



GUIDELINES FOR MEASUREMENT, REPORTING AND VERIFICATION (MRV) OF FACILITY GREENHOUSE GAS EMISSIONS

July 2024

DISCLAIMER

This document is made possible by the support of the American people through the United States Agency for International (USAID). The contents of this document are the sole responsibility of RCEE-NIRAS and do not necessarily reflect the views of USAID or the United States Government.

CONTENTS

ABBREVIATIONS	3
LIST OF FIGURES	4
LIST OF TABLES	4
1. PURPOSE OF GUIDANCE DOCUMENT	5
2. INTRODUCTION TO MEASUREMENT, REPORTING AND VERIFICATION	6
2.1. Background.....	6
2.2. MRV explained.....	6
3. EXISTING MRV STANDARDS AND PRINCIPLES	9
3.1. International protocols for facility-level MRV	9
3.2. The MRV policy framework in Vietnam	13
4. GHG MEASUREMENT GUIDANCE FOR ENTERPRISES	15
4.1. Step 1 - Establish organizational/business boundaries.....	15
4.2. Step 2 - Establish the scope of the GHG emissions	17
4.3. Step 3 - Calculate GHG emissions and reductions.....	17
4.4. Step 4 - Quality management.....	21
4.5. Step 5 - Track/monitor emissions over time.....	23
5. REPORTING AND VERIFICATION REQUIREMENTS IN VIETNAM	26
5.1. GHG mitigation plan	26
5.2. GHG inventory reporting framework	27
5.3. Verification framework.....	27

ABBREVIATIONS

CO ₂	Carbon dioxide
COP	Conference of Parties
ETF	Enhanced Transparency Framework
GHG	Greenhouse gas
GHG Protocol	Greenhouse Gas Protocol
IPCC	Intergovernmental Panel on Climate Change
ISO	International Organization for Standardization
MOIT	Ministry of Industry and Trade
MONRE	Ministry of Natural Resources and Environment
MRV	Measurement, Reporting, and Verification
NDC	Nationally Determined Contributions
tCO _{2e}	Tonnes CO ₂ equivalent
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
UNFCCC	United Nations Framework Convention on Climate Change
USAID	US Agency for International Development
WBCSD	World Business Council for Sustainable Development

LIST OF FIGURES

FIGURE 1. BASIC STEPS OF MRV SYSTEM	8
FIGURE 2. OVERVIEW OF GHG SCOPES AND EMISSIONS	10
FIGURE 3. EXAMPLE OF AN ORGANIZATION BOUNDARY	15
FIGURE 4. EXAMPLE OF EQUITY SHARING	16
FIGURE 5. EXAMPLE OF FINANCIAL CONTROL	16
FIGURE 6. EXAMPLE OF OPERATIONAL CONTROL	17
FIGURE 7. INVENTORY QUALITY MANAGEMENT SYSTEM	22
FIGURE 8. EXAMPLE OF HOW TO CHOOSE A BASE YEAR	24
FIGURE 9. EXAMPLE OF HOW TO RECALCULATE THE BASE YEAR (1)	25
FIGURE 10. EXAMPLE OF HOW TO RECALCULATE THE BASE YEAR (2)	25

LIST OF TABLES

TABLE 1: VIETNAM'S DECREE NO. 06/2022/ND-CP (TEXT BOX)	13
TABLE 2: COLLECT OPERATIONAL DATA AND EMISSION FACTORS	18

1. PURPOSE OF GUIDANCE DOCUMENT

This document provides instructions for Vietnamese industries on how to conduct monitoring, reporting, and verification (MRV) of greenhouse gas (GHG) emissions and their reduction. The guidance aims to:

- Provide foundational knowledge on MRV processes and principles.
- Share steps and procedures for developing an enterprise-level GHG reporting system.
- Describe leading MRV practices, including formats and other institutional models.
- Highlight ways to ensure consistency with international standards for GHG estimation
- Offer options for scaling and extending MRV practices to carbon market mechanisms and other systems in Vietnam designed to manage GHG emissions.

By understanding how to establish robust GHG MRV systems, businesses will be well prepared to meet emerging GHG reporting requirements in Vietnam while strengthening their long-term sustainability plans.

To support the Government of Vietnam's efforts to strengthen private sector competitiveness, the US Agency for International Development (USAID) collaborated with the Ministry of Industry and Trade (MOIT) to develop this guide on GHG MRV along with other guides focused on climate change reporting and disclosure. USAID engaged a consortium led by RCEE-NIRAS to prepare this document and funded the work through the USAID INVEST project. RCEE-NIRAS consulted with Vietnamese business associations to understand priorities and information needs and based on these discussions prepared the following technical guidance document which is divided into four parts:

1. **A review of existing MRV guidance and principles** which enterprises can research and implement for their MRV systems.
2. **A summary of current MRV regulations in Vietnam.**
3. **Measurement guidance for enterprises, outlining key steps in the MRV process.** The guidance builds on 'The Greenhouse Gas Protocol (GHG Protocol)' and provides suggestions for how to align with domestic GHG reporting requirements.
4. **Vietnamese reporting and verification guidance for enterprises.** It is recommended that enterprises follow the guidance provided by the Government of Vietnam, since the domestic regulations on reporting and verification are quite mature.

The guidance is designed to enable Vietnamese experts in charge of GHG management at the enterprise-level to establish a robust MRV system that aligns with national and international requirements.

2. INTRODUCTION TO MEASUREMENT, REPORTING AND VERIFICATION

2.1. Background

In 1994, the United Nations Framework Convention on Climate Change (UNFCCC), came into force¹, laying the foundation for a system of reporting on climate change across countries. As part of this UN framework, countries are required to report their national GHG emissions by sources and removals. Additionally, they must outline the actions they are taking to mitigate emissions and assess progress toward achieving global targets.

The concept of MRV was introduced to the UN framework in the Bali Action Plan adopted by the Conference of Parties (COP) in 2007². Additional guidance from UNFCCC and the 2015 Paris Agreement then followed to make the system of gathering GHG emissions data from national parties more effective and efficient. Relevant examples include ‘Decision 1/CP.13 Bali Action Plan’³ and ‘Decision 21/CP.19 on general guidelines for domestic measurement, reporting and verification of domestically supported nationally appropriate mitigation actions by developing country Parties’⁴.

In the context of Vietnam, MRV plays a key role through the Nationally Determined Contributions (NDC) submitted in 2022⁵. The latest NDC saw Vietnam raise its ambition of reducing GHG emissions by 9% and 27% against a 2014 baseline through conditional and unconditional support respectively. Vietnam is expected to provide biennial update reports to the UNFCCC containing updates on its national GHG inventory and information on mitigation actions, needs and support received. In alignment with its NDC, the Government of Vietnam has incorporated MRV into its GHG mitigation strategies for Vietnamese companies. In accordance with Decree 06/2022/ND-CP regulating the mitigation of GHG emissions and the protection of the ozone layer (Decree 06)⁶, GHG-emitting sectors must implement solutions to mitigate emissions and take responsibility for implementing, reporting, and certifying GHG emission reductions within the scope of their management. It is within this context that an MRV system becomes important for facilities as they are obligated to monitor and report emissions and reductions to the government.

2.2. MRV explained

In the context of national-level GHG accounting, MRV often refers to the tracking of emissions at the sector level, such as energy, industrial processes and product use, waste, agriculture, forestry, and other land-use. The sector-level MRV is generally based on statistical data to inform trends in emissions growth and also helps to assess the effectiveness of sector-level mitigation policies and activities.

