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Monitoring, Reporting and Verification (MRV) Considerations for Offset Projects

A Comparison of MRV Requirements Across Several GHG Offset Programs



The intent of this paper is to focus on the MRV technicalities inherent in the setting up and carrying out of offset projects designed to offer cost-effective emission reduction and removal enhancement opportunities¹ for GHG emitters in view of their use of offsets (credits or certificates) for compliance or to create recognition for early action.²

These technical issues are deemed important as they ensure the smooth transition, integrity and transparency when different offset systems are linked - an emitter in one system being able to purchase emission reduction certificates generated in another system.

Thorough preliminary work was carried out prior to this date, including a joint effort³ to compile a table that attempted to compare each element of the different offset systems using the Voluntary Carbon Standard (VCS) as a benchmark. Further investigations⁴ followed, aiming at clarifying and completing the data already collected. The conclusions of this paper draw on these efforts and invite further feedback as it is indeed impossible to make a definitive statement in an ever-evolving carbon offset regulatory environment.

Our study covers:

- Two international offset mechanisms: Clean Development Mechanism (CDM) and Joint Implementation (JI)⁵
- The offset features of three mandatory systems, two of which are merely proposed: the Western Climate Initiative (as defined by the draft recommendations paper of April 2010) and Canada's Offset System for greenhouse gases (proposed in 2008

¹ Instead of investing in expensive abatement technologies "in-house", GHG emitters purchase GHG emission reductions, often in the form of emission reduction certificates, for GHG emission reductions and/or removal enhancements achieved more cost-effectively elsewhere (forestry projects, manure management, agricultural projects, landfill methane capture, etc.). These certificates allow regulated or volunteer entities to offset their own GHG emissions.

² This paper will not cover the issues around project eligibility, additionality testing and baseline determination as these requirements are outside of the scope of MRV.

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⁵ JI track 2

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- and 2009) and one active system: Alberta’s Offset System for greenhouse gases. British Columbia’s Offset System for greenhouse gases (still under development, draft regulations just published on October 22, 2010) was initially included in our study but as it will be consistent with WCI, it was considered redundant to include it separately from other WCI jurisdictions in the comparison described in this paper.
- A voluntary GHG reduction program: the Climate Action Reserve (CAR)
 - Two voluntary GHG accounting protocols: ISO 14064-2 (ISO) and the WBCSD/WRI GHG Protocol for Project Accounting (GHG Protocol)
 - The Voluntary Carbon Standard (VCS)

Key findings

1. General comment on terminology

One of the main difficulties when looking at and comparing different programs is one of terminology. The same concepts will be referred to in different terms, making the analysis that much more delicate and complicated. The issue of terminology was clearly identified during our preliminary work in elaborating a comparison table. This table attempted to summarize the elements of the different offset systems using the Voluntary Carbon Standard as a benchmark. It was filled in by different people, each knowledgeable in a specific offset system. A result of this first exercise was to pinpoint the inconsistencies in terminology across the different GHG programs. For example, when asked to describe the program principles, some described the principles applicable to the collection and analysis of GHG-related information (relevance, completeness, consistency,) while others described the principles relative to the offset project itself (real, additional, verifiable, etc.). There are other examples of terminology discrepancies identified through this preliminary work. For instance, when looking at project eligibility under a program, one might talk about project type or project methodology or project protocol.

2. General Accounting Principles

The accounting principles listed hereunder apply to the collection, analysis, reporting and verification of GHG-related information.

Principles	CDM	Jl	WCI	Canada	Alberta ⁶	CAR	ISO	GHG Protocol	VCS
Relevance				X	X	X	X	X	X
Completeness	X	X	X	X	X	X	X	X	X
Consistency	X	X	X	X	X	X	X	X	X
Accuracy	X	X	X	X	X	X	X	X	X

⁶ In the Alberta offset system, criteria for offsets include real, measurable, ownership, verifiable and surplus. The Alberta Guidance Document for Offsets considers that these criteria are equivalent to the ISO accounting principles.



