



# GHG Offset Protocol Technical Review and Catalogue

## Final Report

For Environment Canada

Submitted by Climate Change Central

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## Work Completed

### Summary

#### *Protocol Assessment*

Over the past few months, Climate Change Central (C3), with help from other participating organizations, has accomplished a great deal in assessing greenhouse gas reduction protocols/standards/methodologies (herein called ‘protocols’) for potential adaptation to the Canadian Offset System. The Offset Protocol Catalogue is also completed. This report summarizes this work completed for Environment Canada (EC).

Through a global scan of voluntary or compliance-based, proposed or existing greenhouse gas (GHG) offset systems, 487 protocols were identified by Climate Change Central. Of these protocols, 71 were selected for a more rigorous screening based on a pre-established set of criteria (see list in Appendix A).

Over five days of face to face meetings, 26 members of the Protocol Technical Working Group (PTWG) used a transparent process of elimination by using a second more rigorous unbiased set of criteria, based on *Canada’s Draft National Greenhouse Gas Offset System Guide for Protocol Developers* (Section 4), to further screen the 71 protocols.<sup>1</sup> Based on this work, 37 protocols rated easy (52%), 14 medium (20%), and 16 hard (23%)<sup>2</sup>. Of the protocols that rated easy, 31 of these rated “best in their class”, that is, they had the highest score in their sub-category.

The PTWG also commented on what additional work is required to adapt or introduce these “easy” protocols into the Canadian Offset System. This information and other considerations were used to further narrow down the number of protocols that could be “ready to use”, with a reasonable amount of work. As such, the following protocols could potentially be excluded from the first round of government approved protocols:

- All six CDM fossil fuel-based energy protocols could be excluded from the first round of government approved offset protocols, if they are covered under the large final emitters GHG regulation.
- *Reducing the Slaughter Age of Cattle* (Alberta, #2) – This protocol ranked easy but it needs more technical review because the quantification calculator has only been scrutinized by a few scientists.
- *Quantification Protocol For Waste Heat Recovery Projects full scope* (Alberta #68) – Because of its complexity, this protocol requires further technical review (the streamlined version is more suitable for the first round).
- *Quantification Protocol for Enhanced Oil Recovery (full scope and streamlined)* (Alberta #39) – Based on the legal/regulatory hurdles to be overcome at the provincial level and the commercial viability of these projects, it is unlikely the protocol would be used in the initial round of the Canadian offset system.

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<sup>1</sup> 18 core participants

<sup>2</sup> Four (6%) documents were technical seed documents that were not reviewed because they had previously been incorporated into protocols that underwent review.

It should be noted that if the *Draft Quantification Protocol for Acid Gas Injection* (Alberta #36) passes the Alberta technical review process, it could be included in the first round (should be completed by mid-March).

For more details on the above assessment, see Appendix G. In the end, among others, this leaves 20 protocols (21 including the acid gas) that Environment Canada may consider for the first tier of government approved protocols.

**Table 1 List of Protocols that Rated ‘Easy’ based on the PTWG Second Level Set of Criteria (excluding the above protocols)**

Protocol #	Source	Protocol and Project Type
1	Alt Env/C3	Quantification Protocol For Including Edible Oils In Cattle Feeding Regimes
7	EC/ NOQT	Draft Quantification Protocol for the Anaerobic Decomposition of Agricultural Materials
9	Alt Env/C3	Quantification Protocol For Energy Efficiency Projects
10	EC/NOQT	Nitrogen Fertilizer Reduction in Corn Production Protocol
13	EC/ NOQT	Greenhouse Gas Offset System Pork Protocol: The Innovative Feeding of Swine and Storing and Spreading of Swine Manure
15	Alt Env/C3	Quantification Protocol For Tillage System Management
33	Alt Env/C3	Quantification Protocol for Afforestation Project
40	Alt Env/C3	Quantification Protocol For Biofuels Production and Usage
42	Alberta	Quantification Protocol For Diversion of Biomass to Energy from Biomass Combustion Facilities
46	Alt Env/C3	Quantification Protocol For Run Of River Power Generation
47	Alt Env/C3	Quantification Protocol For Solar Power Generation
48	Alt Env/C3	Quantification Protocol For Wind Power Generation
50	Alberta	Alberta GHG Offset System Draft Quantification Protocol For Freight Modal Shifting
51	Alberta	Quantification Protocol For Gravel And Lightly Surfaced Road Rehabilitation Projects
52	GE AES	Methodology for Coalmine Methane and Abandoned Mine Methane Capture and Destruction Projects