¹ UNFCCC. “What is the United Nations Framework Convention on Climate Change?”. Retrieved from: <https://unfccc.int/process-and-meetings/what-is-the-united-nations-framework-convention-on-climate-change>

² UNFCCC (2014). Handbook on Measurement, Reporting and Verification for Developing Country Parties. Retrieved from: [non-annex_i_mrv_handbook.pdf \(unfccc.int\)](https://unfccc.int/non-annex_i_mrv_handbook.pdf)

³ UNFCCC. Bali Action Plan. Retrieved from: [Microsoft Word - Bali Action Plan.doc \(unfccc.int\)](https://unfccc.int/decisions?f%5B0%5D=session%3A3938)

⁴ <https://unfccc.int/decisions?f%5B0%5D=session%3A3938>

⁵ Vietnam NDC 2022. Retrieved from https://unfccc.int/documents/622541?gad_source=1&gclid=CjwKCAjwp4m0BhBAEiwAsdc4aHDrQavFKhBBQ8X1VHoh2UPUHTePPL6zemp_j3U0vOdzCoGlcsna5RoCu_kQAvD_BwE

⁶ Decree 06/2022/ND-CP (English version). Retrieved from: <https://faolex.fao.org/docs/pdf/vie212269.pdf>

At an enterprise level, MRV is based on GHG emissions of designated enterprises (single or multiple facilities) such as factories or power plants. The system allows enterprise owners and stakeholders to track GHG emissions resulting from economic activities and evaluate potential pathways to reduce emissions. In some cases, MRV has been used to assess emissions reductions from a particular project within the enterprise such as those developed under the Clean Development Mechanism (CDM)⁷ and other voluntary carbon programs such as the Verified Carbon Standard⁸ and the Gold Standard⁹.

More recently, enterprises have started assessing their GHG emissions footprint using voluntary guidelines such as The Greenhouse Gas Protocol¹⁰, International Organization for Standardization (ISO) 14064-1:2018¹¹, and the Intergovernmental Panel on Climate Change (IPCC) national inventory guidance¹² to meet various requirements for disclosure of GHG reports (e.g., by stock exchanges, shareholders, and suppliers).

The simplified stages of an MRV system are described below and illustrated in Figure 1:

- **Measurement** is the activity of capturing data from the boundary of the enterprise such as those related to fuel consumption, production or electricity consumption.
- **Reporting** is the activity of calculating, synthesizing and compiling a GHG emissions report in accordance with voluntary standards, for example ISO 14064-1:2018 and The Greenhouse Gas Protocol, or regulatory requirements.
- **Verification** is the activity of auditing and reporting the results from the GHG emissions report. Verification reports are sent to enterprises if the company is doing the measurement of GHG voluntarily or they are issued to a competent authority if a regulatory requirement exists

⁷UNFCCC. The Clean Development Mechanism. Retrieved from: <https://unfccc.int/process-and-meetings/the-kyoto-protocol/mechanisms-under-the-kyoto-protocol/the-clean-development-mechanism>

⁸ <https://verra.org/programs/verified-carbon-standard/>

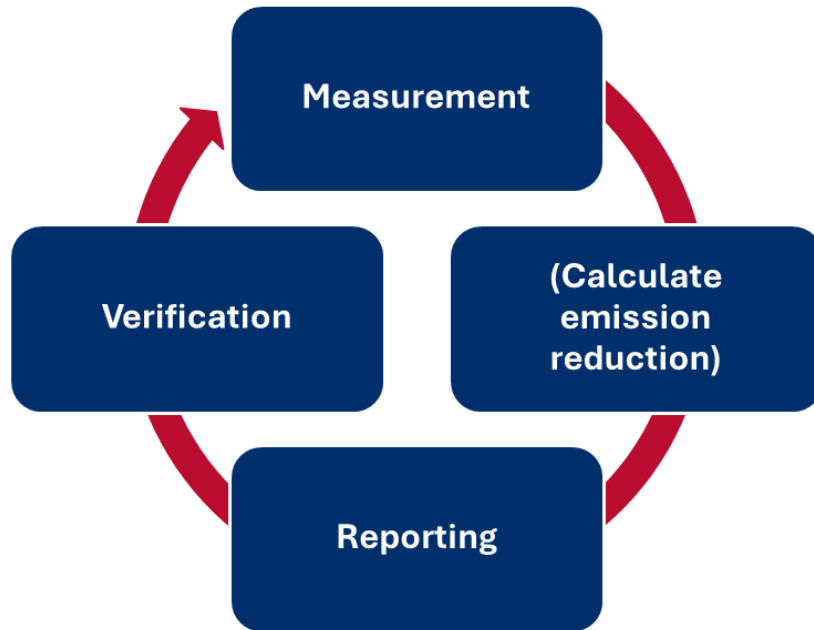
⁹ <https://www.goldstandard.org/>

¹⁰The Greenhouse Gas Reporting Protocol. "A Corporate Accounting and Reporting Standard". Retrieved from: <https://ghgprotocol.org/corporate-standard>

¹¹ ISO 14064-1:2018 Greenhouse gases Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals <https://www.iso.org/standard/66453.html>

¹² <https://www.ipcc-nggip.iges.or.jp/>

Figure I. Basic steps of MRV system



3. EXISTING MRV STANDARDS AND PRINCIPLES

3.1. International protocols for facility-level MRV

Several voluntary and mandatory requirements have emerged on MRV for mitigation activities at the enterprise level. The section below provides a brief overview of some of the relevant standards applicable to Vietnam.

ISO standards

ISO 14000 is a set of voluntary international standards designed to enable organizations to measure and mitigate the environmental impact from their operations in a transparent and consistent manner. The standards provide a systematic approach for enterprises to establish an effective environmental management system.

In the context of GHG emissions accounting, '*ISO 14064-1:2018: Greenhouse gases – Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals*'¹³ provides guidance and structure for the measurement and reporting of GHG emissions and removals at the organizational level. This standard focuses on the following aspects:

- 1. Determination of scope and boundaries.** Guidance for organizations in determining the scope of GHG measurement and reporting, as well as the relevant boundaries of GHG activities.
- 2. GHG identification and measurement.** Guidance on methods and tools for GHG identification and measurement, including GHG emission sources and GHG removal measures.
- 3. Reporting and validation.** Requirements for reporting of GHGs in a transparent and reliable manner, including validation of reports by independent third parties.
- 4. GHG management.** Guidance on developing and implementing an effective GHG management system within an organization, including the development of objectives and action plans for GHG mitigation.

The Climate Registry

The '*General Reporting Protocol*'¹⁴ developed by The Climate Registry, provides guidance on GHG accounting policies and calculation methods essential for reporting organizational GHG inventories across multiple jurisdictions. It's a crucial tool for entities in the United States and Canadian provinces committed to transparent and effective environmental stewardship.

The Climate Registry guidance includes details on determining the scope and boundaries of a GHG report, selecting measurement methods, and estimating GHGs from different emission sources in an enterprise's operations. It also provides guidance on accounting for GHG emissions from major sources such as energy use, transportation, and waste management. Finally, it explains how to report GHGs in a transparent, accurate and reliable manner, including obtaining verification by independent third parties and submitting inventory reports to corporate voluntary and compliance programs.

The overall guidance and reporting principles provided in The Climate Registry's *General Reporting Protocol* can be useful for Vietnamese companies that are interested in setting up

¹³ [ISO 14064-1:2018 - Greenhouse gases — Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals](#)

¹⁴ Retrieved from: <https://theclimateregistry.org/download/general-reporting-protocol-v3-05-2019/>

