

Draft VCS Module

M0479

POST COMBUSTION AND PROCESS CO₂ CAPTURE

Draft Version 1.0

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Sectoral Scope 16: Carbon Capture and Storage

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1 SUMMARY DESCRIPTION

This module applies to project activities that capture or divert CO₂, which would otherwise have been released to the atmosphere, and direct it to permanent geological storage. Eligible project activity types include flue gas capture and diversion of process CO₂ streams (examples provided in section 4).

The module must be used in conjunction with VCS methodology *VM0049 Carbon Capture and Storage* and is globally applicable.

This module establishes applicability conditions, defines the module boundary, and provides procedures and requirements for determining the baseline scenario, quantifying project emissions ($PE_{cap,y}$) and leakage emissions ($LE_{cap,y}$), and monitoring.

The project and leakage emissions calculated in this module, together with those calculated in the transport and storage modules and allocated according to *VT0012 Accounting for Non-VCS CO₂ in CCS Projects* and *VT0013 Differentiating Reductions and Removals in CCS Projects* as appropriate, are used in *VM0049* to calculate the net GHG emission mitigation outcomes from projects using this module.

CO₂ captured and stored, or diverted and stored, by the project activity qualifies as carbon dioxide removals (“removals”) if it is derived from sustainable biomass, or as greenhouse gas (GHG) emission reductions (“reductions”) otherwise.

2 SOURCES

This module is used in combination with the most recent versions of *VM0049* and the following VCS Program modules and tools:

Capture Modules

- *VMD0056 CO₂ Capture from Air (Direct Air Capture)*
- *VMD0062 CO₂ Capture from Natural Gas Processing*

Transport Module

- *VMD0057 CO₂ Transport for CCS Projects*

Storage Module

- *VMD0058 CO₂ Storage in Saline Aquifers and Depleted Hydrocarbon Reservoirs*

Other Modules, Tools, and Requirements

- *VT0010 Emissions from Electricity Consumption and Generation*
- *VT0012 Accounting non-VCS CO₂ in CCS Projects*

- *VT0013 Differentiating Reductions and Removals in CCS Projects*
- *Geological Carbon Storage (GCS) Non-Permanence Risk Tool*
- *GCS Requirements*

This module uses the most recent versions of the following Clean Development Mechanism (CDM) tools:

- *TOOL09 Determining the Baseline Efficiency of Thermal or Electric Energy Generation Systems*
- *TOOL10 Tool to Determine the Remaining Lifetime of Equipment*

3 DEFINITIONS

In addition to the definitions set out in the *VCS Program Definitions* and *VM0049*, the following definitions apply to this module.

Capture materials

The chemicals and media used to capture carbon dioxide. Depending on the technology, this may include capture solvents, solid sorbents, membranes, or catalysts, which may have to be replaced periodically due to loss or degradation over time.

Existing emission source facility

An industrial facility that was in operation before the project start date and continues to operate during the project.

Greenfield emission source facility

An industrial facility that began operations on or after 1 January 2026¹

Ineligible biomass

Biomass feedstocks that do not meet the sustainability requirements as defined in Appendix 1 of this module, or that have a default induced land-use change (ILUC) value of 30 or greater based on the region of production and intended biomass conversion process, as listed in Section 5 of *CORSIA Default Life Cycle Emissions Values for CORSIA Eligible Fuels*²

Membrane process

A method for separating carbon dioxide via semi-permeable materials that allow for the selective transport and separation of carbon dioxide

¹ This is the date on which Verra began development of this module.

² International Civil Aviation Organization. 2024. *CORSIA Default Life Cycle Emissions Values for CORSIA Eligible Fuels*. ICAO. https://www.icao.int/environmental-protection/CORSIA/Documents/CORSIA_Eligible_Fuels/ICA0%20document%2006%20-%20Default%20Life%20Cycle%20Emissions%20-%20October%202024.pdf

Mixed feedstock

A composite feedstock comprised of both biomass and fossil-derived materials

Non-traceable biomass

Biomass feedstocks that do not meet the traceability requirements outlined in Appendix 1 of this module

Process CO₂

A concentrated stream of carbon dioxide produced as a by-product of an industrial production process such as ethanol or other biofuel production, etc.

Sustainable biomass

Biomass feedstocks that meet the sustainability principles and traceability requirements outlined in Appendix 1 of this module

4 APPLICABILITY CONDITIONS

This module applies to project activities that capture or divert CO₂, which would otherwise have remained in or been released to the atmosphere, and direct it to permanent geological storage. Eligible activities include:

- Capture of CO₂ from post-combustion flue gas from heat, power, or combined heat and power generation using biomass, fossil fuels, combinations thereof, or mixed feedstocks (e.g., waste-to-energy), or from industrial production processes such as cement and steel production, where CO₂ is typically released to the atmosphere as part of a mixed gas stream.
- Diversion of concentrated CO₂ streams generated as part of an industrial production process, ethanol and other biofuel production, ammonia production, and hydrogen production. Fertilizer production may be included where a CO₂ stream is generated and separated as part of ammonia production.