55	Alt Env/C3	Quantification Protocol for Aerobic Composting Projects
56	Alberta	Quantification Protocol For Landfill Gas Capture And Combustion
63	Alt Env/C3	Quantification Protocol For Aerobic Landfill Bioreactor Projects
65	GE AES	Methodology for Waste Water Treatment Methane Capture and Destruction Projects
69	Alt Env/C3	Quantification Process For Waste Heat Recovery Project – Streamlined
36	Alt Env/C3	Draft Quantification Protocol for Acid Gas Injection

This final list should not be considered an endorsement from participants to introduce this limited set of protocols as the first round of government approved protocols.

Based on the Protocol Assessment work to date, Climate Change Central recommends Environment Canada pursue the following work/considerations to enable the Canadian Offset System:

- EC should take into account the potential reductions at the cost of \$15/tonne or less when deciding what categories to pursue for the first tier of government issued offset protocols.
- EC should offer as numerous and as broad a range of protocols as possible for the first “tier” of the Canadian Offset System, this will allow the Canadian Offset to be a viable compliance mechanism for large final emitters.

### ***Protocol Catalogue***

C3 has redesigned the search function, design, and layout of the catalogue, so it is more user-friendly and up-to-date. A group of organizations who use offset protocols were consulted on the improved design of the protocol catalogue and their feedback has been incorporated.

## **PROTOCOL ASSESSMENT - Overall Process**

### ***Analysts/Participants***

Climate Change Central approached its many offset contacts with technical protocol expertise to participate in the protocol assessment process. One of those contacts is the Industry Provincial Offsets Group (IPOG) Quantification Working Group of which many members opted to participate in the process. The group C3 assembled named themselves the PTWG whose listserv consisted of 44 members. Ultimately, 25 individuals from across Canada either attended or teleconferenced into the face to face meeting (see Appendix B).

Invitations were sent to several non-governmental organizations (NGOs), including, the Toxic Watch Society, David Suzuki Foundation, World Wildlife Foundation, Pollution Probe and the Pembina Institute, but received little response. Perhaps, the low attendance by NGOs can be attributed to the focus on technical review rather than policy relevant questions. Organizations may have wanted to save their resources for opportunities to influence policy decisions or simply did not possess the technical expertise required for the meeting. For example, one representative from Pollution Probe was going to attend except the only transportation protocols identified did not fall within his realm of expertise so he opted not to join.

Recall, the task for the PTWG is to determine the applicability of existing protocols to the Canadian offset system and note any additional work that would be required to adapt them to the System. In order to accomplish the above, a global scan for offset protocols was conducted to identify all existing public protocols. Two sets of criteria were drafted, in consultation with the PTWG and forwarded onto Environment Canada for final ratification. Lisa Minotti, from Environment Canada, provided input and agreed to the criteria proposed. Both Lisa and Judith Hull reviewed the second set of criteria. Two analysts, Karen Gorecki and Pierre Loots<sup>3</sup>, then identified a subset of 68 protocols<sup>4</sup> using the first screening criteria (see Appendix C). The PTWG then met face to face to analyze the 68 protocols using a more refined second set of criteria (see Appendix D).

### **Global Scan**

In the global scan, 487 protocols were identified - more than double the amount mentioned in the Contribution Agreement (ie the agreement assumed there would be around 250). Of these protocols, 322 are Clean Development Mechanism protocols.<sup>5</sup> The following offset systems were scanned for protocols:

- California Climate Action Registry
- Western Climate Initiative<sup>6</sup>
- Chicago Climate Exchange

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<sup>3</sup> Pierre Loots, Analyst from CantorCO2e

<sup>4</sup> This number excludes seed documents and protocols that were obtained after the first round of screening occurred.

