for operation as required or specified in the service-level agreement[53];
- **Confidentiality**: information that is designated "confidential" is protected as committed or agreed and according to legal requirements. Confidentiality needs to be balanced with practicality. For example, high level project information (project type, contact) should be publicly available, while specific details (e.g. homeowners' names in an aggregated energy efficiency project in Gander) should not be shared;
- **Privacy**: personal information is collected, used, retained and disclosed in conformity with the commitments in the Registry's privacy notice and with the privacy principles put forth by the Canadian

[52] Logical Security consists of software safeguards for an organization's systems, including user identification and password access, authenticating, access rights and authority levels.
[53] A service level agreement may be required when entering a partnership with an existing registry. For example, partnering with a registry in another time zone may require modification to hours of availability. Details of the arrangement may be included in a Service Agreement.

Institute of Chartered Accountants (CICA), Newfoundland and Labrador Access to Information and Protection of Privacy Act and Federal privacy law.[54] The secure handling and transferring of data is integral to build trust within the system; and

- **Accuracy, Reliability and Auditability**: The availability of accurate data records with demonstrable data integrity demonstrates the overall integrity of the system and ensures government accountability. It is necessary to ensure that system processing, including data manipulation and reporting, is complete (e.g. request for serialization, transfer, retirement), accurate, timely and authorized.

  The chain of custody of data and documentation, meaning the chronological paper trail containing every key date, action, participant and transfer is necessary to demonstrate clear ownership. It is crucial that a registry provide auditable and detailed reporting, including date and time stamps. Robust audit trails should be kept including who accessed files, when, and any data manipulations.

  From the regulator perspective, the ability to easily access accurate information and maintain a transparent and auditable chain of custody is integral in demonstrating accountability. Timestamping and documenting user accounts during document upload, project registration, and credit issuing(serialization), transferring and retiring maintain an auditable chain of custody.

To build trustworthiness, it is also important to have a clear, understandable user experience, which includes direct contact with registry staff through telephone and/or an online Help/FAQ section (web toolsets) to assist as required.

Transparency

Transparency is also important to demonstrate the integrity of a regulatory system and is foundational to trustworthiness and accountability. Access to transparent, publicly-available information (within privacy constraints) demonstrates the integrity of the system and is key for the government to demonstrate the effectiveness of its regulatory approach.

The registry collects and displays a significant amount of information to support offset claims. Appendix A outlines high-level information collected through standard registry operations (e.g., offset project plan, project report and verification report). While some information is intended to be available to the public, it is vital to ensure security of confidential information, where appropriate. For example, although individual homeowners

[54]Professional accountant institutions in the United States and Canada collaborated to publish a document describing the Generally Accepted Privacy Principles (GAPP). The GAPP facilitate management of privacy policies and programs on a local, national and international level. Accountants, among other professionals, face a number of differing privacy legislation and regulations. The GAPP offers a comprehensive framework for designing an effective, privacy program that can be applied in a number of industries and professions.

in an aggregated energy efficiency project in Gander, should not have their information displayed, the project developer/aggregator should. All payment-related information must also be kept private.

For transparency, high-level statistics (e.g., number of projects, number of tonnes serialized, number of tonnes retired, etc.) should be available via the public platform, including number of projects, quantity and origin of credits serialized, project reporting documentation, and other types of information deemed relevant by the regulator.

Unique and Descriptive Serial Numbers

A unique serial number tracks a credit throughout its lifecycle. An effective registry uniquely identifies (serializes) and tracks each credit throughout the credit lifecycle in the regulatory system, which provides an audit trail for the regulator. The most significant accounting risk is "double counting"—where a single greenhouse gas emission reduction or removal unit is used to generate more than one offset credit. The creation of unique serial numbers in the registry ensures no double counting of offsets within the system. Unique numbers also facilitate tracking of ownership transfers and retirement requests, supporting the validity assessment of offsets submitted for compliance purposes. Descriptive serial numbers are discussed further in the following section.

An international convention on registry numbers does not exist; however, a serialization engine which provides unique descriptive serial numbers is ideal.[55] Descriptive serial numbers provide transparency as they provide information on credits including identifying the registry, jurisdictions and project or credit types. In addition to meeting transparency standards of other registry systems, descriptive serial numbers provide users with important high-level information about a project and easily enable future scenarios in which offset projects and/or credits originating in other jurisdictions are accepted (if linking with other systems is desired in the future).[56] A descriptive format also assists both the public and stakeholders in understanding the nature of the reduction at a high level. The serialization designation for each credit ideally contains unique, identifiable specific information including[57]:

- Originating system (Regulatory system in Newfoundland and Labrador);
- Credit type (offset or performance);
- Project type/facility number according to each system (carbon offsets or regulatory emissions reporting);
- Country and Province of origin (only credits eligible at this point are from Newfoundland and Labrador);
- Numeric identification of the project developer (offset credit); and
- Vintage year of GHG emission reductions / removals.

[55] Alberta's registry (CSA) uses a random number which does not follow a set format. BC's new registry has not developed serial number format to date.

[56] At this time, legislation does not provide for linking.

[57] Descriptive serialization number format is designed to illustrate potential expansion to other regulatory marketplaces or desired functionality.

A sample serialization format is provided below (Table 21) as an example of what a descriptive serialization number could look like. It is a hypothetical energy efficiency offset project that has registered a carbon offset credit range of 15,000 credits. This serialization format was developed based on the Clean Development Mechanism (CDM) international credit system and an assessment of other registry systems, including Voluntary Carbon Standard, Gold Standard and California Compliance Registry.