This module is applicable under the following conditions:

- 1) The project activities must include at least one of the following:
 - a) PA1: The installation and operation of new equipment or systems to capture CO₂ from post-combustion CO₂ streams, or to divert process CO₂ to permanent geological storage, where no such capture or diversion activity previously existed. This project activity applies to existing or greenfield emission source facilities
 - b) PA2: The refurbishment of existing equipment or systems that capture CO₂ from post-combustion CO₂ streams, or that divert process CO₂ to permanent geological storage, where such systems are in place but have reached the end of their operational life and ceased operation. This project activity applies to existing emission source facilities only.

- c) PA3: The expansion of the capacity of existing systems that capture CO₂ from post-combustion CO₂ streams, or that divert process CO₂ to permanent geological storage. This project activity applies to existing facilities only.
- 2) Capture occurs using one or a combination of the following processes:
 - a) Chemical or physical absorption or adsorption, with liquid solvents or solid sorbents (e.g., amines)
 - b) A membrane process
- 3) The capture process used in the project activities is designed to regenerate the primary capture fluid or media, such that it is not a one-time use, and a concentrated CO₂ stream is recovered from regeneration and available for subsequent transport (where applicable) and storage.

This module is not applicable under the following conditions:

- 4) Project activities that divert CO₂ separated from raw natural gas streams through acid gas removal processes.
- 5) Project activities use oxy-fuel combustion capture for power generation.
- 6) Project activities comprise upgrades to existing facilities or changes in operational practices leading to improved capture efficiency.

5 PROCEDURES

5.1 Module Boundary

The equipment, processes and emission sources included in the module boundary depend on the project activity type listed in section 4. The module boundary for post-combustion CO₂ capture activities is established in section 5.1.2. The module boundary for process CO₂ diversion activities is presented in section 5.1.3.

Note: CO₂ captured by the project activities is quantified in VM0049 and is therefore not included as a carbon sink within the module boundaries presented in this section.

Commonly used equipment and processes for all project activity types may include:

- equipment used to generate airflow for the capture process;
- capture of CO₂ in contactors, beds, or vessels by absorption, adsorption, or other processes;
- regeneration processes to generate a CO₂ stream and recover capture fluid or media;
- conditioning of CO₂ to allow further processing of CO₂ along the carbon capture and storage (CCS) segments (namely transport and storage); and

- co-located utilities for the CO₂ capture process (e.g., air separation units, water treatment systems, electrical or steam systems).

Section 5 of the most recent version of VM0049 provides further details on determining the module boundary. The capture facility, ancillary sites, equipment, and relevant project emissions included in the module boundary and quantified using this module must be clearly identified and documented. The project proponent must ensure that equipment is not omitted or double-counted.

Projects capturing or diverting CO₂ derived from mixed feedstocks or a combination of sustainable and non-traceable biomass feedstocks must use the most recent version of VT0013 to allocate project emissions and leakage emissions between reductions and removals.

5.1.1 Non-VCS CO₂ in the Project Boundary

In cases where non-VCS CO₂ is captured in or flows through the project boundary, the most recent version of VT0012 must be used to calculate the proportion of project emissions and leakage emissions associated with that non-VCS CO₂.