<sup>5</sup> CDM protocols are actually termed methodologies but for consistency they will be referred to as protocols in this report.

<sup>6</sup> WCI does not yet have publicly available offset protocols.

- Regional Greenhouse Gas Initiative<sup>7</sup>
- Alberta's Specified Gas Emitters Regulation
- Protocols created by Canada's National Offset Quantification Team and various government departments
- Clean Development Mechanism
- Greenhouse Gas Abatement Scheme (GGAS ) New South Wales
- France's Offset System
- New Zealand.<sup>8</sup>

## Initial Screen

To conduct an initial screen the 467 protocols were split into 156 non-CDM protocols and 322 CDM protocols (see attached excel spreadsheet for CDM analysis). Each of these groups was reviewed using different techniques, as described below.

For the 156 non-CDM protocols, the screen was to some degree streamlined after reviewing a number of protocols. Many of the protocols from the old version of the C3's protocol catalogue were project specific documents outlining details of a GHG reduction project but not actual protocols. This was the case with all Clean Air Canada Inc.'s (CACI), Pilot Emission Reduction Trading (PERT), Greenhouse Gas Emission Reduction Trading (GERT), Voluntary Climate Registry (VCR), and the Prototype Carbon Fund (PCF) "protocols". Pilot Emission Removals, Reductions and Learning Initiative (PERRL) documents were both generic protocols and project specific documents. A couple of "protocols" from each of these programs were reviewed but all rated as hard because of the project specific nature of the documents. Hence, all project specific protocols from the above entities were excluded from the subset of protocols to be reviewed by the PTWG. Most generic PERRL protocols were excluded because they were already taken into account (seed documents) in protocols subsequently developed by the National Offset Quantification Team (NOQT).<sup>9</sup>

A point system was used in the initial screening to come up with the overall ratings for protocols. Each criterion had qualifiers to rate a protocol as easy, medium, or hard, and the following points were associated with each rating:

- Easy = 3 point,
- Medium = 2 points, and
- Hard = 1 points.

With six criteria each equally weighted, when the total points were added up the following ratings were obtained:

- 15-18 pts = Easy
- 10-14 pts = Medium
- 6-9 pts = Hard.

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<sup>7</sup> Regional Greenhouse Gas initiative protocols were not obtained in time for the review.

<sup>8</sup> New Zealand has discussed implementing an offset system but when contacted directly did not have any protocols to share.

<sup>9</sup> The exception to this is PERRL's CO<sub>2</sub> Capture and Geological Storage Quantification Protocol.

## ***Results***

Of the 156 (non-CDM) protocols analyzed, 47 rated easy, 15 medium, and 84 hard (and 10 were not analyzed at all).<sup>10</sup> All protocols rated as easy or medium were advanced to the second level screening where they faced more detailed and stringent criteria.

## ***CDM Screening***

Screening the Clean Development Mechanism protocols required a different methodology considering the sheer numbers of methodologies and the nature of the documents.<sup>11</sup> Pierre Loots, from CantorCO2e, along with a working group comprising ICF and C3 staff listed all the CDM protocols and rated them against four criteria: relevance to Canada, potential reductions, interest and whether the protocol is completed (see Appendix E). The list of protocols has been sent to Environment Canada as an excel file titled *CDM PTWG Protocol Analysis*. When applying these criteria, it became apparent the consolidated methodologies, in general, emerged as rating the highest. These protocols are complete, and (except for one) have the greatest relevance to Canada. It was therefore decided that 12 of the CDM consolidated methodologies would be advanced to the PTWG for further analysis as they would sufficiently capture the breadth of the Clean Development Mechanism.

## **Face to Face Meeting (November 26-30, 2007; Calgary, Alberta)**

### ***Process***

In all, over 26 participants either called in or attended a 5 day working session to screen the subset of protocols (see agenda in Appendix F); Climate Change Central set the agenda for the week to walk participants through a stage-gated learning process for reviewing the protocols. At the outset of the meeting, participants were informed of the process for the week. It was made clear ‘what the role of the group was not’, namely, giving policy advice, commenting or recommending changes to technical content, or making direct recommendations on protocol priorities. Participants were also given an overview of existing and emerging voluntary and compliance-based offset systems; this provided some generalizations about protocol characteristics from each of these schemes. Participants were also briefed on the process and results of the first cut of the Protocol Matrix. Before starting to analyze the protocols, the second set of criteria was reviewed one more time for consensus.