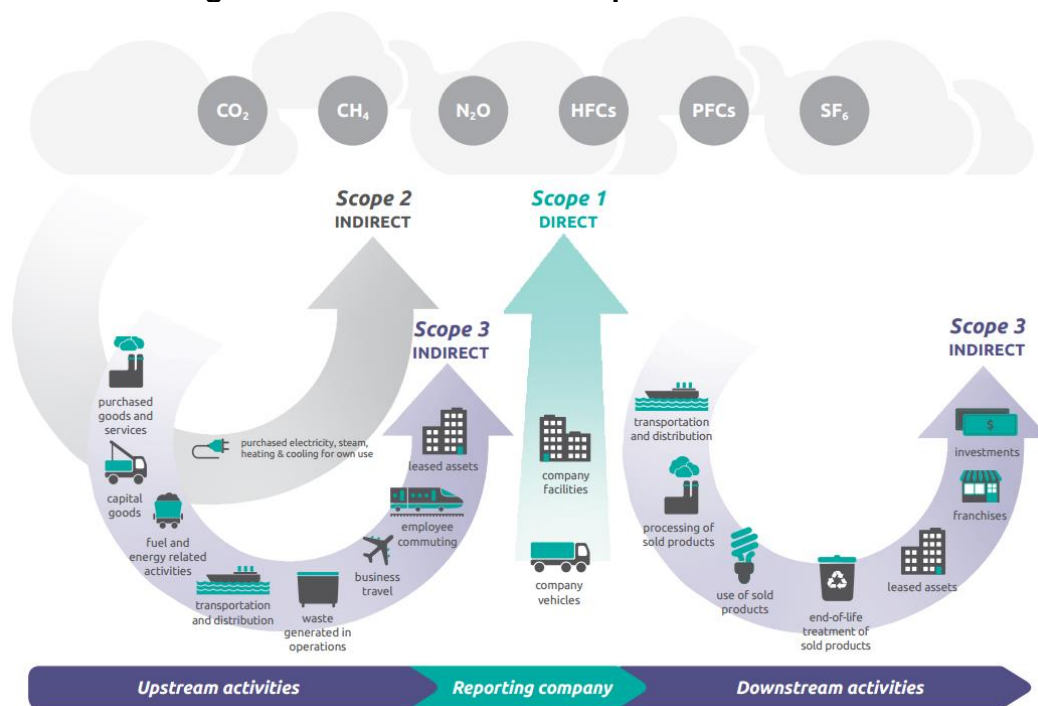
comprehensive GHG management systems. However, since the guidance is designed for North American organizations, enterprises will need to substitute Vietnamese emission factors and activity data to develop emission estimates that fit the Vietnamese context

The Greenhouse Gas Protocol - Corporate Accounting and Reporting Standard

The GHG Protocol is the most commonly used emissions accounting guidance at the enterprise level. The guidance is applicable to all companies irrespective of size and geography and has been developed for practical use with illustrations and best practices. Detailed guidelines can be found in the document 'The Greenhouse Gas Protocol - A Corporate Accounting and Reporting Standard (revised edition)'¹⁵.

The GHG Protocol offers a comprehensive, standardized global framework to measure and manage GHG emissions from private and public sector operations, value chains, and mitigation actions. It categorizes GHG emissions into three scopes: Scope 1, Scope 2, and Scope 3 which are illustrated in Figure 2. This guidance focuses on Scope 1 and Scope 2 emissions.

Figure 2. Overview of GHG Scopes and emissions



Notes: Carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydroflouorocarbons (HFCs), perflouorocarbons (PFCs), and sulfur hexafluoride (SF₆)

Source: Adapted from [WRI/WBCSD Corporate Value Chain \(Scope 3\) Accounting and Reporting Standard, Page 5](https://www.wri.org/publications/2011/01/wri-wbcscd-corporate-value-chain-scope-3-accounting-and-reporting-standard)

- **Scope 1 emissions** refer to direct GHG emissions from sources that a company owns or controls. This includes emissions from: stationary combustion sources, such as boilers and furnaces; mobile combustion sources such as company vehicles; process emissions from industrial activities; and fugitive emissions from equipment leaks. It can also include emissions from chemical manufacturing in owned or controlled process

¹⁵ Retrieved from: <https://ghgprotocol.org/sites/default/files/standards/ghg-protocol-revised.pdf>

equipment¹⁶. Companies must identify all these sources within their operational control to compile a complete Scope 1 inventory. They then collect activity data, such as fuel usage and kilometers traveled, and apply appropriate emission factors to calculate total emissions.

- **Scope 2 emissions** are indirect GHG emissions from the generation of purchased electricity, steam, cooling, or heat consumed by the company¹⁷. These emissions occur at the power plants where the electricity, steam, or heat is generated, not at the company's facilities. To account for Scope 2 emissions, companies need to gather data on their electricity, steam, or heat usage. The GHG Protocol provides two methods for calculating emissions associated with purchased electricity. The **location-based method** reflects the average emission intensity of the grid where the energy consumption occurs. The **market-based method** considers emissions from the electricity, heat, or steam that a company has purposefully chosen, including renewable energy contracts or certifications.
- **Scope 3: Other indirect GHG emissions** is an optional reporting category that allows for the calculation of all other indirect emissions. Scope 3 emissions result from an enterprise's activities, but occur from sources not owned or controlled by the enterprise.

To ensure accuracy in their GHG inventories, companies should use reliable and up-to-date emission factors from sources such as national inventories or specific supplier data. For Scope 1 emissions, this involves applying factors for various fuels and processes. For Scope 2 emissions, the emission factors should correspond to the grid electricity or specific electricity contracts.

Quality assurance is crucial for maintaining the integrity of the GHG inventory. Companies should implement systems for regular data review and verification, ensuring the data's accuracy and completeness. Maintaining thorough records and documentation is essential to support the inventory data.

When reporting GHG emissions, it is important to clearly separate Scope 1 and Scope 2 emissions. Companies should provide context for their data, including the methodologies used, any assumptions made, and any exclusions. Transparency about efforts to reduce GHG emissions and the impact of these efforts is also crucial.

There are several advantages to using *The GHG Protocol*, which is becoming increasingly popular. These include:

- **Compatibility with national regulations.** *The GHG Protocol* has been developed based on international principles but is also designed to reflect each country's specific regulations and economies. This makes it more suitable for local regulations and conditions in Vietnam.
- **Transparency and reliability.** *The GHG Protocol* provides specific and consistent guidelines for measuring and reporting GHGs, thereby creating an accurate and reliable database. This helps enterprises in Vietnam increase transparency and reliability over their GHG management.
- **Easy integration into other regulatory and policy frameworks.** *The GHG Protocol* is often integrated into other environmental and sustainability management frameworks, helping enterprises easily apply it to their current management system.

¹⁶ Direct CO₂ emissions from biomass combustion will not be included in Scope 1 but will be reported separately. GHG emissions are not mentioned in the Kyoto Protocol, e.g. CFCs, NO_x, etc. will not be included in Scope 1 but may be reported separately.

¹⁷ Purchased electricity is defined as electricity purchased or brought within the scope of an enterprise's organization.

- **Support from global organizations.** *The GHG Protocol* is often supported by reputable international organizations and agencies such as the World Resources Institute and the World Business Council for Sustainable Development (WBCSD), providing enterprises with a reliable source of advice and support in implementing and complying with standards.
- **Accessibility.** This standard is free to use and made available to all enterprises.

3.2. The MRV policy framework in Vietnam

Over the years, the Paris Agreement has evolved and several requirements around improvements to MRV have been discussed. Notably, the new Enhanced Transparency Framework (ETF)¹⁸ has come into effect and countries are obligated to update their institutional MRV systems in accordance with these requirements. Countries must also submit Biennial Transparency Reports to the UNFCCC starting in December 2024 that include progress toward meeting their NDC commitments.

Transparency through effective MRV is key to ensuring environmental integrity under the Paris Agreement, including Article 6 which establishes a framework for GHG emissions trading among countries. Monitoring approaches under Article 6 consider the host country's NDC and the national reporting commitments of both the host and purchasing country. Developing enterprise-level GHG measurement and reporting capacity is an important step in creating the institutional capacity for implementing an effective ETF system and Vietnam has taken important steps to enhance its current setup.

The Law on Environmental Protection and the implementation of Decree 06 and Decision No 2359 has established the basic foundations for a comprehensive facility-level MRV system:

- Law on Environmental Protection No. 72/2020/QH14¹⁹, effective January 1, 2022. Article 91 of the law stipulates a number of specific requirements related to MRV of GHG emission mitigation.
- Decree No. 06/2022/ND-CP²⁰, issued on January 7, 2022, provides specific and detailed requirements related to inventory development and mitigation of GHG emissions. In particular, Article 11 provides detailed regulations on GHG inventory activities. Text Box 1 below provides more detail on Decree No. 06/2022/ND-CP.
- Decision No. 2359/QĐ-TTg²¹ of the Prime Minister, dated December 22, 2015, authorizes the creation of a national GHG inventory system for enterprises. The Decision specifies the data to be reported to the national GHG inventory system as well as the ministries and branches responsible for designing and operating the system.