Transparency	X	X	X	X	X	X	X	X	X
Conservativeness	X		X	X	X	X	X	X	X
Confidentiality	X	X							
Appropriateness (consider local conditions)			X						
Practicality						X			

3. The “M” in MRV - Monitoring and Quantification Requirements

“Monitoring is the process of collecting data used to quantify GHG reductions and to validate assumptions underlying the quantification”. (The GHG Protocol)

Most offset programs have developed or are in the process of developing project type-specific methodologies/protocols that address project monitoring and the determination of baseline conditions⁷. These methodologies include criteria and procedures to:

- **Identify all relevant GHG sources, sinks and reservoirs (SSRs)** impacted⁸ by the project and those in the baseline scenario.
- **Select the GHG SSRs that must be quantified** (sometimes referred to as the GHG Assessment Boundary).
- **Determine** which of these SSRs must be regularly **monitored** and which ones can just be **estimated** - A written justification for not selecting a relevant GHG SSR for regular monitoring is usually but not always required.
- **Quantify** GHG emissions and/or removals for each SSR relevant to the project, and separately for each SSR in the baseline scenario.
- **Quantify overall** GHG emission reductions and/or removal enhancements as the difference between the GHG emissions and/or removals relative to the project and those in the baseline scenario.
- **Manage data quality** – uncertainty assessment usually required. When uncertainty levels are too high, certain programs require that a conservative quantification method be applied in order to ensure that emission reductions and/or removal enhancements are not overestimated.

⁷ This paper does not cover the determination of baseline scenarios.

⁸ Controlled by, related to or affected by the offset project



4. The “R” in MRV - Reporting Requirements

There are several project documents that are important for the integrity and transparency of an offset system and are key to the validation and verification stages:

- The project design document or project plan
- The monitoring reports
- The project reports

4.1. Project Design Document, Project Description or Project Plan

The Project Design Document, Project Description or Project Plan is a key document at the validation stage of a project to assess its eligibility against the criteria of an offset program. It is also used by verifiers as a basis for assessing the conditions resulting from the project against the baseline, and assessing claimed emissions reductions and/or removals. When a program requires projects to follow predefined project protocols, the content of the Project Design Document or Project Description is usually lighter as much of the project additionality and baseline information as well as the structure of the Quantification, Monitoring and QA/QC Plans is already outlined in the project specific protocol. In some programs (CAR for example) the Project Design Document or Project Description is replaced by a Project Submittal Form containing the information needed to assess the project’s eligibility.

When a more complete Project Design Document is needed (for example in the CDM or under Alberta’s regulation), it usually covers the following areas:

I. Project identification

- Project title, purposes and objectives
- Project location

II. Project contact information

- Project proponent
- Technical consultants
- Other parties with a material interest
- People who can provide information on any government programs providing financial or other assistance for the carrying out of the project
- Roles and responsibilities



III. Project description

- Conditions prior to project initiation
- Project design to achieve GHG emission reductions and/or removal enhancements
- Project technologies, products, services and the expected level of activity

IV. Project details

- Project type/protocol
- Project scope⁹
- Project boundary¹⁰
- Inventory of SSRs
- Project baseline
- Quantification plan
- Monitoring plan
- QA/QC plan
- Process flow and data flow diagrams
- Chronological plan of start date, end date and frequency of reporting
- Prior or potential links to other registries or programs
- Project performance risks
- Environmental Impact Assessment
- Stakeholder consultation documents

4.2. Monitoring Reports

Monitoring reports are required by most offset programs. They are designed to provide information and data on measured and estimated GHG emissions related to the project as well as all the supporting data (calculation & estimation methods, conversion factors & other standard factors, calibration of monitoring equipment, data and information management systems and controls) in accordance with the monitoring plan.

⁹ Under Alberta's regulation, [project scope](#) explains the function of the project and all of the relevant components and clearly identifies which activities are included/excluded for the purposes of quantification of GHG reductions. In other programs, project scope corresponds to project type.

¹⁰ Under Alberta's regulation, [project boundary](#) describes the boundaries for the offset project. The project boundary may extend beyond the physical or geographical boundaries of the project's infrastructure, or may be a smaller portion of a larger physical site boundary.



Most programs specify the need for project proponents to prepare separate monitoring reports (VCS, GHG Protocol, CDM, JI, *Canada*). In other programs, project proponents are not required to prepare a monitoring report per se but to set up a record-keeping plan (CAR, ISO 14064-2).

In the CDM, a template for monitoring reports is now available and required to be used. Monitoring reports under the CDM record among other things, the certified emission reductions (CERs) generated and thus serve the purpose of a preliminary project report, prior to DOE verification.

The GHG Protocol requires the monitoring report to be produced concomitantly with the annual quantification report in order to confirm that the GHG project has been implemented as planned.

Offset monitoring reports can be directed to regulatory bodies, as is the case in Alberta and WCI jurisdictions where the credits produced are, or are proposed to be, used for compliance purposes.