Three principles were presented to guide the work for the week – Transparency, Adaptive thinking, and Agreement. By Transparency, open and honest dialogue, with numerous cross-checking to make sure criteria were applied consistently was the rule; By Adaptive thinking, after the first few iterations of protocol review, all participants weighed in to see if the things were working and if not, find out where to tweak things; and, Agreement is defined by no sustained objection. As a result of these principles, the second level criteria went through several interpretations and revisions until we felt we ‘had it right’. These were presented to Lisa Minotti on the Wednesday morning throughout the meeting process. Any previous decisions were revisited and corrected according to the final interpretation to ensure consistent application.

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<sup>10</sup> These ten were not analyzed because they were in French, or not able to be obtained.

<sup>11</sup> For example, the CDM methodologies have had extensive technical review but are not ISO 14064 compliant.

## ***Results***

Of the 71 protocols rated in the second level screening, 37 protocols rated easy (52%), 14 medium (20%), and 16 hard (23%).<sup>12 13</sup> Each criteria had qualifiers to rate a protocol as easy, medium, or hard, and the following points were associated with each rating::

- Easy = 3 point,
- Medium = 2 points, and
- Hard = 1 points.

With nine equally weighted criteria, adding up the total points resulted in the following ratings:

- 27-23 pts = Easy
- 22-16 pts = Medium
- 15-9 pts = Hard.

Thirty protocols rated easy and also had the highest score in their sub-category.

## **Recommended Future Work**

### ***Technical Comments on Protocols***

Throughout the PTWG face to face meeting, many technical comments were made regarding each protocol. Appendix G outlines many of these comments to ensure Environment Canada receives the important technical notations made by the PTWG. In this section, there is also a subsection outlining some trends in protocols across different offset systems. Summaries of technical review processes for some of these offset systems have also been included to provide details on the level of technical review for each protocol.

The PTWG's technical comments regarding each protocol should not be considered comprehensive and are only based on what expertise was present in the room. Some comments related to policy development have also been included, but, these also shouldn't be considered comprehensive as it was not the role of the PTWG to identify policy issues.

### ***Review Team Challenges and Technical Issues***

Some broad technical issues that arose during the meeting included:

- **Scope Flexibility** – The PTWG pondered whether scope flexibility should be considered positive or negative. Too much scope can make a protocol unfocused and difficult to verify. Yet, too little scope can limit the number of projects in the first phase of the Canadian offset system and requires a larger number of protocols to be written and reviewed. In the end, a balance was struck in rating protocols on scope. A protocol rated high if it is flexible enough to be inclusive of different types of projects, yet provides enough calculation guidance for sufficient certainty for validation.
- **How to determine the level of technical review** – Some participants knew, in depth, the review processes that have gone into specific protocols even though they may not

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<sup>12</sup> Four (6%) documents were technical seed documents that were not reviewed because they had previously been incorporated into protocols that underwent review.

<sup>13</sup> Four protocols were added for analysis that were not included in the first level of screening because they were obtained after that screening was complete.

have been publicly posted. If protocols did not have an individual present who knew the development/review process, they would be at a disadvantage in scoring. In the end, protocols lost only some points if their review processes were not publicly posted but known within the group. It also tended to be apparent which protocols had had sufficient technical review.