Although the legal basis is in place for enterprise GHG reporting, there is no unified reporting on sub-sector emissions due to the lack of operational data and capacity of relevant agencies. As of March 2024, the Vietnamese Government has not published national guidance on MRV. However, establishments can implement MRV according to the instructions of their respective industries. The first sectoral MRV guidance (Circular No. 17/2022/TT-BTNMT) was issued by the Ministry of Natural Resources and Environment (MONRE) in November 2022 for the waste management sector. The second sectoral MRV guidance is Circular No. 38/TT-BCT/2023, issued by the MOIT in December 2023. It covers the industry and trade sector. These two circulars are considered reference documents for other ministries and sectors to develop their own legal documents on MRV.

Table 1: Vietnam's Decree No. 06/2022/ND-CP (Text box)

Decree No. 06/2022/ND-CP aims to enhance the accuracy and reliability of enterprise-level GHG emissions data, which is essential for tracking progress toward emission reduction targets and supporting carbon market integrity. The Decree emphasizes the
--

¹⁸ <https://www.wri.org/paris-rulebook/enhanced-transparency-framework>

¹⁹ [Law 72/2020/QH14 on Environmental Protection in Vietnam \(thuvienphapluat.vn\)](#)

²⁰ Decree No. 06/2022/ND-CP. Retrieved from: [Nghị định 06/2022/NĐ-CP giảm nhẹ phát thải khí nhà kính và bảo vệ tầng ô dôn mới nhất \(thuvienphapluat.vn\)](#)

²¹ Decision No. 2359/QĐ-TTg. Retrieved from: [Quyết định 2359/QĐ-TTg duyệt hệ thống quốc gia kiểm kê khí nhà kính 2015 \(thuvienphapluat.vn\)](#)

importance of a robust MRV to monitor and manage GHG emissions effectively and authorizes the creation of a National MRV System. The proposed MRV system is intended to ensure compliance with Vietnam's national and sector-level emission reduction targets and facilitate the operation of a national carbon market. The system will also help Vietnam comply with its international climate commitments and enhance its environmental governance. The Decree includes the following MRV elements:

Measurement: Large GHG-emitting facilities are mandated to implement GHG inventories including those emitting 3,000 tonnes of carbon dioxide (CO₂) equivalent or more annually, commercial buildings with significant energy consumption, and large solid waste treatment plants. These facilities must measure their emissions using standardized methodologies to ensure consistency and accuracy.

Reporting: Once emissions are measured, facilities must report these to the relevant authorities. The decree specifies that entities in sectors such as energy, agriculture, waste management, and industrial processes need to submit their GHG inventories annually. The reported data must include detailed information about the sources and amounts of emissions, adhering to formats and standards set by MONRE.

Verification: The verification process is critical to the integrity of the MRV system. Independent third parties or designated government bodies verify the reported emissions data to ensure its accuracy and reliability. This verification process helps to prevent discrepancies and ensures that the reported emissions reflect actual emissions. More details on verification requirements are described in section 5.3 below.

National MRV system: The decree mandates the development of a National MRV System to supervise and enforce compliance with GHG emission regulations. This system will play a pivotal role in the management of GHG emission quotas and the certification of carbon credits, which can be traded in the carbon market.

Implementation and oversight: MONRE is tasked with implementing and managing the National MRV System. This includes setting technical guidelines for GHG measurement and reporting, training of relevant personnel, and conducting audits to verify compliance. The ministry also issues certifications for carbon credits and manages the registry for GHG emission quotas.

Decree No. 06/2022/ND-CP provides the overall principles and requirements for the future MRV system. However, it does not provide technical guidance for enterprises on how to establish and implement MRV systems for covered facilities. The Decree envisions that the respective line ministries will develop such guidance. To date, MONRE has prepared reporting guidance for the waste sector (Circular No. 17/2022/TT-BTNMT) and MOIT for the industry and trade sector (Circular No. 38/TT-BCT/2023).

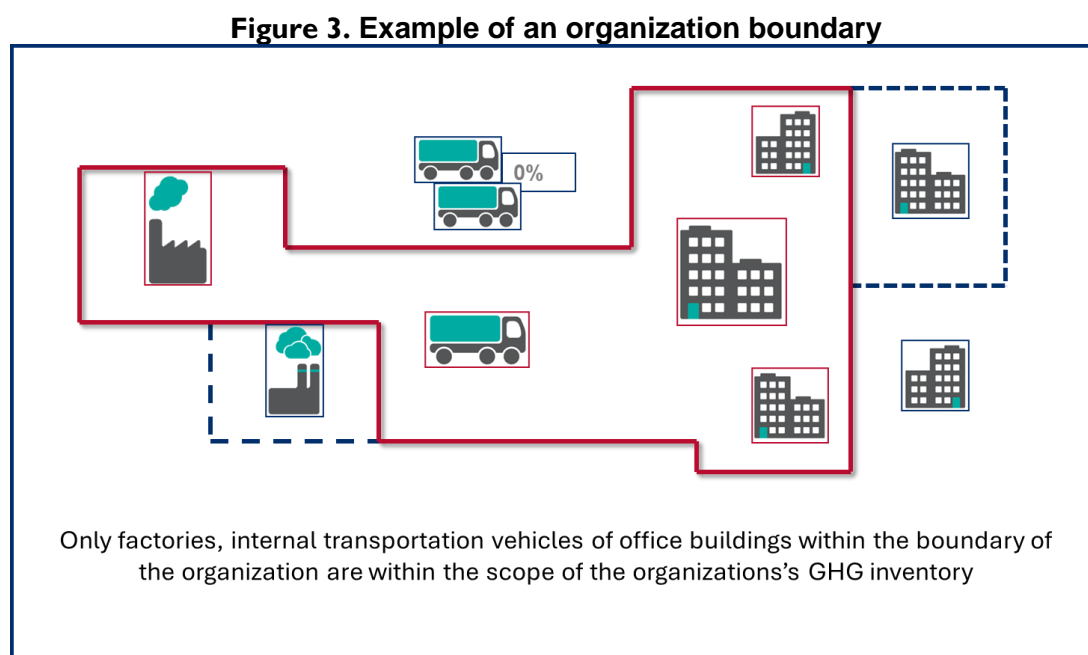
4. GHG MEASUREMENT GUIDANCE FOR ENTERPRISES

In this chapter, we provide specific guidance on the measurement of GHG emissions in alignment with international standards such as *The GHG Protocol*. The specific GHG measurement steps are outlined below and are in line with the facility-level GHG emissions reporting requirements outlined in Form No. 02, Appendix IV, Decree No. 06/2022/ND-CP.

4.1. Step 1 - Establish organizational/business boundaries

Enterprises have diverse setups in terms of their legal structure. This includes wholly-owned operations, incorporated and unincorporated joint ventures, subsidiaries and other entities. When determining organizational boundaries, an enterprise selects a method for synthesizing GHG emissions and then consistently applies the chosen method to identify its business activities for accounting purposes. Enterprises should select a method based on the requirements of the GHG reporting framework that they have to or are willing to participate in (see Section 3 for example GHG inventory protocols). This is important as it ensures consistency in emissions measurement in the long-term. The boundary-setting activity will also determine which activities/departments will be involved in the GHG accounting process.

Figure 3 provides an illustration of an organization boundary for GHG accounting. All the activities inside the solid line are counted towards the corporate inventory. Activities within the dotted lines are the ones that may or may not be included based on the boundary approach selected.



Source: Adapted from [The Greenhouse Gas Protocol, a corporate accounting and reporting standard](#)

Two approaches are generally applied while choosing the organizational boundary of the GHG inventory – equity share and control.

