

GREENHOUSE GAS MEASUREMENT, REPORTING AND VERIFICATION (MRV)



Overview

MRV is a general term describing the process of measuring and collecting data on greenhouse gas (GHG) emissions or mitigation actions, compiling and reporting this information to a respective program, and then subjecting this reported data to a third-party review and verification.

The MRV process is applied to: 1) the reporting of GHG emissions by an entity or facility; and 2) the generation of carbon offset credits through the development and implementation of GHG offset projects.



Entity & Facility-Level Reporting & Measurement

A variety of GHG reporting programs exist at the entity level and facility level. Typically, entity-level reporting is voluntary and facility-level reporting mandatory. Current mandatory reporting programs for facilities in North America include:

- Alberta
- Ontario (WCI)
- Saskatchewan
- Massachusetts
- British Columbia (WCI)
- Québec (WCI)
- California (WCI)

Common Features

Programs have many similarities, but do have some differences in their structure and criteria. The basic criteria for GHG measurement and reporting include:

- **GHGs reported**
 - CO₂, CH₄, N₂O, SF₆, HFCs, PFCs, biogenic
- **Reporting Thresholds**
 - The most common thresholds for who has to report GHGs are either 10,000 metric tonnes carbon dioxide equivalents (tCO₂e) or 25,000 tCO₂e on an annual basis. Program thresholds can range from a low of 5,000 to 50,000 tCO₂e.
- **Sectors Included**
 - A wide variety of industrial sectors are included in programs including power generation, refineries, gas & electric utilities, manufacturing, mining & minerals, chemical production, metals production, fuel distribution and upstream oil/gas.
- **Reporting Timing**
 - Programs usually require entities/facilities to report their GHG emissions for the previous year within 6 months of the end of the previous year, with verifications completed within 6-12 months of the end of the previous year.
- **Emission Factors**
 - Programs use a variety of emission factors for different GHG sources and fuels that can be updated over time with the release of new data. Emission factors are typically published by governmental agencies (e.g. Environment Canada, U.S. EPA) or GHG registries (e.g. The Climate Registry).
- **Specific Calculation Methodologies**
 - Most programs provide reporters with specified methodologies for the calculation of their GHG emissions, especially for common and large sources of GHGs, and for certain energy-intensive industries.



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Carbon Offsets Reporting & Measurement

Similar to GHG reporting, a variety of carbon offset programs exist as part of compliance programs or for voluntary purposes. Compliance offset programs present in North America include:

- Alberta
- British Columbia (WCI)
- Québec (WCI)
- California (WCI)
- Regional Greenhouse Gas Initiative (RGGI)

While each program allows a specific list of offset projects to be eligible for credits, many of the same project types are eligible across multiple programs. Examples of offset project types found across several North American compliance programs include:



- Capture and destruction of methane at livestock operations
- Destruction of ozone depleting substances
- Forestry
- Landfill gas capture and destruction

Specific offset methodologies (protocols) are developed for each offset project type. Protocols can be developed on a project-specific basis or use a standardized approach (performance-based or activity-based). Performance-based and activity-based protocols each have their own pros and cons.

Offset projects must follow the accepted protocols, which ensure that each project meets the essential offset criteria (real, additional, permanent, verifiable, quantifiable, enforceable). An important component of any protocol is the methodology and equations to calculate the amount of emissions reductions generated by an offset project.



Verification - GHG Reporting and Carbon Offsets

Verification Bodies (VBs or Verifiers) are third-party companies that are either accredited or approved to review the submitted reports of GHG reporters or carbon offset projects. The concept of verification has been present since the first GHG programs initiated in the 1990s. VBs assess whether the submitted reports meet all requirements of the GHG reporting or carbon offset program as well as the applicable protocol. Typical verification criteria include program-specific requirements, a reasonable level of assurance, and 5% materiality thresholds.

In most programs, VBs are required to be accredited to the International Organization for Standardization (ISO) standards of 14065, 14064-3 and 14066. VBS are certified to these standards by an appropriate accreditation body.

In North America, the American National Standard Institute (ANSI), Standards Council of Canada (SCC) and the Mexican Entidad Mexicana de Acreditación (EMA) are accreditation bodies for VBs. Accreditation of VBs is an important aspect of any GHG program, ensuring that the VBs are conducting the reviews in a uniform manner and that the verification team members are competent and able.