Table 21: Sample Serialization Format (NL-GHG–10-CA-NL-00125-2013-12-10000 to 25000)

Identifier	Description	Examples	Range
NL	Originating System	Newfoundland and Labrador = NL, Alberta Offset System = AOS; Saskatchewan = SOS	Alpha - up to three digits
GHG	Credit Type	Greenhouse Gas credit = GHG; Emission performance credit = EPC	Alpha - up to three digits
10	Project type	E.g. Energy Efficiency; Numbered protocols by type or numbered facilities for EPC's	Range 1-9999
CA	Country of origin	Canada = CA United States = US	(Alpha – two-digit country codes)
NL	Province (or State) of origin	Newfoundland and Labrador = NL Alberta = AB Saskatchewan= SK	(Alpha – two digit)
00125	Project/Facility ID (Originated by the registry)	Numeric ID attached to each Project or Facility ID. E.g. "ACME Project" is 025 and "NARL facility" is 2594	Range 1-99,999
2013	Vintage (Registered year)	2017	(Numerical – 4-digit year)
12	Batch Number (number assigned to each batch of offsets created; unique to the originating registry/system)	It is typical that a project's credits be serialized in a 'batch' or lump sum. This type of function will allow for that. (e.g. an energy efficiency project where sites 1-100 are serialized at one time (as a batch). Sites 101-	Only numeric – Range 1-999,999,999

Identifier	Description	Examples	Range
10000	Sequence number (allowing for up to 1 billion units)	200 could be serialized later (as another batch) Consecutive number attached to each sequential tonne	Only numeric – Range 1-999,999,999

Flexible and Workflow Driven

Legislative frameworks, best practices and emerging trends in other regulated markets are also important to consider when designing a registry. The needs of stakeholders and the market are also constantly changing. A flexible registry ensures that the regulator, regulated facilities and all stakeholders can work 'smarter' and 'faster,' thereby ensuring efficiency in registry use and operation.

Flexible workflows enable registries to be used for different types of credits with the same features as the offsets registry, including user function, auditability and automation. For example, a flexible registry could be used for both offset credits and performance credits that are generated from industrial facilities. A performance credit registry that is not structurally dissimilar to an offset credit registry is required for tracking. Both the offsets registry and performance credit registry would involve the public display of vital project or facility information and the tracking of credits through the system.

While similar, there are subtle differences between a performance credit registry and an offset project registry. Performance credit tracking systems are simpler as there are not as many types of users – regulated facilities use the registry to track and submit credits for compliance (there are no project developers). Posting project documentation, including reporting and verification documents, is not needed – a performance credit is issued by the regulator and is considered irrevocable.

Offset credit systems are evolving rapidly and more offset systems are being established. Throughout this evolution, identified market concerns will need to be integrated into existing offset systems to ensure standards continue to be met. As systems and programs evolve, it is important to design a registry system that is flexible and can be easily changed to meet changing needs and requirements. This is especially important to consider in the development of a new registry as it is most easily achieved when developed from the beginning.

A flexible registry software design will enable efficient updates and extended functions. Future considerations may include:

- The ability to link to trade exchanges (e.g. North American Climate Exchange (NACX));
- Linking to other jurisdictions or automated data sharing with other registries (regulated or voluntary); and

- Integrating other aspects of the Regulation to provide a consistent overview of compliance obligations. This could provide regulated entities with the ability to connect to a single-secure portal where all regulatory obligations could be managed from a single dashboard.

Aggregation Enabling

If aggregated projects are allowed in an offset system, sub-projects (see definition) must be tracked, which requires special consideration. Aggregated projects are comprised of multiple sub-projects. Sub-project tracking is vital to ensure that they are not registered in more than one aggregated project. Sub-project data such as location, site ID, or equipment identification numbers is required to assess the uniqueness of the sub-project and the associated emission reduction. The information that will be required to assess uniqueness of a sub-project will need to be determined during protocol development. For example, in an energy efficiency project, the protocol could require that the homeowner's or business owner's name, street address, telephone number, postal code and GPS location be provided as well as information pertaining to the type of energy efficiency upgrades implemented (serial number, activities undertaken).

Project developers/aggregators must be required to provide sub-project information during the project serialization process. This information will enable the registry to assess the uniqueness of each sub-project—both within the aggregated project being serialized and other aggregate projects. Information collected by the registry is used to assess the uniqueness of sub-projects and is not typically displayed publicly.

Access to information and privacy legislation should be considered in aggregated projects. An ideal registry system is designed with the capacity to manage aggregated project types and conduct automated duplication checks as required. For example, an automated check through the registry system upon registration could take place to assess the uniqueness of each sub-project.

Additional Desirable Features of a Registry

The following features may be considered desirable in a registry, but are not essential:

- A registry system with an automated "paperless" design may reduce turnaround time for project registration while minimizing transaction time and tracking. In practice, electronic files are uploaded to the registry (e.g. project report, verification report) for staff review; however, it is possible to design a system that reads files (e.g. PDF files) and assess completeness, which streamlines processing time.
- A registry platform that provides specific reporting requirements and deadlines based on user types can increase transparency. Table 22 below lists a few examples of reports by user type.

Table 22: Possible Registry Report Types by User

User/ Role Based Profile	Reports Available	Description
Government Regulator	Chain of Custody reports	A transaction log for all credits serialized after a specific date for management and enforcement purposes. This report could display the current and previous owners of a credit and all associated transactions.
	Lifecycle Report	A life cycle report for all credits serialized after a specific date. This report could show key actions and dates including serialization, transfer, initiation of retirement and retirement.
	Registry Report	One page report containing up to date high level statistics on the registry.
Project Developer/ Aggregator	Asset reports	An asset report could allow project developers to view all assets in their name including credits across projects.
	Transaction logs	A transaction log could be available for all credits serialized after a specific date.
Public	Registry Report	One page report containing up to date high level statistics on the registry.

Global Examples of Registry Operations

Most existing systems have outsourced the development of their IT systems (see table below); however, the operation of registries varies by system (Partnership for Market Readiness, 2015). Private sector commercial registry service providers such as Markit or APX offer customizable platforms whereas other systems use off-the-shelf systems with generic interfaces and procedures.[58] Table 23 and Figure 9[59] below present the models used by a few common offset systems[60] [61].

[58] Service providers are flexible with regards to system updates. Customization is part of the contract. Recent innovations to APX include an extensive registration report for administrators that tracks all fields entered by the project developer, a forward transfer function that allows for instantaneous credit trades, and allows the project developer to manually release credits into their account in order to control when the issuance fee invoice is generated.