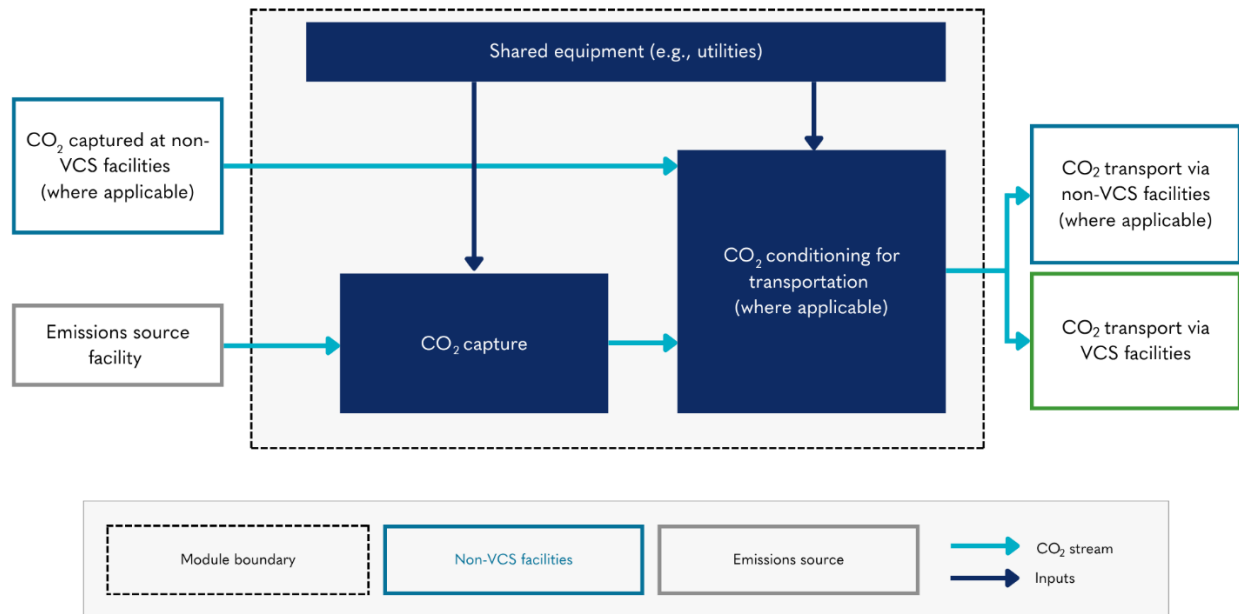
The following CO₂ streams must be accounted for as non-VCS CO₂ for all projects using this module:

- CO₂ streams captured or diverted using equipment and processes that were operational before the project start date, not at end of life, and continue to operate during the project (i.e., baseline scenario B2);
- CO₂ streams captured post-combustion or those diverted from an industrial process including biofuel production, where an environmental benefit is credited to the product of that facility or process (e.g., through environmental attribute certificates or compliance credits such as RINs, RECs, EACs, or towards compliance with a product or facility benchmark under an output-based pricing system),
- CO₂ streams accounted for under another carbon crediting program.

5.1.2 Module boundary for post-combustion CO₂ capture activities

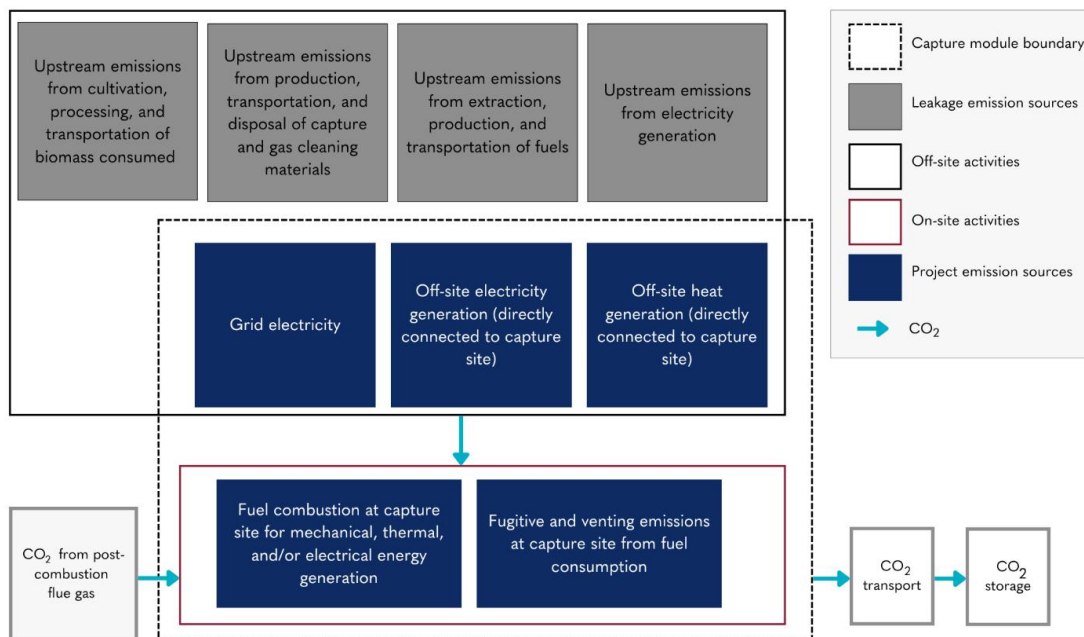
The module boundary for these activities includes the capture facility but does not include the emission source facility generating the CO₂ streams relevant to the project (i.e., related to post-combustion projects). The boundary for these projects is presented in Table 1.

Figure 1. Module boundary for post-combustion CO₂ capture projects



Sources of GHG emissions within the module boundary of post-combustion CO₂ capture are depicted in Figure 2.

Figure 2. Emission sources within the module boundary for post-combustion CO₂ capture projects



The GHGs included in and excluded from the module boundary for project activities involving post-combustion CO₂ are given in Table 1.

