

Preparing for GHG Inventory Verification

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To ensure that the greenhouse gas inventory is accurate and complete, prepare for eventual third-party verification during the planning and data collection stages.

MANY ORGANIZATIONS HAVE REALIZED the implications on their business decisions of global climate change and upcoming restrictions on greenhouse gas (GHG) emissions as well as the emerging international market for GHG emission trading allowances. The first step in knowing where the corporation is and how it should move forward with its climate change strategy is understanding the sources and quantities of GHGs associated with the organization's operations. To obtain this knowledge, businesses are compiling inventories of their GHG emissions as well as identifying opportunities for reductions and offsets.

Throughout the inventory design and implementation process, careful consideration should be given to eventual third-party verification. Verification is the independent assessment of emissions and/or emission reduction information by a third party. This third-party verifier evaluates the accuracy of this information and issues an opinion of the data's quality and completeness. This opinion provides subsequent users of the GHG information, such as the sellers and buyers of the emission reduction credits, an indication of its reliability.

Planning for verification early will ensure that the organization's baseline and annual inventories are easily verifiable and found to be accurate and complete.



This article gives suggestions for setting up a GHG inventory system that is more easily verified. For simplicity, it is limited to the concepts of verification (a third-party assessment of collected GHG data) of an inventory (an entity-wide accounting of GHG emissions). Many of the concepts discussed can also be applied to validation (*i.e.*, a third-party assessment performed prior to implementation of an activity) and to emission reduction projects or other GHG management activities, including annual reporting.

Planning for verification

When an organization decides to compile a GHG inventory, the eventual third-party verification of the collected information is often not an initial consideration. Inventory planning addresses many aspects of the inventory, including the use of one of the existing GHG inventory protocols vs. the creation of a customized protocol. The organization is also focused on actual inventory decisions pertaining to defining scope and schedule, identifying included facilities, recognizing emissions sources, setting up the data collection system, and gaining top management and facility-level support and employee involvement. Because of the many planning details, a business may not consider all the potential future uses of the data it is collecting. After the data are collected, a situation may arise that necessitates verification of the GHG information.

To improve the efficiency of the inventory effort and to facilitate verification, inventory verification should be addressed during the planning and implementation stages rather than after data are collected or the final report is written. Organizations that plan for verification from the beginning can avoid common pitfalls that may arise later. Early planning can also streamline the preparations for verification, as it can avoid the need to search for relevant records or re-create supporting documents, ensure transparency and consistency throughout the inventory process, simplify the work of the verifier and thus save time and money, and achieve the desired outcome of an unqualified verification opinion.

Collection of evidence

The goal of verification is a final opinion statement by the verifier that supports the completeness and quality of the GHG information without qualifications or caveats. The verification process is a series of steps that are undertaken to reach this opinion. GHG verifiers base their opinion on three types of evidence that they collect during the verification process: physical, documentary and testimonial (1).

Physical evidence refers to something that can be seen or touched. It is gathered by direct observation, often during a site visit by the verifier to a facility that is included in the inventory. Examples of physical evidence include fuel or utility meters, calibration equipment and the like (1). Verifiers may identify that such meters are present, operational and correctly calibrated. They may also observe how personnel use this equipment to collect GHG data to determine if this task is being performed correctly.

Documentary evidence is information recorded on paper or in computer files. These documents may consist of energy worksheets, log books, inspections sheets, invoices, and other records (1). These documents usually contain data on activities related to GHG emissions, but may also include information providing insight into data collection, such as key personnel and frequency. Verifiers may review such documents to confirm their existence and

accessibility, as well as evaluate the accuracy of the information that they contain.

Testimonial evidence is gathered from interviews with personnel who work within the GHG management system (1). These may be people who read meters, enter data into spreadsheets, perform conversion calculations, or execute other inventory tasks. Verifiers may ask these individuals questions about how they perform these tasks, as well as relevant knowledge of the GHG inventory process.