[59] Both and Table 2 are reproduced from Partnership for Market Readiness, 2015.

[60] Programs that provide voluntary offsets to their retail customers (airlines, for example) typically purchase large blocks of offsets through a public registry and then manage the offset inventory internally.

[61] Markit has offices in Vancouver, Calgary and Toronto. APX operates as a US company.

Table 23: Project Database and Tracking Registries in Common Offset System

Offset Program	Registry IT Provider	Notes	Links
Alberta	Canadian Standards Association (CSA)	Project database and tracking system. Recently revised to include Emission Performance Credits. CSA also runs voluntary Clean Projects Registry.	http://www.csaregistries.ca/albertacarbonregistries/home.cfm
BC	Markit	Project database	https://mer.markit.com/br-reg/public/bc/index.jsp
QUE	In-house	Project database	http://www.mddelcc.gouv.qc.ca/changements/carbone/credits-compensatoires/registre_creditscompensatoires-en.htm
Ontario	TBD		TBD
Climate Action Reserve	APX	APX provides and maintains the software platform for CAR's offset project registry, which is customized to CAR's unique interface and the programmatic requirements of both CAR's voluntary protocols and the California compliance protocols. CAR submits software change requests to APX on a regular basis and APX makes the requested revisions to a test site where updates are tested prior to full implementation.	https://thereserve2.apx.com/mymodule/mypage.asp
Clean Development Mechanism (CDM)	In-house		https://cdm.unfccc.int/Registry/index.html
Global Standard (GS)	Markit	GS projects are registered in Markit's general registry system, but identified as GS projects. The Markit registry functions as both project database and credit issuance/tracking system.	http://www.markit.com/product/registry

Voluntary Carbon Standard (VCS)	APX Markit	Both registry service providers maintain credit issuance and tracking systems. They also maintain project tracking systems that link to a central VCS project database. Project developers must register with either one of these service providers and submit validation and verification reports to them, as well as submit information to the VCS project database at different stages of the project cycle.	VCS project database http://www.apx.com/ http://www.markit.com/product/registry
Climate Community and Biodiversity Standard (CCBS)	APX Markit	CCBS certification is flagged in the project information provided by the APX and Markit registry platforms. CCBS also maintains its own project database page.	CCBS project database http://www.markit.com/product/registry http://www.apx.com/
Social Carbon	Markit	The project information Markit provides flags Social Carbon certification. Social Carbon does not maintain a separate project database.	http://www.markit.com/product/registry

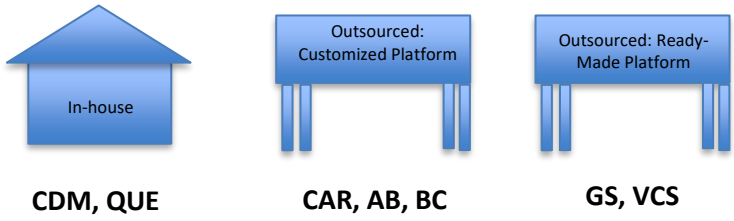


Figure 9: Registry Approaches

Designing a Registry

The first step in the design of a registry should be a needs assessment to identify the right functional balance, including an analysis of risks and scalability requirements (Partnership for Market Readiness, 2016). Policy makers should explore alternative management structures, including who will be responsible for the administration of the registry, its management and operational and supporting processes (e.g. an interactive IT system). These decisions will impact the cost and resources needed.

An assessment of registry opportunities for Newfoundland and Labrador, based on the anticipated market, is provided in this report in the following section.

There are pros and cons associated with both development of a new unique registry system and partnering with an existing organization. At a high level, the pros and cons are explored in Table 24.

Table 24: Pros and Cons Associated with Registry Model

	Pros	Cons
Ground- Up Build and Administration	• Ability to customize – designed to ensure compliance with needs and expectations • Potential ability to recoup costs through fees • Ability to include performance credits • Maintain sovereignty over the registry	• Registry operations are complex – there is significant work involved with designing and administering a registry • Costly to build • Time-intensive to build • Qualified staffing is required (registry expertise and database expertise)
Partnering with Existing Service Provider	• Some ability to customize • Likely reduction in cost to put in place (relative to ground-up) • Expedited launch • Registry staffing (ability to staff with knowledgeable parties)	• Depending on the nature of customization required, the cost to adapt software can exceed the cost to build from scratch. • Risk of discontinued service.[62] • May have annual licensing and staffing fees regardless • Need for contractual arrangements to ensure ministerial accountability for overall system, which may come at a cost • Ability to adapt to include performance credits unknown.

User Fees

User fees are an important mechanism of recouping the cost associated with registry development and administration. Most registries are operated on a fee-for-service basis. While the exact expectations differ by registry, the fees are generally associated with various stages of the project or credit life cycle (previously discussed). Table 25 below summarizes registry fees associated with several registries. It should be noted that charging fees based on services required means that revenues are unpredictable in both the amount and timing. For example, a project may not serialize tonnes every year. In addition, the more complex the fee structure the more difficult it is to predict revenues. Moreover, since fees are paid for by project developers and are passed on to regulated entities, it is important to balance fee structure within a broader business case for investment in offsets project by regulated entities. In this context, it is likely that revenues that may be received will not result in full cost recovery for registry operation.

[62] Should the third party cease to exist, revenue generating assets (contracts) would likely be purchased by another service provider and service would likely continue although there may be short interruption in service.