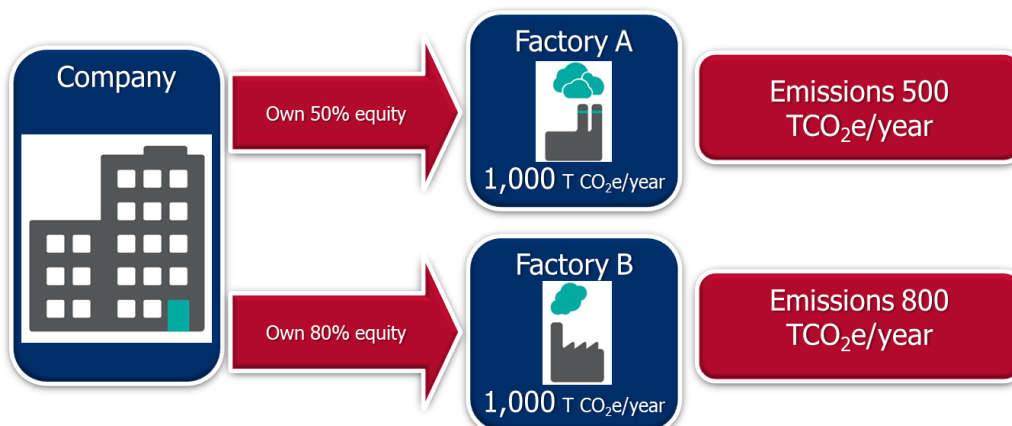
Equity share approach

Under the equity share approach, a company accounts for GHG emissions according to its share of equity in the operation. The equity share reflects economic interest, which is the extent of rights a company has from an operation. Typically, the share is aligned with the

company's percentage ownership of that operation, and equity share will normally be the same as the ownership percentage.

Figure 4. Provides an illustration of the boundary established under the equity share approach.

Figure 4. Example of equity sharing

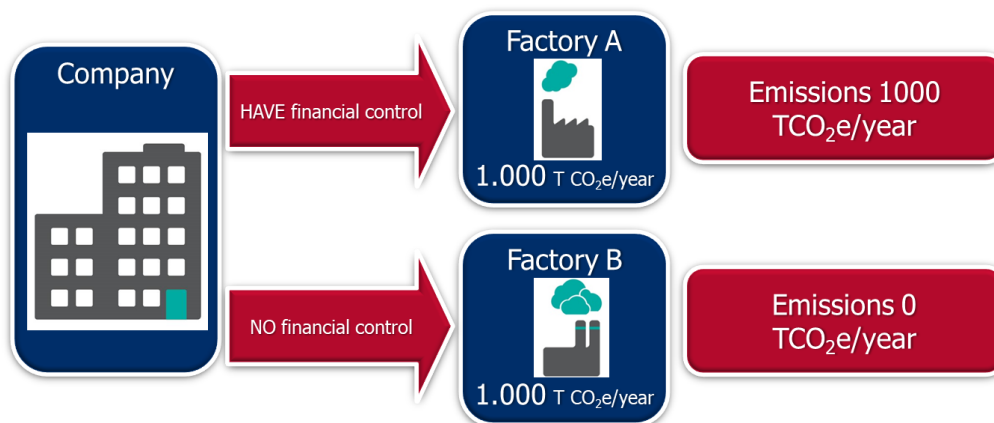


Control approach

In this approach, the boundary of the enterprise is determined based on its financial and operational control. Enterprises will count 100% of GHG emissions from the activities of facilities under the 'control' of the enterprise. With this approach, 'control' means financial control or operational control.

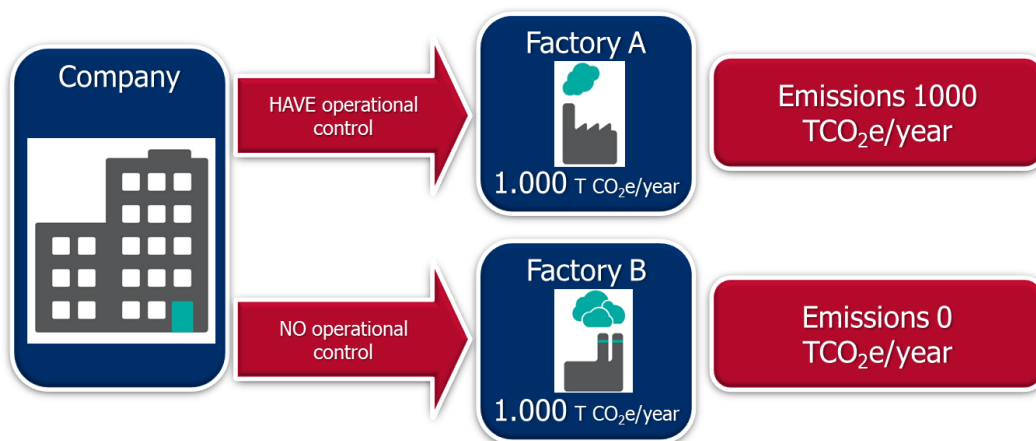
- **Financial control:** Financial control is a critical factor in determining responsibility for greenhouse gas emissions. When an enterprise assumes most of the risks and benefits associated with ownership, it is considered to have financial control. In such cases, the enterprise bears full responsibility for 100% of the emissions from those facilities. Figure 5 illustrates a boundary based on the financial control approach.

Figure 5. Example of financial control



- **Operational control:** If the reporting enterprise has operational control of a plant or a facility, such as having the complete authority to implement operational policies and associated changes, then it is responsible for 100% of the emissions. Figure 6 illustrates a boundary based on the operational control approach.

Figure 6. Example of operational control



Enterprises should also report any changes to the operational boundaries as it affects the next steps with respect to the GHG accounting.

4.2. Step 2 - Establish the scope of the GHG emissions

In this step, enterprises must determine the activities that are likely to result in GHG emissions. Establishing the scope of these emissions includes categorizing them into direct and indirect emissions as described in more detail in Section 3.1.3.

Determining the scope of emissions will help:

- Understand the emission sources that need to be calculated.
- Categorize sources to avoid duplication.
- Provide useful information to stakeholders with respect to the emissions covered by the GHG inventory.
- Manage GHG risks and opportunities in the value chain.

To help enterprises determine direct and indirect emissions, adopting *The GHG Protocol's* guidelines is recommended. Figure 2 provides the categorization of direct and indirect emissions as per *The GHG Protocol*.

4.3. Step 3 - Calculate GHG emissions and reductions

In this step, enterprises must calculate GHG emissions using the process outlined below

Select a method to calculate GHG emissions

The IPCC national inventory guidelines²² cover a hierarchy of calculation methods and techniques, from the application of general emission factors to direct measurement. Direct measurement of GHG emissions by monitoring gas concentrations and flows is not common practice in Vietnam due to the cost of equipment and the technical capacity of staff needed to synthesize data into results. More commonly, emissions can be calculated using a mass balance or chemical balance approach specific to a facility or process. In addition, emissions can also be calculated using an appropriate emission factor which can be attributed to the activity source (e.g., grid emission factor for GHG emissions from electricity used).

Enterprises should use the most accurate calculation method available that is appropriate to their reporting context.

²² UNFCCC. "2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories". Retrieved from: <https://www.ipcc.ch/report/2019-refinement-to-the-2006-ipcc-guidelines-for-national-greenhouse-gas-inventories/>

Collect operational data and emission factors

Enterprises (large, medium and small) must collect activity data and GHG emission factors based on the scope of the emissions accounting established in Section 4.2. At a minimum, data to be collected include the elements described in Table below.

Table 2: Collect operational data and emission factors

ACTIVITY DATA	EMISSION FACTOR
<p>Scope 1: Data on fuel purchased (natural gas, oil, diesel, etc.); data on miles traveled by company-owned vehicles.</p>	<p>Fuel emission factor from the vendor; fuel emission factor for fuels published by national sources, such as the most recent version of Vietnam’s national GHG emissions inventory reported to the UNFCCC. Decision No. 2626/QD-BTNMT, issued by MONRE, stipulates the GHG emission factors to be applied in the calculation and reporting of GHG emissions in Vietnam.</p>
<p>Scope 2: Data on electricity consumption (receipts from electricity supplier).</p>	<p>Grid emission factor published by the electricity supplier or relevant government ministry. The Department of Climate Change of MONRE publish and update the grid emission factor annually, based on actual data from electricity production activities. The latest grid emission factor is 0,6766 tCO₂/MWh for the year 2022, and was published by MONRE in 2024²³.</p>
<p>Scope 3: Data on materials purchased; data on vehicles used for distribution of products; data on leased assets; data on investments; data on business travel (miles); data on employee commuting.</p>	<p>Emission factors provided by public or third-party databases (e.g., International Aluminum Institute, International Iron and Steel Institute, U.S. Petroleum, WBCSD Sustainable Cement Initiative, International Oil and Gas Industry Environment Conservation Association, Ecolvent, etc.).</p>

GHG emission reporting programs typically require quantification and reporting of emissions on an annual basis. This is also the case for facilities in Vietnam covered under Decree No. 06/2022/ND-CP. This means that enterprises should collect activity data for a full year of operating activities.