4.3. Project Reports

A project report is a compilation of information on an offset project. Depending on the offset program, these reports are compiled either prior to project verification (GHG Protocol, CAR, *Canada*, CDM) and serve as a basis for project verification activities, or after project verification. In the former case and for some programs, project reports are not spelled out as such but consist of a combination of several other project documents: for example the monitoring reports and the GHG Assertion¹¹. In the latter case, project reports are aimed at informing the public about the project and are not required to contain any confidential information (ISO 14064-2). In other words, the significance of project reporting differs entirely from environmental performance reporting from organizations. For projects, reporting is usually synonymous with internal record keeping of GHG emission reductions and/or removal enhancements calculations done based on the procedures of the project's monitoring plan. These records, often compiled in a monitoring report, are then reviewed by verifiers. Verification bodies prepare specific documents that are submitted for approval prior to the issuance and/or use of GHG offset credits. For organizations, reporting GHG emissions represents a slightly different approach in that the result of a reporting exercise is directed either towards regulatory bodies for compliance purposes or disclosed to the public to ensure the transparency of the organization's environmental performance.

¹¹ In *Canada's* offset system, the GHG Assertion would identify the project, specify the reporting period covered, and set out the GHG reductions that are claimed.



The frequency of reporting on project GHG emission reductions and/or removals depends on the program and is usually project specific.

Alberta: project specific. The timing of the report is developed cooperatively with the Project Developer and a third party verifier.

VCS: There are no project reports *per se*. There are validation and verification reports instead associated with a verification statement. These documents describe the validation and verification process, any issues raised during the validation and verification and their resolutions and document the conclusions reached by the validation and verification body. The verification statement states the actual amount of VCUs associated with the project specific monitoring report that has been verified.

CAR: Same situation as for the VCS, there is no project report as such. The verification body prepares a set of documents on the project (verification opinion, verification report and list of findings) that is submitted to CAR for final approval of the verification and issuance of CRTs generated by the project. The public will have access to some of the project information through CAR's online database.

GHG Protocol: annual GHG reduction quantification reports

Canada: Generally, the first GHG Assertion and Verification Statement would be required to be submitted at the end of the first full calendar year after the project is registered or when 100,000 tonnes of GHG reductions has been achieved, whichever comes first. The frequency of subsequent reports and their verification would usually be at the discretion of the project proponent, except for agricultural sink projects which would be required to report annually, or when the Offset System Quantification Protocol specifies other requirements for the frequency of reporting.

5. The "V" in MRV - Validation and Verification requirements

In the context of offset programs, the "V" covers two different steps:

- Project Validation¹², prior to project registration
- Verification¹³ of emission reductions and/or removal enhancements, prior to the issuance and/or use of offset credits

While some programs have very detailed requirements covering project validation and verification of project emission reductions and/or removal enhancements, other programs only have generic requirements in that area.

¹² Validation is a systematic, impartial and documented process for the evaluation of a proposed GHG project against suitable validation criteria.

¹³ Verification is a systematic, impartial and documented periodic review or determination by the verifier of the reported GHG emissions, removals, emission reductions or removal enhancements.



Most programs contain at least some validation and verification requirements except for the GHG Protocol for Projects that does not specify any. ISO 14064-2 states that the project proponent should have the project validated and/or verified but the use of the word “should” instead of “shall” makes this attribute non-mandatory.

Validation is optional under the Alberta and the WCI offset systems. It is not required at all under the Climate Action Reserve. The Reserve’s project eligibility criteria are indeed mostly standardized enabling a straightforward determination of project eligibility in which minimal interpretative judgment by verification bodies is required. Under the VCS, offset project plans must be validated by a validation body in a manner consistent with ISO 14064-3¹⁴. In Canada’s offset system as well as in the CDM and the JI¹⁵, project validation is also required and represents the first step in the offset credit creation process.

Verification of achieved emission reductions and/or removal enhancements is required in all offset programs that are linked to either mandatory cap-and-trade systems or voluntary carbon markets. Only international standards like ISO 14064-2 and the GHG Protocol do not specify verification requirements as those standards apply to projects that may operate in other GHG offset systems where verification requirements are already defined. Where there are no other applicable GHG offset programs, project proponents that have decided to comply with ISO or the GHG Protocol standards may choose their own verification approach for the project.

In this paper, we chose to compare validation/verification scopes and objectives, validator/verifier accreditation requirements, the levels of assurance requested against a validation/verification statement and lastly the contents of the verification statements across the different programs.