Table 25: GHG Emissions Offset Registry – Cost Structure Review

Registry/Exchange	FEES
Alberta Emissions Offset Registry (AEOR)	
Project Listing	No Fee
Project Creation	$500
Project Registration/	$500 to register; $500 to post associated documents[64] and 0.10 per tonne serialization
Project Add On[63]	$500
Intra-company Transfer	no charge
Inter-company transfer	$0.02 per tonne
Pending Retirement	$0.02 per tonne
Retirement: No Fee	No Fee
Corrections to Project: No Fee	No Fee
British Columbia	BC has a flat $30/tonne cost that is absorbed within provincial budgets
GHG Clean Projects Registry (CSA)[65]	
Verified Emission Reduction/Removal VERR = 1 ton CO_2e	
Registration Fee = Internal Administration/Processing Project (Mandatory)	$200
Display New GHG/Ver Report (Mandatory)	$250
Serialization and display VERR's (post reports, update account statement; includes delisting/retirement)	$0.05/VERR
Transfers/Change of Status	*Current no charge*
No Retirement Charge	*Current no charge*
Clean Development Mechanism[66] (CDM) - USD	USD
Certified Emission Reduction (CER) = 1 ton CO_2e	

[63] Project Add-on refers to the serialization of additional tonnes under one project. For example, a project may serialize 2017 tonnes in 2018 and serialize additional tonnes (add-on) in a subsequent year.
[64] Document posting fee applied each time the request is made. For example, multiple documents can be posted at one time for the fee.
[65] http://www.csaregistries.ca/reductions/index_e.cfm?err=There_was_no_VERR_found
[66] https://cdm.unfccc.int/Reference/Guidclarif/reg/reg_guid07.pdf

Registry/Exchange	FEES
Registration fee = *share of proceeds applied to expected annual average ER* for project activity over its crediting period Maximum registration fee Registration - Certified emission reduction for the first <15 000 Registration - CER in excess 15 000 in calendar year Issuance of CERs	*$1000* *No fee if <15,000 ER over credit period* Max: $350 000 USD $0.10/CER to $0.20/CER +2% of actual registration
Climate Action Reserve (CAR (APX[67])) - USD - Climate Reserve Tonne (CRT) = 1 tonne CO2e Project Submission Fee Account Set up fee Account Maintenance Fee (Annual) CRT Issuance Fee (per issued) Account Transfer Fee (per CRT transferred, paid by seller) No charge Retirement	USD $500 $500 $500 $0.22/CRT $0.03/CRT
VCS Offset Project Registry Fee Schedule[68] Account opening/set up (one-time) Account maintenance (annual)* Project listing submission (per project) Issuance** (Non-forestry projects) Issuance** (Forestry projects) Activation/cancellation† (Non-forestry projects) Activation/cancellation† (Forestry projects) ROC holding‡ Transfer (per unit)	 $300.00 $300.00 $500.00 [Estimated issuance*** x $0.16] capped at $10,000 [(Estimated issuance*** – Buffer****) x $0.16] capped at $10,000 [(Total issuance x $0.16) – Issuance fee] [(Total issuance – Buffer) x $0.16] + [Buffer x $0.04] – [Issuance fee] $5,000 $0.03

[67] http://www.climateactionreserve.org/how/program/program-fees/
[68] http://www.v-c-s.org/oprfeeschedule/

Registry/Exchange	FEES
Cancellation of early action VCUs (per unit)	$0.03
APX VCS Registry (USD)	
Issuance Fee (per VCU)	$0.05 /VCU +
VCSA Levy Fee	$0.10 /VCU
Transfer Fee	**$0.15 /VCU**
Annual Subscription Fee	**$0.02 / VCU**
No charge Retirement	$500.00
MARKIT ENVIRONMENTAL REGISTRY	
Account Set up fee	$500.00
Annual Account Fee	$100.00
Account Closing Fee	$150.00
Retirement Certificate	$200.00
VCS Issuance Fee	$0.05 /VCU + VSCA $0.10/VCU **= $0.15 /VCU**
Transactions Fee	**$0.02 /VCU**
APX Gold Standard Registry[69] **–** Gold Standard	
Voluntary Emissions Reduction(VERs)/Certified	$500.00
Emission Reductions (CERs) credits	*$0.10 USD per credit of expected average*
Account Subscription Fee – Annual	
Pre-feasibility assessment fee	*$0.05 USD per credit of expected year*
Project Registration Fee	*$0.05 USD per GS CER*
Credit Certification/Issuance Fee	*From $0.10 per Credit*
Subsequent issuances	
Fee scale for Microscale projects	
American Carbon Registry [70] Voluntary (USD)	
Account Set up fee	$500
Annual Account Fee	$500
Issuance Fee	*Free*

[69] http://www.goldstandard.org/sites/default/files/documents/annex_I_2016.pdf
[70] http://americancarbonregistry.org/how-it-works/membership/acr-fee-schedule.pdf

Registry/Exchange	FEES
Transactions Fee variance based on Founding Member and Member transactions (fee for both parties) Activation Fee Transfer and cancellation fee	*From $0.05 to $0.14 per offset* *$0.15* *From $0.02 $0.03 per offset*

Expected registry fees collected are nominal as activity is expected to be limited. Table 26 below summarizes two hypothetical scenarios – a low tonne scenario and a high tonne. The low tonne scenario is based on a total of three projects registered totaling 15,000 tonnes annually. The high tonne scenario is based on a total of five projects registered totaling 25,000 tonnes annually. Total revenue generated through registry fees would be $4,500 in the low tonne scenario and $7,500 in the high tonne scenario.[71]

Table 26: Hypothetical Registry Fee Revenue Scenarios

Registry Action	Registry Fee Low Tonne Scenario	Registry Fee High Tonne Scenario
Number of Projects	3 Hypothetical Projects Project 1: 3500 Tonnes Offsets Project 2: 2000 Project 3: 9500	5 Projects Project 1: 3500 Tonnes Offsets Project 2: 2000 Project 3: 9500 Project 4: 4000 Project 5: 6000
Project Listing	no Fee	no Fee
Project Creation (@ $500 per)	$ 1,500	$ 2,500
Project Registration (@ $500 per)	$ 1,500	$ 2,500
Project Serialization ($0.10 per tonne)	$1,500	$ 2,500
Annual Revenue Collected Through Registry Operations	$ 4,500	$ 7,500

Using the costs in Table 25 and fees in Table 26, we estimated a simple payback (excluding time value of money) assuming no future projects are funded in future years (Table 27). The minimum simple payback for a standalone registry is 54 years (lowest cost and the highest tonne scenario). The maximum payback for a standalone registry is estimated over 450 years (high cost and lowest tonne scenario). The minimum simple

[71] Based on registry fees outlined for Alberta's Offset System.

payback for the registry partnership is 2.7 years (lowest cost and the highest tonne scenario). The maximum payback for the registry partnership is estimated at 40 years (high cost and lowest tonne scenario).