It is understood that collecting high quality activity data will be a significant barrier for an enterprise at an early stage of its GHG reporting process. It is important to establish effective data collection processes before commencing the GHG reporting process. Some useful measures enterprises can follow include:

- Building a data collection process that will allow similar data to be collected efficiently for future reporting years.
- Converting fuel consumption data into energy units before applying emission factors.
- Comparing current year data with historical trends. If the data does not consistently change from year to year, the cause of these inconsistencies should be investigated (e.g., changes above 10% from year to year may need to be analyzed).

²³ [Vietnam power grid emission coefficient 2022 | Legal documents | Department of Climate Change \(dcc.gov.vn\)](https://dcc.gov.vn)

- Investigating activity data generated for purposes other than preparing GHG inventories in order to determine if it can be useful for future inventory improvements. This involves ensuring that the data meets the necessary criteria for accurate and consistent GHG reporting. Specifically, companies should check the following aspects:
 - Completeness: Ensuring that the data covers all necessary activities and sources.
 - Consistency: Verifying that the data aligns with the definitions and categories used in the GHG inventory.
 - Consistency with Emission Factors: Confirming that the data is compatible with the emission factors applied in the GHG inventory calculations.

Where emission factors are unavailable or inaccurate, enterprises can refer to the IPCC 2006 inventory guidelines²⁴ for default emission factors or refer to the list of emission coefficients for GHG inventory published by MONRE.²⁵

Calculation of GHG emissions

Once enterprises have collected the necessary GHG emission factors and activity data they can begin to calculate GHG emissions, ensuring accuracy and transparency throughout the calculation process. Enterprises can calculate GHG emissions using the process as shown below:

$$KNK_i = AD_i * EF_i$$

Where:

- i: type of GHG;
- KNK_i : emission of GHG i (tonne);
- AD_i : activity data of GHG i;
- EF_i : emission factor of GHG i.

The formula for calculating total GHG emissions of a facility:

$$TPT = \sum_i KNK_i * GWP_i$$

Where:

- TPT: Total GHG emissions of the facility (tonne of CO₂e);

GWP_i : the global warming potential of GHG i applicable according to the latest IPCC guidelines

Calculation of GHG emission reductions

The three methods outlined below explain how to calculate GHG emissions reductions.

Method 1. Calculation based on emissions reduction measures

Using Method 1, the enterprise may calculate the GHG emission mitigation results at the facility in one year using the following formula:

²⁴ [Publications - IPCC-TFI \(iges.or.jp\)](https://www.iges.or.jp/public/ipcc_tfi/)

²⁵ [Decision 2626/QD-BTNMT 2022](#)

$$GPT = \sum_d GPT_d$$

- GPT is the amount of GHG emission reduction of the facility in a year (tonnes of CO₂e);
- d is a measure to reduce the facility's GHG emissions;
- GPT_d is the facility's GHG emission reduction in one year when implementing mitigation measures (tonnes of CO₂e).

GPT_d is calculated using the following formula:

$$GPT_d = PTCS_d - PT_d$$

- PT_d is the facility's GHG emission level in a year when implementing mitigation measures (tonnes of CO₂e);
- $PTCS_d$ is the facility's expected GHG emissions level in a year when no emission mitigation measures are implemented (i.e., the business as usual scenario). This should be reported in tonnes of CO₂e.

Method 2. Based on the results of the GHG inventory

Under Method 2, the enterprise calculates the GHG emission mitigation results of the facility in one year using the following formula:

$$GPT_i = KKKNK_i - KKKNK_{i-1}$$

- GPT_i is the amount of the facility's GHG emission reduction in year i (tonnes of CO₂e);
- $KKKNK_i$ is the facility's GHG emission level in year i (tonnes of CO₂e);
- $KKKNK_{i-1}$ is the facility's GHG emission level in the previous year ($i-1$) (ton CO₂e).

Method 3. Based on GHG emissions intensity

Using Method 3, the enterprise calculates the GHG emission mitigation results of the facility in one year using the following formula:

$$GPT_i = (PTC\textcircled{D}_{i-1} - PTC\textcircled{D}_i) * SLSPT\textcircled{D}_i$$

- GPT_i is the amount of GHG emission reductions at the facility in year i (tonnes of CO₂e);
- $PTC\textcircled{D}$ is emission intensity, representing the amount of GHG emissions per equivalent product in the year (tonnes of CO₂e/product);
- $SLSPT\textcircled{D}_i$ is the equivalent number of products, representing the total output of the enterprise through the number of equivalent products in year i (number of products).

The enterprise must determine the GHG emission intensity for each product unit of the year ($PTC\textcircled{D}_i$) as follows:

$$PTC\textcircled{D}_i = \frac{KKNK_i}{SLSPT\textcircled{D}_i}$$

Enterprises need to determine equivalent products of their facility to be able to apply this third calculation method.

For more information on using Method 3, enterprises can refer to the sectoral guidance and tools provided by *The GHG Protocol*. Some of these include:

- **Cross-sector tools.** Applicable to many industries and enterprises (e.g., emission factors, GHG emissions from stationary combustion, GHG emissions from transport or mobile sources, refrigeration and air conditioning equipment, global warming potential values).
- **Country-specific tools.** Customized for specific developing countries.

Sector-specific tools. Designed for specific industries (e.g., aluminum, adipic acid, ammonia, cement, iron and steel, HCFC-22, nitric acid, pulp and paper, semiconductors, wood and lime).

Aggregate GHG emissions data at the group/corporation level

In this step, enterprises aggregate GHG emissions from multiple facilities at the group level. Planning for this step is important in order to minimize the reporting burden and lower the risk of errors when collecting and compiling data across multiple facilities. Ideally, enterprises should consider integrating GHG reporting within their existing internal tools and processes that are consistent and approved by the management. Where possible, enterprises should leverage existing internal data already being collected across the facility instead of creating a new process for accounting for these within the GHG report.

The tools and processes chosen for data reporting will depend on the existing information and communications infrastructure (i.e., the ease with which new data categories can be introduced into the enterprise's database level). It will also depend on the level of detail at which corporate headquarters require facilities to report. For internal reporting up to the enterprise level, standardized reporting formats should be used to ensure data received from different business units and facilities are comparable and compliant with internal reporting rules.

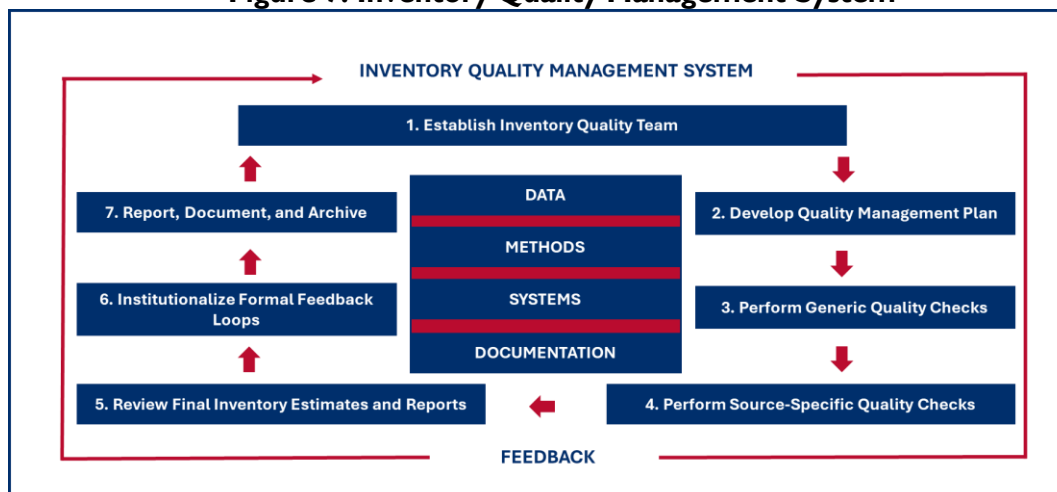
4.4. Step 4 - Quality management

Enterprises have several reasons to ensure the GHG emissions reported meet certain quality standards. These include:

- Quality of data to ensure improvement opportunities are identified.
- Quality of data to comply with regulatory requirements around GHG reporting.
- Quality of data to enable transparent communication to stakeholders.