The review team faced some key challenges when attempting to analyze the 71 protocols presented to them. These challenges include:

- **Consistency in analysis** – To ensure the large number of protocols could be analyzed over the five days allotted, analysts were split into two groups. The two groups analysed different protocols, but to ensure consistency in applying the criteria, the results of each group’s analyses were collectively reviewed by all present, and assumptions and decision rules compared and adjusted, at the end of each day. Further, to start everyone off with the same understanding of how to apply the second level criteria, the whole group analyzed a subset of protocols (landfill gas protocols) together the first afternoon of the first day.
- **Restriction to a short final list of protocols** – Participants did not feel comfortable recommending a small number of protocols for many reasons. Consulting organizations did not want to appear to favour one sector over another, when they have clientele across sectors. Other representatives did not feel that the offset system should be restricted as they see it to be the key compliance mechanism for the Regulatory Framework on Air Emissions in the short term. The “final” protocol list presented largely represents the ‘best in class’ for each category (ie highest ranking) with some protocols eliminated for reasons related to viability of projects and work required to further develop the protocol. This list was not shortened purely for the purposes of reducing numbers.
- **Verifier representation** – Comments were made by one of the participating organizations that the lack of participation from the auditing community left a gap in expertise. Yet, many analysts had at least worked with verifiers and were well versed on protocol related issues in verification.
- **Determining interest in protocols** – It was deemed inappropriate to poll the analysts at the meeting on their interest in specific protocols, as there was not sufficient numbers or diversity to accomplish such a task (further discussion can be found in section Analysts/Participants above).
- **Funding to bring in a diversity of participants** – Climate Change Central found it challenging to get a diversity of participants to attend when analysts were not paid for their time, travel, accommodation, or meals. One particular NGO expressed concern over the lack of funding for participation.
- **Restriction to protocols that use ISO 14064-2** – Some frustration was expressed that the CDM methodologies and other protocols that did not use the ISO 14064 standard, using the established criteria, rated much lower when compared to other protocols that used the Standard. Some were concerned that the protocols that were less technically robust would score higher simply because they used the ISO format.

NOTE: To ensure agreement with all statements made in this report, it was given to all PTWG members for review. A conference call was held to discuss the report. All comment were considered and incorporated.

## **PROTOCOL CATALOGUE – Design**

C3 created an online GHG offset protocol catalogue in 2004. Originally a joint effort between C3 and Environment Canada, the intention of the catalogue was to provide reference, information, and ideas for GHG offset protocols – essentially a repository for good practice guidance in many sectors and project areas. At the time, several of these documents were more project-specific rather than what we’ve come to think of a protocol in today’s terms. These older documents will be hosted in a separate database called the “Historical Project Specific Database” (see next section for more information).

While the quality and quantity of protocols globally available has changed significantly since its creation, the catalogue has not been updated until now. C3 has also taken into account feedback it has received over time on how the catalogue structure and search design could be more user friendly.

### ***Structure/Layout***

The updated online GHG Offset Protocol Catalogue hosts two separate databases and a guidance document on searching for the Clean Development Mechanism (CDM) methodologies - totalling 158 hosted documents. The GHG Offset Protocols database contains 70 GHG reduction and removals protocols from around the world. The Historical Project Specific database contains 88 documents that come from past programs in North America such as Greenhouse gas Emission Reduction Trading (GERT), Pilot Emission Reduction Trading (PERT), the Voluntary Challenge Registry (VCR), Clean Air Canada Inc. (CACI), and the Prototype Carbon Fund (PCF). These documents are generally not in protocol format. They are project descriptions sometimes with quantification methodologies used for specific projects. These documents should not be considered true offset protocols/methodologies, but are important from a reference point of view.

Separate databases were created to ensure the user recognizes the difference between a “true” protocol and a historical project specific document. Past approaches to GHG quantification were pilot-based and formed the foundation of many of today’s quantification approaches, but may not fit the current policy context. Also, most of these historical documents do not fit the definition of a protocol, and should thus be distinguished from actual protocols. At the same time, historical project specific documents could be useful to refer to for a technical perspective.

Users of the previous protocol database found the classification of project-based documents non-intuitive, as they were split up into project-specific and project-type documents (the latter being more like a protocol). Protocols and project specific documents were not clearly delineated, thus could confuse users on what current projects use for quantification purposes. Plus, the search engine was not very user friendly. These shortcomings have been addressed in the current format.

It would be duplicative and resource intensive to host the numerous CDM methodologies directly in the protocol catalogue. These methodologies are constantly growing in number and even approved methodologies can be revised and reposted with changes. Therefore, C3

has opted to provide numerous important links to the CDM methodologies site and a one page guide on how to navigate the site. Understanding how the site is organized is not trivial, thus this guide will likely save users much confusion. The CDM guide is found in Appendix H.