Table 27: Simple Payback of Registry Options without Annual Operational Cost

	Registry Cost		Registry Revenues		Simple Time to Payback (not including interest - years)
Ground-up Build	Low Cost	$405,000	Low Tonne (3 projects totaling 15,000 tonnes)	$1,500.00	270.0
			High Tonne (5 projects totaling 25,000 tonnes)	$7,500.00	54.0
	High Cost	$680,000	Low Tonne (3 projects totaling 15,000 tonnes)	$1,500.00	453.3
			High Tonne (5 projects totaling 25,000 tonnes)	$7,500.00	90.7
Partner with Existing Service Provider	Low Cost	$20,000	Low Tonne (3 projects totaling 15,000 tonnes)	$1,500.00	13.3
			High Tonne (5 projects totaling 25,000 tonnes)	$7,500.00	2.7
	High Cost	$60,000	Low Tonne (3 projects totaling 15,000 tonnes)	$1,500.00	40.0
			High Tonne (5 projects totaling 25,000 tonnes)	$7,500.00	8.0

Including the operational staff and additional fees associated with hosting a registry (website cost) further illustrates the cost effectiveness. Including these operational fees further decreases the cost effectiveness of a ground-up build.

Recommendations: Registry Design and Administration

26. We recommend that Newfoundland and Labrador:

- ***Pursue a ready-made approach by partnering with an existing service provider (e.g. APX or Markit, CSA).***
- ***Pursue a 'one stop compliance window' that would integrate an offset registry and performance credit registry.***
- ***Complete a technical and detailed risk assessment that considers e-commerce, cyber security and other property rights legislation (such a review is beyond the scope of this study), prior to entering into a service contract with a service provider.***

7.0 Providing Stability for Project Investment

Offsets are a way to incent the adoption of new technologies, management practices, activities, etc. in the private sector and 'offset' the cost. Often the financial benefits associated with an offset are considered in the investment decision. While potential participants may want to 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 reductions for a set period. To enable a robust market, it is necessary to provide project developers with both baseline stability as well as stability of the system. Establishing crediting periods over which a project can generate offsets is another means of providing stability. 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. Each jurisdiction can set their own project crediting period; for example, Alberta has an 8-year crediting period with a possible 5-year extension (see Table 1 at the beginning of this report).

7.1 Project Certainty and Baseline Stability

The Regulator can implement a variety of strategies to make offset projects more attractive to business investors by providing stability. These include:

- Establishing a time during which a project developer may apply a given quantification approach (e.g. Crediting period of 8 years).
- Creating baseline certainty for which the project can apply the given baseline. This provides assurance as to the rate of offset creation over a given time. This may allow developers to acquire and retain project financing.

Sequestration projects typically require extended crediting periods and need to be assessed based on project types (e.g. forests vs soil carbon sequestration) since the time it takes for equilibration of the carbon dynamics to reach a steady state will differ between project types.

This would be similar to Alberta's system (e.g. soil carbon is 20 years), and likely what Ontario will do. Forestry projects can have longer timeframes, but it will depend on the forest mix and climatic conditions. The crediting period for California forest projects is 30 years.

The Pan-Canadian Framework has four pillars, including pricing carbon pollution; complementary measures to further reduce emissions across the economy; measures to adapt to the impacts of climate change and build resilience; and actions to accelerate innovation, support clean technology, and create jobs. Together, these interrelated pillars form a comprehensive plan to drive change. At the time of writing, work is under way to assess a number of opportunities that may impact offset eligibility across the country.

Recommendation: Project Certainty and Baseline Stability

27. ***We recommend that Newfoundland and Labrador wait until the Pan-Canadian Framework Offset Initiative complete their work to assess the approach for project certainty and baseline stability.***
28. ***We also recommend that Newfoundland and Labrador, with respect to sequestration projects, work with local experts in the province to determine the equilibration timeframe for each sequestration project type during protocol development processes.***

7.2 Limited Credit Liability

The offset liability period refers to the time during which an offset can be invalidated if it is found not to result in a real, quantifiable and permanent reduction in greenhouse gas emissions. Any offset can be invalidated – regardless of the nature of the offset and in in some systems regardless of the findings of previously completed verification and audit processes. Alberta has an unlimited liability for revocation of offsets. California's system has finite liability periods of either 3 years or 8 years. For example, completely unrelated occupational health and safety violations, in the past have had the potential to invalidate offsets. The California system burdens project developers with ensuring all aspects of the law—not simply those relevant to securing a reduction, increasing the risk of revocation; however, California is now relaxing its standard of regulatory compliance somewhat. Quebec and Ontario will likely align with the liability periods in California.

Recommendation: Credit Liability

29. ***We recommend that Newfoundland and Labrador place a limit of eight years on invalidation of offsets to provide project developers with more certainty and allow credits to hold their value. We also recommend that this value be reduced to three years if a project undergoes a second full verification.***

8.0 Conclusion

in June 2016, the Government of Newfoundland and Labrador (NL) passed the *Management of Greenhouse Gas Act*. The *Act* requires all facilities emitting more than 15,000 tonnes of CO_2e per year to annually report their emissions and industrial facilities in the manufacturing, oil and gas extraction, mining and electricity generation sectors emitting more than 25,000 tonnes of CO_2e per year to meet GHG reduction targets. Similar to GHG legislation in other jurisdictions (such as Quebec, Ontario, Alberta and Canada), regulated facilities have the flexibility to reach compliance using several different mechanisms. Specifically, regulated facilities can make on-site improvements (such as reducing venting, fugitive and flaring emissions), purchase carbon offset credits from unregulated sectors and/or pay into a greenhouse gas reduction fund (i.e. purchase "fund credits"). Furthermore, regulated facilities that exceed their targets through on-site improvements can generate "performance credits"