Preparing for collection of evidence. To facilitate collection of the evidence during GHG verification, organizations can take steps to identify and locate available evidence for the verifier. First, carefully documenting tasks related to the measuring and monitoring of GHG emissions will provide a clear description of these activities. This documentation should include the location of relevant meters and other sources of data and how to obtain accurate data from these sources. In addition, these procedures may include necessary calibration steps to ensure accurate measurements. This documentation can serve as a guide for collecting physical evidence when the verifier conducts site visits.

Other procedures should address recordkeeping activities and document control. These procedures will direct how data records should be completed, as well as methods to ensure the accuracy and quality of these records. Instructions should also specify what records are kept and where they are located as well as when and how such information is archived or discarded. These types of procedures will support verification in two ways. First, individuals working with the verifier will be able to efficiently locate and provide the documentary evidence that the verifier requests. Second, this information will provide a basis of evaluation for the verifier as the documents are reviewed.

Finally, individuals who are responsible for collecting data or managing records should be trained to ensure their awareness of the implications of their duties. They should also receive training on specific procedures associated with the work they perform. In addition to ensuring that these tasks are performed correctly, this training will assist individuals in providing clear answers to interview questions when verifiers are seeking testimonial evidence.

Assessment against a protocol

Verification, in its most basic form, is the assessment of how an entity has performed its inventory and reported its results against a protocol that establishes expectations of relevance, completeness, consistency, transparency and accuracy. After a GHG report is verified, the protocol provides a point of reference and a method of comparison.

A protocol also provides guidance on how to measure and report GHG emissions. Recognized GHG reporting protocols and standards include The Greenhouse Gas Protocol developed by the World Business Council for Sustainable Development (WBCSD) and World Resources Institute (WRI) (2), the California Climate Action Registry's

General Reporting Protocol (3), and the forthcoming ISO 14064 international greenhouse gas standard. A company may also establish its own customized corporate protocol to address industry-specific issues as well as to provide a greater level of detail to the process.

Verifiers will examine the GHG management system to ensure its consistency with the protocol under which verification is sought. This assessment will include, for example, ensuring that the entity has established boundaries, implemented calculation methodologies, used conversion factors, and followed reporting guidelines, all as the protocol suggests or specifies.

Preparing for assessment against a protocol. To facilitate this aspect of the verification process, the business should carefully document how it addresses the various aspects of the protocol. Each organization may employ different methods of demonstrating such adherence.

At a minimum, it is advisable that the company use language in documents associated with GHG measurement and reporting that is consistent with the language in the protocol. For example, if an organization has followed the WBCSD/WRI GHG Protocol for its inventory, reporting of “scopes” will indicate adherence to the protocol because the GHG Protocol defines operational boundaries in terms of scope levels (2). Other ways of demonstrating clear adherence to the protocol include numbering procedures to be consistent with protocol elements or providing a table or chart identifying how organization activities align with standard requirements.

Furthermore, information addressing key components of a protocol should be clearly documented to demonstrate conformity. Consider the example of boundaries and sources. Most protocols provide guidelines on determining which emissions to include in the inventory, also known as inventory boundaries and sources. The verification process can be significantly simplified if the organization effectively demonstrates how the issues of boundaries and sources were addressed. For example, it may be helpful to keep minutes of important meetings held to set boundaries and identify sources, as these can help the verifier identify decisions or assumptions made at these events.

Assessment of the data management system and GHG information

Development of a GHG inventory involves the collection, compilation, and conversion of different types of technical data. A verifier will examine the steps by which GHG data progresses from facility source to corporate report. This review also looks at the processes, procedures, and methods used to manage that data. This assessment aims to identify any procedures or controls that lack sufficient detail to ensure accuracy and consistency or that could increase uncertainty or introduce errors into the final results.

The assessment of the data management system will also specifically examine the quantification methodologies and

emission factors, which are the calculation formulas and coefficients used to convert activity data, such as fuel consumption, to GHG emissions. This check will confirm that the methodologies and factors are appropriate for the sources and that they have been correctly used to convert activity data.

A final component of the verification consists of sampling the GHG data and checking its accuracy. This sampling may be focused according to findings of the data management systems assessment so that areas of the process about which the verifier was unclear or had questions or concerns are checked more closely. Emissions checking also involves using the data and system methodologies to recalculate emissions to confirm that these results match the information that has been reported.