5.1. Validation/verification scopes and objectives

Name of program	Validation		Verification	
	Scope	Objectives	Scope	Objectives
CDM	Project Design	Validation report confirming that the	Monitoring reports, with	Verification report and

¹⁴ Specification and guidance for validation and verification – the validation/verification process put forth in this international standard consists in the following steps: (1) Agreement on validation/verification objectives, scope, criteria and level of assurance, (2) Development of validation/verification approach including the determination of a sampling plan and a validation/verification plan, (3) Assessment of the GHG information system controls, (4) Assessment against the criteria, (5) Evaluation of the GHG assertion and (6) Issuance of the validation/verification statement

¹⁵ Under JI, the validation stage is referred to as the determination.



Name of program	Validation		Verification	
	Scope	Objectives	Scope	Objectives
	Document Public comments Possible site visits and consultations with the local stakeholders	project is a valid CDM project by reference to an approved methodology/protocol	records of the CERs generated	certification report based on the verification assessment
JI	Project Design Document Public comments	Final determination report by reference to requests of host government and potentially the JI oversight body's approved protocols	Monitoring reports with possible site visits	Verification report (no certification procedure for JI projects)
Canada	Project application form as defined in the Program Rules and Guidance for Project Proponents Public comments	Assessment of the project's eligibility to generate offset credits and project registration by reference to approved protocols	Monitoring reports and offset credits generated	Certification report
Alberta	VALIDATION INCLUDED in verification report to confirm that project complies with approved protocol		Monitoring plan Project records and documents	Verification report
VCS	Same as the above	validation report consistent with the VCS Validation Report template requirements	Emission reductions achieved by the project and the accuracy of emission	



Name of program	Validation		Verification	
	Scope	Objectives	Scope	Objectives
			reduction calculations as per the requirements of ISO 14064-3	
ISO 14064-2	Documents and information sources as defined in ISO 14064-3 ¹⁶	Validation statement	Documents and information sources as defined in ISO 14064-3 ¹⁷	Verification statement
CAR	VALIDATION NOT REQUIRED		Project documentation Monitoring data and procedures Site visits required	Verification Opinion Verification Report
WCI (program under development)	VALIDATION STEP NOT REQUIRED in all cases (some protocols might require a validation step)		GHG assertion or reduction	To be determined

5.2. Competence of Validator or Verifier

Listed hereunder are the competence and accreditation requirements for each program.

CDM: Designated Operational Entity that is accredited by the CDM Executive Board for the relevant scope – Accreditation requirements are contained in the CDM Accreditation Standard.



JI: Independent Entity that is accredited by the JI Supervisory Committee (JISC) for the relevant scope according to the JI accreditation standard.

Canada: Third-party verifier accredited by the Standards Council of Canada in accordance with ISO 14065. Verification bodies that are in the process of becoming accredited can submit a verification statement. The reduction claimed in such a case will not be certified, however, and no offset credits will be issued until the verification body becomes successfully accredited.

Alberta: Independent third party verifier who must be either a chartered accountant or a professional engineer. Alberta is currently moving towards ISO 14065 requirements.

WCI: Verification is conducted by an accredited third party verifier that is recognized by WCI Partner Jurisdictions.

VCS: Third-party verifier accredited under either an approved GHG Program (within the scope of their accreditation) or ISO 14065:2007 with an accreditation scope specifically for the VCS Program. Validation and verification teams shall meet the competence requirements as set out in ISO 14065:2007.

CAR: Third-party verifiers trained by CAR or its approved Designees and employed by or subcontracted to an accredited verification body. As of January 1, 2011, verification bodies are to be accredited under ISO 14065 and have sector specific accreditation.

5.3. Level of Assurance

The level of assurance required applies to the validation or verification statement made by the validator or verifier at the end of a validation or verification process. For a reasonable level of assurance, the validator or verifier provides a reasonable, but not absolute, level of assurance that the project's GHG assertion is free of material misstatement. For a limited level of assurance, the risk of a material misstatement is greater. In limited level validations and verifications there is less emphasis on detailed testing and the procedures used consist primarily of enquiry, analytical procedures and discussions related to GHG information supplied.

The offset programs that we have looked at do not have consistent requirements regarding levels of assurance. Canada, CAR, VCS, CDM, JI, WCI require, apply¹⁸ or recommend¹⁹ a

¹⁸ The CDM and JI Accreditation Standards do not define levels of assurance but the level of assurance applied by DOEs is reasonable.