The Office of Climate Change is currently in the process of establishing standards for the development, quantification and verification of GHG emission reduction (offset) projects. To assist with this process, the Office of Climate Change engaged Viresco Solutions, Brightspot Climate and Climate Action Reserve to complete the above report on offset system design and provide recommendations on how Newfoundland and Labrador should move forward. The report covers the roles and responsibilities of market stakeholders, offset system governance, management and development (including estimated costs associated with in-house versus out-sourced management), essential offset criteria (including the protocol development process), factors that influence market integrity (i.e. additionality, start date, leakage, permanence, verification, auditing, credit certification, validation, aggregation, credit ownership, data management system) and methods of providing stability for project investment; and draws on the project teams experience working in other jurisdictions. Table 29, provides a brief description of these jurisdictions; however, a more comprehensive comparison is provided in Table 1 of Section 2.0.

Table 28: Brief Overview of Canadian Offset Systems

System Component	British Columbia	Alberta	Ontario	Québec
Description	Offset market created to enable public service	Offset market that requires large final emitters	Western Climate Initiative cap and trade program	Western Climate Initiative cap and trade program

System Component	British Columbia	Alberta	Ontario	Québec
	carbon neutrality; coupled with a tax on certain fuels.	(emitting more than 100,000 tCO_2e/year) to reduce emissions; coupled with a levy on certain fuels.	that regulates emissions from facilities and natural gas distributors with emissions of 25,000 tCO_2e or more/year.	that regulates emissions from facilities and natural gas distributors with emissions of 25,000 tCO_2e or more/year.
Reduction Target	Reduction of at least 33% below 2007 levels by 2020 and 80% below 2007 levels by 2050.	A reduction by December 31, 2020 of specified gas emissions relative to Gross Domestic Product to an amount that is equal to or less than 50% of 1990 levels.	A reduction of 15% below 1990 levels by the end of 2020, a reduction of 37% below 1990 levels by the end of 2030 and a reduction of 80% below 1990 levels by the end of 2050 (with starting cap set at 142,332,000 tCO_2e in 2017).	A reduction of 20% below 1990 levels by 2020. The Government publishes in the Gazette officielle du Québec a notice of the caps for each year. The cap is set to decrease annually at an average rate of 4% a year to help Quebec achieve its 2020 GHG emission reduction target (when the cap is set at 54.74 million tCO_2e).
Compliance Options	Internal reductions and/or carbon offsets.	Internal reductions, performance credits, purchase of carbon offset credits or payment into the Technology Fund.	Internal reductions, purchase of carbon credits (including early reduction credits) or purchase of emission allowances.	Internal reductions, purchase of carbon credits (including early reduction credits) or purchase of emission allowances.

System Component	British Columbia	Alberta	Ontario	Québec
		Unlimited usage of offsets.		

At a high level, the project team recommends that Newfoundland and Labrador build on learnings from these jurisdictions by ensuring it provides clear system oversight, ongoing technical guidance and annual opportunities for stakeholder engagement. Furthermore, the offset system framework must allow offsets to be generated in a cost-effective manner; protocols must be economically viable and environmentally credible; verification and registry costs must be reasonable; and aggregated project development must be allowed to increase the number of participants in the market. If these criteria are not met the offset market will be unlikely to flourish.

Table 30 provides a more comprehensive summary of the project team's recommendations by topic. In these recommendations, unique aspects of the Newfoundland and Labrador context, such as the limited number of regulated facilities (six or fewer in the near term) and anticipated demand for offset credits (expected to exceed supply in the medium to long term), have been considered.

Table 29: Summary of Report Recommendations

Topic	Recommendation
Framework	1. We recommend that Newfoundland and Labrador follow the approach of Alberta, British Columbia and Ontario to remain nimble and flexible based the framework outlined in Figure 2
Stakeholder engagement	2. We recommend that Newfoundland and Labrador take a three-part stakeholder engagement approach involving: a. Annual Stakeholder Sessions – to communicate updates, discuss challenges and encourage continuous improvement; b. Carbon Trading 101 Sessions – to help build understanding of regulatory requirements and project cycles; and c. Buyers Workshops – to build understanding of carbon trading and associated risks. 3. To maximize outcomes from these recommended session and workshops, we recommend Newfoundland and Labrador consider bringing in individuals from regulated entities, verifiers, and project developers from other jurisdictions with regulated offsets systems in place to share lessons learned.
In-house management	Protocol Development: 4. We recommend that Newfoundland and Labrador take a blended approach, where the regulator seeds the initial development of protocols (using a third-

vs. outsourcing

party contractor) and then signals to the private sector that they can champion protocol development. The Government of Newfoundland and Labrador has already made a significant investment into the development of three energy efficiency and fuel switching protocols and is, therefore, committed to the first part of this approach. Following initial seeding, stakeholder led protocol development can save costs, while still broadening the market.

5. If this path is chosen, we also recommend that a protocol development guide be prepared by the regulator (using a third-party contractor) and that the regulator vets third party protocol ideas to help ensure the idea meets the requirements of the system, before the protocol developer invests substantial time in its development.

Offset System Guidance:

6. We recommend that Newfoundland and Labrador outsource the develop of offset system guidance, since this guidance is technical in nature and requires specific expertise.

Offset System Management:

7. We recommend that Newfoundland and Labrador provide market support in-house using existing staff where possible and develop its own website to save costs.

Market Oversight:

8. We recommend that Newfoundland and Labrador maintain the role of market oversight to ensure the requirements set out in the *Management of Greenhouse Gas Act* and subsequent regulations are met.

Registry:

9. We recommend that Newfoundland and Labrador partner with an existing registry provider.

Additionality

10. We recommend that Newfoundland and Labrador require that all projects pass a regulatory additionality test (i.e. projects that are required by regulation or any other applicable laws are ineligible) based on the approaches used in regulated systems in other jurisdictions and, where possible and appropriate, that performance standard baselines be used.