The new protocol catalogue has improved functioning, and is more user friendly. The search engine in the revised protocol catalogue uses a much simpler search format than its predecessor. There will be seven fields, three of them searchable. Using ‘insequel’ server software, these three searchable fields can be used to find protocols. An extensive synonym list allows users to find results using several search formats. See Appendix I to view the fields and the protocol listings.

### Web Search Structure

The search engine for the main protocol database will have a much more simplistic search format than the previous C3 protocol catalogue. The updated protocol database will have seven major fields, of which the first three of the fields (shaded below) are used in the search request.

An example of the fields is displayed below: a synonym field has been created to generate queries related to *Protocol Area*, so that if users type in these key words in the search engine, they will be receiving similar results. This will assist users in generating a search for protocols that can be general or specific. In this example the user can use any of the following words to generate a query: Agriculture, Biogas Management or Alberta.

Sector	Protocol Area	Source	Approved for use	Protocol Title	Description	Standard used	Link
Agriculture	Biogas Management	Alberta	Alberta	Draft Quantification Protocol for the Anaerobic Decomposition of Agricultural Materials	Anaerobic digestion of organic feedstocks from agricultural materials such as animal manure, silage, dead animal stock; for the creation of methane (CH <sub>4</sub> ) creation to use as an alternative energy source.	ISO 14064-2	

For a full list of the synonyms used see Appendix J.

Due to the different informational requirements, the historical project specific database will have different fields from the main GHG reduction database. Only two fields will be searchable – Project Area and Source. The fields are listed with an example below.

Project Area	Source	Project Title	Document Location	Date	Proponents
Energy Efficiency, General	GERT	BCBC	\\mail.climatechangecentral.com\VIHHub\Protocol\s13a.pdf	March, 2001	British Columbia Building Corp. /

### ***Consultation***

To ensure the new iteration of the protocol catalogue is practical, meaningful, useful and relevant for all organizations who use GHG offset protocols, several organizations were consulted. An email with design questions was sent to several organizations. See Appendix K for the list of organizations consulted. These organizations were asked if:

- The general layout makes sense?
- The three separate classification of protocol materials is clear, logical and comprehensible?
- Where should the protocol catalogue be housed?
- Given the complexity of the CDM methodology process, will a navigational tool be useful?

While only four replies were received, in general, all responses were positive. All respondents thought the layout of the database works well. Only one respondent felt that mixing all the protocols into one database would be helpful to highlight all the categories within a given project. Another respondent thought, separating different types of protocols would help avoid confusion on what is approved for use in various regions. Half of the respondents wanted the catalogue hosted on the Carbon Offset Solutions site, and the other half its own unique website. One suggestion stemming from our consultation was to indicate within what region the protocol has been approved for use so there is no confusion as to where project developers can use the protocol. Thus, once protocols become approved for use in different Canadian regions, C3 will likely add a column that indicates where the protocol has been approved for use.

### ***Ongoing Issues***

One of the ongoing challenges in hosting a GHG protocol database is to ensure the database is up-to-date. The previous database included protocols that were not approved or that were no longer the most recent version. This provides a challenge for database administration, but, if monitored and updated, would ensure that the results of a search could be relied upon without having to go back to the source to ensure that the version found on the database was the most recent. Thus, C3 will either have to secure ongoing resources or continually use C3 resources to update the site. The path-forward has not been decided. If resources were secured, users could be assured the catalogue is updated as C3 will post the date the catalogue was updated.

### **Conclusion**

Climate Change Central, in conjunction with Environment Canada and other participating organizations, have provided an enabling foundation for further tool development that will

add to facilitating offset projects in Canada and inform the Canadian Offset System. The Protocol Review Process allowed the offset community to come together to conduct rigorous analysis that outlines the state of existing protocols in relation to the Canadian Offset System. Updating the GHG offset protocol catalogue provides offset project developers and governments a one-stop-shop for GHG offset protocols and important reference materials.