Figure 7 illustrates the primary elements covered by a quality management system for GHG inventory preparation.

Figure 7. Inventory Quality Management System



In line with Figure 7, enterprises should consider putting in place an internal quality management process to ensure their GHG emissions data is consistent, accurate and auditable. The quality management process should include the following elements at a minimum:

A process to determine the quality of the GHG inventory.

Enterprises should ensure the GHG report they develop is relevant, complete, consistent, transparent, and accurate. This will ensure the enterprise has followed a collaborative and comprehensive process to report emissions that are true and fair to their operations.

Inventory program framework.

Enterprises should design a quality management system that can minimize issues on data accuracy, errors and duplication, amongst other factors. The system should also be easy to implement while remaining flexible enough to adapt to future improvements (e.g., integration with the enterprise’s risk management framework). Some of the key functionalities of the system should include the following:

- **Methodology.** As enterprises use technical methodologies to develop inventories, the framework should allow for the selection, application, and updating of methodologies as new approaches are identified.
- **Data.** Data is critical for GHG accounting as it determines the level of accuracy in reporting. The inventory program framework should allow a process for collecting high quality data along with a process for maintaining and improving procedures.
- **Inventory process and systems.** The framework should include institutional, management, and technical steps for preparing GHG inventories. These include outlining responsibilities of the various functions within the enterprise in the GHG accounting and reporting process.
- **Documentation.** The framework should ensure that the methodologies, data and assumptions used to calculate the GHG emissions inventory are captured. This will mean that GHG emissions data can be validated to ensure accurate and fair reporting to internal or external stakeholders.

Inventory quality team

Enterprises should consider setting up a dedicated team for internal GHG accounting and reporting. The team should be responsible for developing a high quality inventory and coordinate with necessary business units for data and other activities.

Quality management plan

Enterprises should outline a quality management plan at the start of the GHG reporting period. The plan should include all steps to be undertaken across the enterprise to prepare the GHG report – from data collection to the reporting of emissions for senior management/the board. In addition, this should include procedures on internal and external audit, feedback to management and ensure these are aligned with ISO standards to ensure the GHG report is audit-ready. Further guidance on a quality management plan can be found in *The GHG Protocol*.²⁶

Uncertainty in GHG estimation

Preparing a GHG inventory involves computational and scientific tasks due to the complex nature of data collection, emissions estimation, and the subsequent analysis of various activities and processes.

Enterprises commencing first-time GHG accounting may face issues around the quality of primary data and may rely on secondary data, especially emission factors. It is from these situations that uncertainty around GHG emissions arises and can be categorized as scientific uncertainty or estimation uncertainty. Enterprises should compile the basis for both types of uncertainties. For example, uncertainty due to the use of Global Warming Potential values for combining emission estimates can be considered as insignificant since these are scientifically validated. Where estimation-related uncertainties exist, enterprises should consider analyzing these using robust sample data (where possible) for parameters and document any issues (for example, the calibration of a device monitoring gasoline used on a site for diesel generators).

4.5. Step 5 - Track/monitor emissions over time

Enterprises must establish a system for tracking emissions over time. This enables enterprises to assess the impact of GHG reduction measures and assess progress towards meeting relevant GHG commitments. Tracking of GHG emissions over time includes the elements described in the following sections.

Establishing a base year

Enterprises must establish a base year against which future years' GHG emissions can be compared. Enterprises should choose the earliest suitable date for which they have reliable data as the base year. Some international organizations have taken 1990 as the base year to comply with the Kyoto Protocol. However, collecting reliable and verification data for historical base years such as 1990 can be very difficult. If a business continues to grow through acquisition, it can adopt a change policy or choose a rolling base year to achieve uniformity in inventory coverage. A fixed base year has the advantage of allowing emissions data to be compared on a like-for-like basis over longer periods of time than a rolling base year approach. Most emissions trading and registration programs, including the National MRV System to be developed for Vietnam, require the implementation of a fixed base year policy.

²⁶ GHG Protocol Corporate Standard, Chapter 7

The baseline is the historical period over which a facility's emissions are tracked, while the base year is the earliest year for which verified GHG emissions data is available for the required scope. If this is the first GHG inventory, the facility can use the current year as the base year to measure changes in GHG emissions over time as long as the scope and boundaries are representative of the activity. Figure 8 provides an example of how to select a base year.

Figure 8. Example of how to choose a base year

2018		2019		2020		2021	
Scope 1		Scope 1		Scope 1	4.500	Scope 1	4.500
Scope 2	8.000	Scope 2	8.500	Scope 2	9.000	Scope 2	9.500
Scope 3		Scope 3		Scope 3		Scope 3	11.000

Recalculate base year emissions

Enterprises often undergo significant structural changes such as acquisitions, divestments and mergers. These changes will alter a business's historical emissions profile, making meaningful comparisons over time difficult. To maintain consistency, or in other words continue to compare 'like with like,' historical emissions data would have to be recalculated.

Enterprises must develop a policy for recalculating base year emissions and clearly present the basis and context of any recalculation. Where applicable, the policy will clearly state any 'significance thresholds' that apply to the decision to recalculate historical emissions. 'Significance thresholds' are qualitative and/or quantitative criteria used to determine significant changes to data, inventory boundaries, methods, or any other relevant factor. Enterprises are responsible for determining the 'significance threshold' for recalculating base year emissions and publishing the results. It is the verifier's responsibility to confirm the business's compliance with its threshold policy. Figure 9 provides an example of how to recalculate a base year.

The following cases require recalculation of base year emissions:

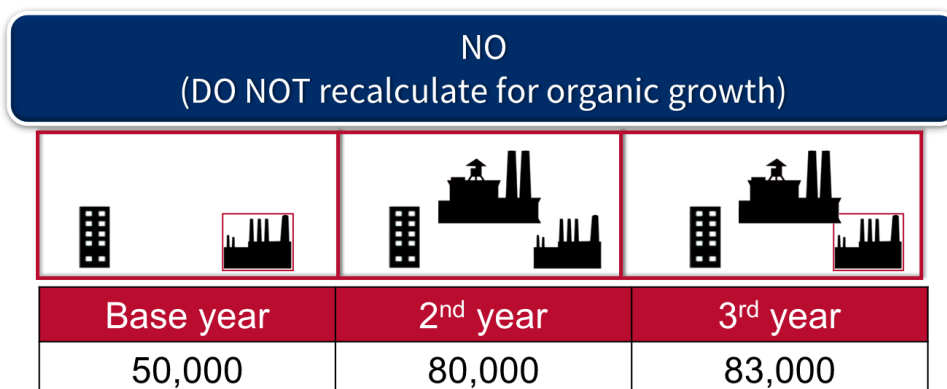
- **Structural changes in the reporting organization** involves transferring ownership or control of operations or activities that generate emissions from one enterprise to another. While a single structural change may not have a significant impact on base year emissions, the cumulative effect of several small structural changes can result in a significant impact. Structural changes include:
 - Mergers, acquisitions and divestments.
 - Change in the use of internal and external resources for emissions activities.
- **Changes in calculation methods or improvements in the accuracy of emission factors or operational data** that result in a significant impact on base year emissions data.
- **Detection of serious errors or a number of accumulated errors** leading to a major impact on the GHG inventory results.