Receipt of government incentives

11. We recommend that Newfoundland and Labrador adopt a pro-rata approach through which a project receives offset credits proportionate to the amount that was self-funded, unless the project developer can demonstrate that there is a specific contractual arrangement between the government funder

	and project proponent that allows the project to claim offsets using a non-pro rata formula.
Offset system start date	12. We recommend that Newfoundland and Labrador use an offset start date of January 1, 2017 (the start of the next calendar year after the date of first announcement of the approval of the legislation) for projects for which a corresponding protocol exists at the start of the offsets system, and, where an offsets protocol does not exist at the start of the offsets system, a start date no more than three calendar years prior to approval of a protocol by the regulator.
Leakage	13. We recommend that Newfoundland and Labrador require that protocols and project documents are developed in conformance with the ISO 14064:2 standard, including that the protocol development process include an analysis of potential leakage effects (activity shifting and market effects) due to the implementation of projects within the scope of the protocol.
Permanence	14. We recommend that Newfoundland and Labrador implement a program level buffer pool approach where deductions are based on the risk of reversal for the specific protocol. We also recommend that all reversals be quantified, verified and publicly displayed on the registry within a year of their occurrence.
Accreditation	15. We recommend that Newfoundland and Labrador require that organizations providing verification services be accredited to the ISO 14065 standard with an appropriate scope designation for the offset project type subject to the verification.
Reporting and verification frequency	16. We recommend that Newfoundland and Labrador not establish a requirement for the minimum length of the offset reporting period, but set a maximum reporting period of two years to provide flexibility for smaller projects while ensuring that projects are regularly reporting and subject to verification.
Maximum successive verifications	17. We recommend that Newfoundland and Labrador establish a limit on the frequency of verifications equal to a maximum of six of the most recent nine project reports to provide flexibility for project developers and manage conflict of interest due to familiarity.
Offset project auditing	18. We recommend that Newfoundland and Labrador retain the authority to audit any project for up to seven years after the project reporting period, that the audit process consist of a complete secondary verification conducted by an independent verification firm, that the costs associated with audits be paid

	for by the regulator, and that the regulator make a final determination of action required for any and each identified issue or conflict.
Offset certification	19. We recommend that Newfoundland and Labrador avoid assuming any liability for revocations or reversals of offset credits through certification of offset credits.
Validation	20. We recommend that Newfoundland and Labrador require project validation for all projects, that validation be conducted by an accredited validation body, that the requirement for an on-site visit be outlined in each offsets protocol that may be developed based on anticipated project types and complexity, and that a formal acceptance process be established to ensure that all required documentation has been submitted, a check that the validation body is in good standing with its accrediting organization and that the validation body has managed conflict of interest through the validation process.
Aggregation	21. We recommend that Newfoundland and Labrador ensure that the protocols that are developed, as well as the registry, enable aggregation. 22. In addition, we recommend that Newfoundland and Labrador work with project developers and aggregators to encourage them to engage in best management practices to minimize verification risks associated with aggregation.
Data management systems	23. We recommend that Newfoundland and Labrador work with project developers to set expectations regarding data management and ensure that data management systems maintained by project developers can accommodate the necessary information to implement projects in Newfoundland and Labrador (given the capital and operational requirements that may be present in local projects).
Credit ownership	24. We recommend that Newfoundland and Labrador include a section in a general guidance document for project developers that outlines ownership related benefits and complexities. 25. In addition, we recommend that Newfoundland and Labrador work with project developers to ensure that ownership issues are effectively addressed in contractual arrangements that may be established between parties in an offset project.
Registry Design and Administration	26. We recommend that Newfoundland and Labrador: • Pursue a ready-made approach by partnering with an existing service provider (e.g. APX or Markit, CSA). • Pursue a 'one stop compliance window' that would integrate an offset registry and performance credit registry. • Complete a technical and detailed risk assessment that considers e-commerce, cyber security and other property rights legislation (such a review

	is beyond the scope of this study), prior to entering into a service contract with a service provider
Project certainty and baseline stability	27. We recommend that Newfoundland and Labrador wait until the Pan-Canadian Framework Offset Initiative complete their work to assess the approach for project certainty and baseline stability.
	28. We also recommend that Newfoundland and Labrador, with respect to sequestration projects, work with local experts in the province to determine the equilibration timeframe for each sequestration project type during protocol development processes.
Credit liability	29. We recommend that Newfoundland and Labrador place a limit of eight years on invalidation of offsets to provide project developers with more certainty and allow credits to hold their value. We also recommend that this values be reduced to three years if a project undergoes a second full verification.

In terms of next steps, the project team recommends that Newfoundland and Labrador carefully consider the recommendations presented in this report, confirm its chosen direction and then proceed with developing an offset system guidance document for project developers and potentially a protocol development guidance document for protocol developers (depending on the protocol development approach agreed upon). Simultaneously, supporting infrastructure for the creation of the offset system will need to be developed (or identified if partnering with an existing system). Supporting infrastructure includes the registry, a website for sharing program information and required staff needed to facilitate the program.

9.0 References

American Carbon Registry. (2015, January). *The American Carbon Registry Standard Version 4.0.* Retrieved from American Carbon Registry: http://americancarbonregistry.org/carbon-accounting/standards-methodologies/american-carbon-registry-standard/acr-standard-v40-january-2015.pdf

(2012). *Benefits, Existing Methods and Key Challenges to Aggregating Greenhouse Gas Emissions Offsets.* Electric Power Research Institute.