¹⁹ WCI does not require but recommends the application of a reasonable level of assurance.



reasonable level of assurance concerning their validation/verification statements; Alberta requires a limited level of assurance; ISO 14064-3 states that the level of assurance must be agreed upon with the client.

5.4. Content of the verification statements

Under the VCS, the verification statement shall state the actual amount of VCUs (Voluntary Carbon Units) associated with the project specific monitoring report that has been verified. The content of the verification statement under the VCS is described in the table below and follows the requirements of ISO 14064-3. Canada's Offset System also proposes to apply ISO 14064-3 requirements as far as verification activities are concerned.

In the CAR program, the verification statement is actually composed of three documents: the Verification Report, the List of Findings (containing both immaterial and material findings) and a Verification Opinion (detailing the vintage and number of reductions or removals verified). The verification report is a transparent overarching document that contains at least the elements described in the table below.

In the Alberta system, there are three possible verification statements that can result for the review:

- A limited level assurance statement, when the reviewer is satisfied about the Project GHG Assertion
- A qualified limited level of assurance statement, when the reviewer is unable to form an opinion on certain aspects of the GHG Assertion.
- An adverse assurance statement of verification, when there is outstanding unresolved and undisclosed material discrepancies.

Displayed in the following table are the elements of the verification statement in the different systems seen so far.

Elements of the verification statement	VCS ISO 14064-3 Canada	CAR	Alberta	CDM
Level of assurance	X		X	
Standard used to verify GHG emissions reductions or removals		X	X	
Details of the verification team				X
Objectives of validation/verification	X		X	
Scope of validation/verification	X	X	X	X
Description of the eligibility assessment, regulatory test		X		



Criteria of validation/verification	X	X	X	
Description of the verification activities/process		X		X
List of relevant emission sources identified and ranked by magnitude		X		
Description of the sampling techniques, plan and risk assessment methodologies employed for each source		X		
Evaluation of whether the project is in compliance with the applicable project protocol		X		
Evaluation of whether the project is in compliance with the Project Design Document, the monitoring plan in compliance with the monitoring methodology, monitoring in compliance with the monitoring plan				X
A list of each parameter specified by the monitoring plan and a clear statement on how the values in the monitoring report have been verified				X
Comparison of the project's overall GHG removals or reductions with the verifier's calculation of GHG removals or reductions		X		X
Description of whether the data and information supporting the GHG assertion were hypothetical, projected and/or historical in nature	X			
List of findings of the desk review and site visits				X
Assessment of remaining issues from the previous verification period, if appropriate				X
Responsible party's GHG assertion	X		X	
Conclusion on the GHG assertion, including any qualifications or limitations (or on the verified amount of emission reductions achieved)	X	X	X	X

Overall conclusions and next steps

There are two significant differences in the way that the programs covered by this study were or are being built that have an impact on the MRV structure of these programs.

First, there are those programs that were built using a bottom-up approach (e.g. CDM, JI), where the project proponents need to prove project additionality and define project baseline on a project-by-project basis. These programs need a detailed and comprehensive MRV structure.

Second, there are those programs that pre-approve project protocols and require project proponents to abide by these protocols. In these programs, project



additionality testing and baseline determination have been conducted up front during the creation phase of a protocol, thus making emission reduction calculations for project proponents more straightforward and verification activities less dependant on project specific situations that may create bias and increase uncertainty.

Another major difference resides in the accreditation requirements for verifiers (ISO 14065, Designated Operational Entity, CARB accredited verifiers, chartered accountants or professional engineers). Nevertheless there seems to be a convergence towards ISO 14065 with for example CAR requiring accreditation against this international standard for its verification bodies as of January 2011 and Alberta heading there quickly as well.

Apart from these two major differences, there seems to be a relatively consistent MRV pattern across these programs, with similar accounting principles being applied, monitoring and reporting requirements that follow the same basic approaches, and verification of claimed carbon credits by third-party verifiers.

References

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Kyoto Protocol Mechanisms: Joint Implementation
Guidelines for the users of the joint implementation project design document form
(Version 2)

ISO 14064-2 *Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements*

ISO 14064-3 *Specification with guidance for the validation and verification of greenhouse gas assertions*

ISO 14065 *Competence requirements for greenhouse gas validation and verification teams with guidance for evaluation*

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(http://www.ghgprotocol.org/files/ghg_project_protocol.pdf)

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