Figure 9 and Figure 10 below illustrate two examples of how to recalculate the base year for company A.

Case 1: Company A opened another factory to meet the need to increase production output

- Demand for Company A's products increases
- A new factory needs to be opened in year 2 to meet this demand. Should base year emissions be recalculated?

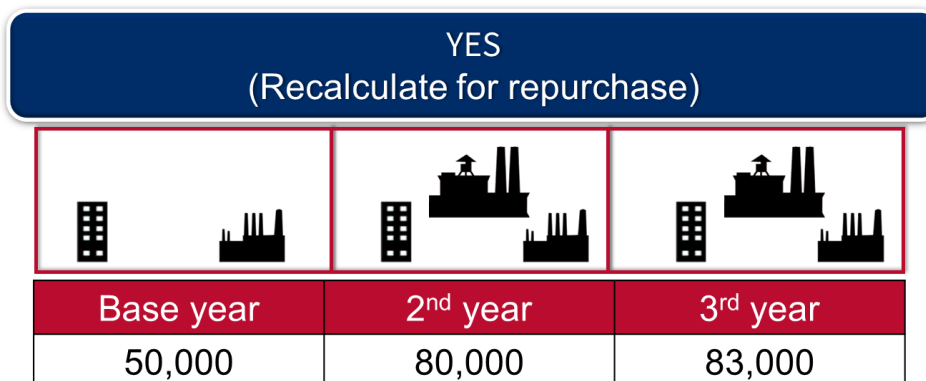
Figure 9. Example of how to recalculate the base year (1)



Case 2: Company A buys an additional factory to meet the need to increase production output.

- Demand for Company A's products increases
- Purchase an older factory from Company E in 2nd year to meet this need. Should base year emissions be recalculated?

Figure 10. Example of how to recalculate the base year (2)



In summary, base year emissions should be retrospectively recalculated to reflect changes within the business that would otherwise affect the consistency and appropriateness of reported GHG emissions information. Once a business has determined its policy on how to recalculate base year emissions, it will apply the policy consistently. For example, both increases and decreases in GHG emissions must be recalculated.

5. REPORTING AND VERIFICATION REQUIREMENTS IN VIETNAM

According to Decree 06 and Circular 01/2022/TT-BTNMT detailing the implementation of the Law on Environmental Protection (Circular No. 01), line ministries are responsible for developing specific guidance on how to conduct GHG reporting and verification. As of July 2024, one circular has been developed by the Ministry of Environment and Natural Resources for the waste sector (Circular No. 17) and another by the Ministry of Industry and Trade for the energy and industrial sectors (Circular No. 38).

5.1. GHG mitigation plan

According to Decree No. 06, enterprises need to prepare a GHG Mitigation Plan to indicate how they will reduce their GHG emissions over time. The requirements for the GHG Mitigation Plan are described below

Reporting timelines

- **2023-2025:** Facilities must develop and implement measures to reduce GHG emissions during the period from 2023 to the end of 2025 in accordance with the production and business conditions of the facility.
- **2026-2030:** Facilities must develop and approve a plan to reduce GHG emissions during the period from 2026 to the end of 2030. The facility must adjust and update this plan annually (if needed) and submit it to MONRE and line ministries

GHG mitigation plan template

The facility level GHG emission mitigation plan must be developed according to Form No. 02, Appendix IV issued with Decree 06. The form requires information on the following basic contents:

- Results of the facility's GHG inventory for the most recent data year;
- The expected level of GHG emissions during the base year or planning period before technologies and measures to reduce GHG emissions have been applied;
- Target to reduce GHG emissions for each year of implementation for the period from 2026 to the end of 2030;
- GHG emission mitigation measures should be selected in accordance with the actual situation, technology level, and implementation resources of the facility;

The facility must have a plan in place to monitor and supervise the implementation of the GHG reduction plan.

GHG emission mitigation plans

Facilities that develop plans to reduce GHG emissions must ensure compliance with the following criteria:

- The facility-level GHG emission mitigation plan should reflect the nature and scale of the facility's operations, capacity, existing technologies, and current production and business plans. It should also reflect the facility's GHG inventory results and expected GHG emission levels during the planning period;
- The facility must select GHG emission mitigation measures that align with those identified in Vietnam's NDC and with the enterprise's technical and financial conditions, readiness for implementation, and the ability to conduct MRV for the measures;

- The methodologies for estimating reduced GHGs of each measure must be developed according to the GHG accounting guidance established by the UNFCCC.
- The facility must have a plan in place to monitor, supervise, and report on the measures to reduce GHG emissions in accordance with specified MRV requirements.

5.2. GHG inventory reporting framework

According to Decree 06/ND-CP/2022 large GHG-emitting facilities must submit annual GHG inventory reports to line ministries and MONRE, using the following procedures:

Report on GHG inventory results

Facilities must prepare and submit annual GHG inventory reports to their line ministries and MONRE. The reports must show complete information about the methods, activity data, applicable emission factors and GHG inventory results. Specifically, the establishments specified in Clause 1, Article 5 of Decree No. 06 must carry out the following every two years:

- From 2023 and onward, the facility must provide activity data and related information that can be useful for the development of a GHG inventory. The facility must submit this information before the reporting period begins on March 31 of the relevant reporting year.
- Prepare a facility-level GHG inventory and submit a facility-level GHG inventory report every two years starting with the 2024 data year and onwards. The GHG inventory report must use the template provided in Form No. 06, Appendix II issued with Decree 06. The facility must send the inventory report to the Provincial People's Committee before March 31, 2025 for verification.
- Complete the facility-level GHG inventory and send it to MONRE before December 1 of the reporting period starting in 2025.

Report on GHG emission mitigation results

Facilities specified in Clause 1, Article 5 of Decree 06 (which are synonymous with the list of large GHG emitters specified in Decision 01) are required to periodically prepare reports on GHG emission mitigation at the facility level. These reports should be submitted annually for the data year preceding the reporting period, using Form No. 02 from Appendix III issued with Decree 06. The reports must be sent to MONRE, the ministries specified in Clause 2, Article 5 of Decree 06, and relevant specialized agencies of the Provincial People's Committee before March 31, starting from 2027.

The GHG emission mitigation report must show complete and accurate information on measurement methods, activity data, emission factors, technical solutions, and management methods to reduce emissions. The report must ensure comprehensiveness of GHG emission mitigation activities and it must be prepared according to the templates, methods and time frames specified in the MRV guidance issued by the competent authority (i.e., line ministries).

5.3. Verification framework

The high level principles outlining the verification process to be used by large GHG-emitters is provided in Decree No. 06/2022/ND-CP while Chapter III of Circular No. 01/2022/TT-BTNMT by MONRE provides detailed guidance for how to seek verification of GHG inventories and GHG mitigation plans. The specific verification steps are covered below.

Verification of GHG inventory results

To ensure consistency and reliability, verification of GHG inventory results must comply with the process issued by MONRE. Specifically, large GHG emitting facilities must:

- Organize and develop facility-level GHG inventory reports every two years for the 2024 data year and onwards and submit these for verification to the Provincial People's Committee by March 31, 2025 and onwards.
- After receiving the verification results of the People's Committee, update and complete facility-level GHG inventory reports and submit these to MONRE before December 1 of the reporting period starting in 2025.

Verification of GHG emission mitigation results

Verification of GHG emission mitigation reports should be carried out by competent authorities according to the order prescribed by MONRE in Article 14 of Decree 06/2022/ND-CP. The verification must be annual starting with the year 2026 and must comply with the detailed technical instructions to be developed by the line ministries specified in Clause 2, Article 5 of Decree 06. The results of the reported GHG emission reductions will be announced by competent authorities.

Large GHG-emitting facilities must submit their GHG emission mitigation report to the government's verification unit as specified in Clause 2, Article 5 of Decree 06. After that, the verification unit will verify the estimated GHG emission mitigation and send the verification report to the facility. After receiving the GHG emission mitigation verification report, the facility sends the inventory report and the associated verification opinion, as well as the GHG emissions mitigation verification report to the MONRE and the line ministries.