Preparing for data management system and GHG information assessment. To facilitate data management, organizations should establish a carefully linked system that transfers data from its source to the final inventory report. Instead of developing a new system to track GHG data, it may be beneficial, for consistency and quality, to use data management methods in place for other environmental data. As with other aspects of the inventory, the data management system structure and procedures should be carefully documented. Quantification methodologies and emission factors and their sources should be specifically identified. Any assumptions made should be recognized and recorded for reference.

While the introduction of a computer-based information management system can greatly facilitate data collection, such systems can complicate verification because the process becomes concealed in computer code. When using such systems, it is helpful for verification to avoid creating “black boxes” in which data are entered and information is output without transparency regarding what conversions and calculations occurred within the information management system.

The data management system should also include quality control procedures and checks at each step of the process. Records associated with these checks, such as internal audit reports, can direct verifiers to areas that have previously experienced issues as well as how such issues were resolved and will be prevented in the future.

Case study: Verification of a manufacturer's inventory

The GHG inventory of a diversified manufacturing company was recently verified. The inventory was limited primarily to the energy generation (natural-gas-fired boilers) at four of the company's plants, as well as electricity use at ten other facilities. Because energy represented an important cost for the company, data had already been collected for several years. However, only the energy expenses were reported to corporate headquarters.

When the decision was made to identify GHG emissions, overall responsibility was assigned to the corporate

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environmental manager. This manager began by developing a customized protocol for conducting the inventory that borrowed ideas from other recognized protocols, but reflected the basic and straightforward approach the firm would take. He also developed instructions explaining how the energy data should be collected, including an organization chart identifying who was collecting and sending him the data. To support this process, he established an energy information worksheet that identified necessary data, which each operations manager at the facilities would complete and fax to him each month. Information from the form was entered into a master spreadsheet containing the GHG emissions quantification formulas.

At the end of each quarter, the environmental manager traveled to each plant to obtain copies of fuel invoices and electricity bills. A summary of the GHG data for the entire company was provided to upper management and plant managers at the end of each year. In addition, the company's total emissions appeared in an annual newsletter that was sent to members of the communities in which the facilities were located.

After the third year, the company decided to have its GHG emissions verified in preparation for submitting its data to a GHG registry. Because of the environmental manager's careful documentation, the verifier was able to understand the data collection process without difficulty. The organization chart made it easy to identify the appropriate individuals to contact at two plants at which he conducted site visits and interviews. Although several fuel invoices for one month for one of the plants had been misplaced, the environmental manager was able to provide back-up copies at headquarters for the verifier to review.

Unfortunately, when the verifier began to examine the master spreadsheet, he encountered some difficulties. Several minor errors resulted when the manager had entered data incorrectly into the spreadsheet. In addition, a conversion factor used for two electricity conversions was inconsistent with the factor in the latest version of the company's system documentation. The environmental manager remembered that he had changed the value in the spreadsheet because another, more-precise emissions factor had been issued by the utility. He had trouble identifying the source, but eventually found a printout of the website from which he had taken the information.

After these issues were rectified, the verifier's final opinion of the company's GHG report supported its completeness and accuracy. In response to challenges identified during the verification, the environmental manager made several changes to the data management system. Facility managers now fax bills and invoices with the energy data worksheet each month, and a report identifying spreadsheet entries for their facility is faxed back for their review and approval. The environmental manager also developed improved documentation for the master spreadsheet that identifies the source of the calculation method-

ology. Annual reporting responsibilities have been transferred to an air quality engineer and the corporate environmental manager is working to identify and report emission reduction projects.

In summary

Careful documentation is essential to the verification process, as verifiers will rely on this information to understand the system. In addition, assurance that the company personnel involved are aware and understand their roles and responsibilities with regard to the corporate GHG inventory can facilitate the verification process. Controls and checks should also be incorporated into the inventory process to provide quality assurance of the final results.

While the purpose of this article has been to demonstrate how these aspects can improve the verification process, the associated benefit of this preparation is likely to be an improved inventory. Since verification is the independent confirmation of GHG data accuracy, preparing for verification can ensure that this quality and completeness are designed into the inventory process. **CEP**

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