CDM Programmes of Activities. (2015). Retrieved February 26, 2015, from UNFCC Clean Development Mechanism: http://cdm.unfccc.int/ProgrammeOfActivities/index.html

Diamant, A., Weisberg, P., & Zakreski, S. (2012). *Benefits, Existing Methods and Key Challenges to Aggregating Greenhouse Gas Emission Offsets: Background Paper for EPRI Greenhouse Gas Emissions Offset Policy Dialogue Workshop #12.*

EDF, CDC Climat Research, Caisse des Depots Group, & IETA. (2015). *Quebec: An Emissions Trading Case Study.* Retrieved from http://www.cdcclimat.com/IMG/pdf/quebec-ets-case-study-edf-ieta-cdcclimat_28042015-5.pdf

Government of Alberta. (2007). *Specified Gas Emitters Regulation.* Retrieved from http://www.qp.alberta.ca/documents/Regs/2007_139.pdf

Government of British Columbia. (2017). *Greenhouse Gas Reduction Targets Act.* Retrieved from http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/00_07042_01

Government of Newfoundland and Labrador. (2016). *Management of Greenhouse Gas Act.* Retrieved from http://www.assembly.nl.ca/business/bills/bill1634.htm

Government of Ontario. (2017). *O. Reg. 144/16: The Cap and Trade Program.* Retrieved from https://www.ontario.ca/laws/regulation/160144

Government of Quebec. (2017). *Regulation respecting a cap-and-trade system for greenhouse gas emission allowances.* Retrieved from http://legisquebec.gouv.qc.ca/en/ShowDoc/cr/Q-2,%20r.%2046.1

Greenhouse Gas Emissions Reporting by Facility. (2017). Retrieved from Government of Ontario: https://www.ontario.ca/data/greenhouse-gas-emissions-reporting-facility

(2006). *Greenhouse gases - Part 2: Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements.* ISO.

Marcu, A., Egenhofer, C., Roth, S., & Stoefs, W. (2013). *Carbon Leakage: An Overview.* CEPS.

Partnership for Market Readiness. (2015). *Options to Use Exisitng International Offset Programs in a Domestic Context; Technical Note 10.* World Bank Group.

Partnership for Market Readiness. (2015). *Options to Use Existing International Offset Programs in a Domestic Context: Technical Note 10.* World Bank Group.

Partnership for Market Readiness. (2016). *Emission Trading Registries: Guidance on Regultion, Development and Administration.* World Bank Group.

Western Climate Initiative. (2010). *Offset System Essential Elements Final Recommendations Paper.* Retrieved from http://www.westernclimateinitiative.org/document-archives/Offsets-Committee-Documents/Offsets-System-Essential-Elements-Final-Recommendations/

Appendix A: Information Collected in Registry Operations

Registry requirements differ by system; however, they generally include:

1. Project Plan – Document detailing how the project will be implemented;
2. Project Report – Document detailing the project activities; and
3. Verification Report – Document detailing the verification findings.

Sample Project Plan Content

a. Project Scope and Site Description

i. Project Name
ii. Project Purpose and Objective(s)
iii. Project Start Date
iv. Reporting Start Date
v. Crediting Period
vi. Expected Lifetime of the Project
vii. Estimated Emission Reductions/Removals
viii. Applicable Project Protocol(s)
ix. Protocol(s) Justification
x. Other Environmental Attributes
xi. Legal Land Description of the Project and/or Other Unique Site Descriptions

b. Contact Information

i. Complete contact information for Project Developer
ii. Authorized Project Contact (Alternative contact designated by the project developer)

c. Other Project Information

d. Description of how the project will achieve greenhouse gas emission reductions/removals

e. Project Eligibility

Demonstration that the project meets the eligibility criteria of the system (e.g. start date, etc.

f. Project technologies, products, services and the expected level of activity

g. Identification of risks

What are the risks that a project will not achieve the emission reduction forecasted in the Project Plan?

h. Inventory of sources and sinks

i. Identification of the Baseline and Project

Description of baseline and project conditions

j. Quantification Plan

The **quantification plan** describes the methodology used to quantify greenhouse gas emissions reductions/removals generated by the project, which includes:

i. A description of the key (included) sources and sinks to be quantified;
ii. A full list of parameters required for quantification indicating which parameters will be measured and which will be estimated;
iii. A description of the measurement and estimation procedures for each parameter;
iv. Supporting information to justify the measurement and/or estimation procedures (i.e. references for emissions factors, measurement equipment specifications);
v. An understanding and identification of records and project information available to support greenhouse gas emissions quantification;
vi. Sample calculations, conservativeness analysis and other information needed to support greenhouse gas emissions quantification. This must include justification for any assumptions being made. Proper referencing and footnoting is required; and
vii. Quantification for any flexibility mechanisms being used.

k. Estimate of total annual greenhouse gas emission reductions/removals enhancements attributable for the project through the crediting period

l. Monitoring Plan

The **monitoring plan** explains how the measured parameters required for calculating the emission reduction or removals for the project will be monitored and input into the data management system. It should include specifications for monitoring equipment to be used, locations of sampling points, frequency of sampling events, data collection methodology, and other details needed to ensure the project is implemented according to the requirements stated in the approved quantification protocol.

Below is an example monitoring plan.

Source/ sink identifier and name	B3 – Diesel volume
Data parameter	Volume of diesel combusted
Estimation, modeling, measurement or calculation approaches	Monitored
Data unit	L
Sources/Origin	Total diesel purchases in a period, reconciled with opening and closing inventories.
Monitoring frequency	Periodic (per delivery)
Description and justification of monitoring method	This is the most accurate method of measuring this parameter.

Uncertainty	Low – this quantity is based on a commercial transaction.
Provide the details for any deviations from protocol(s) including the justification and rationale.	N/A

Data Management System and Records

Description of the data management system, including source documents, controls, and security applicable to the offset project used to ensure the integrity, completeness, accuracy, and validity of the data.

Project developers must ensure they have implemented appropriate quality control/quality assurance (QA/QC) procedures. These must be documented in a **QA/QC plan** included in this section of the offset project plan.

Source data and project records, including records storage, back-up, and retention plans must be described.

Project Developer Signature and Date

Project Report

The project report resembles information found in the project plan, but rather than what was planned, the report details what occurred. For instance, rather than present quantification plan, the report outlines the quantification. An offset project report will also include:

- Tonnes of GHG emissions reduced/removed (offsets)
- Variances from Plan

Verification Report

This report is developed and issued by the verification body and should include all relevant information on the project verification, including:

- Level of assurance provided - reasonable assurance is the ISO standard
- Materiality
- Verification Findings (can be submitted as a separate list)