Table 1. GHG sources and sinks accounted for as baseline, project, and leakage emissions for post-combustion CO₂ capture projects.

Source / Sink		Type	Gas	Included?	Justification/Explanation
Baseline	Electricity and fuel consumption for flue gas conditioning at source facility	Source	CO ₂	No	Excluded for conservativeness
			CH ₄		
			N ₂ O		
			Other		
	Electricity consumption at capture facility	Source	CO ₂	No	There is no capture facility relevant to the project present in the baseline and therefore no baseline emission sources are included.
			CH ₄		
			N ₂ O		
			Other		
	Fuel consumption at capture facility	Source	CO ₂	No	CO ₂ streams captured in the baseline must be accounted for as non-VCS CO ₂ as per section 5.1.1.
			CH ₄		
			N ₂ O		

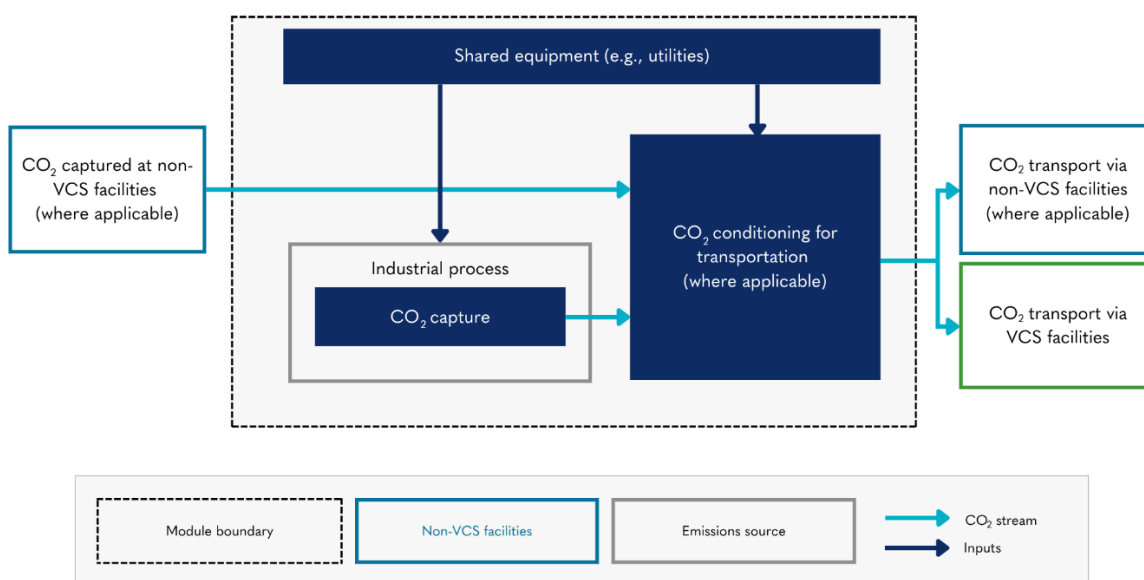
Project	Fugitive and venting emissions from on-site fuel use	Source	Other	No	Projects must use VT0012 to quantify and allocate emissions to non-VCS CO ₂ streams.
			CO ₂		
			CH ₄		
			N ₂ O		
	Fugitive and venting emissions from upstream gas production	Source	Other	No	The upstream components of the natural gas service present in the baseline are also present in the project and therefore the emissions are equivalent.
			CO ₂		
			CH ₄		
			N ₂ O		
	Electricity consumption from capture facility	Source	Other	No	Excluded for simplicity; emissions are considered negligible.
			CO ₂		
			CH ₄		
			N ₂ O		
	Fuel consumption from capture facility	Source	Other	No	Excluded for simplicity; emissions are considered negligible.
			CO ₂		
			CH ₄		
			N ₂ O		
	Fugitive and venting emissions from CO ₂ stream processing	Source	Other	No	Excluded from the baseline since only CO ₂ is considered for permanent geological sequestration.
			CO ₂		
			CH ₄		
			N ₂ O		
	Fugitive and venting emissions from on-site fuel use	Source	Other	No	Excluded for simplicity; emissions are considered negligible.
			CO ₂		

Leakage			N ₂ O	No	Excluded for simplicity; emissions are considered negligible.
			Other	No	Excluded for simplicity; emissions are considered negligible.
	Fuel and electricity consumption at capture facility	Source	CO ₂	Yes	Major source
			CH ₄	Yes	Major source
			N ₂ O	No	Negligible
			Other	No	No other greenhouse gases
	Upstream emissions of feedstocks consumed as fuel at emission source facility	Source	CO ₂	Yes	Major source
			CH ₄	Yes	Major source
			N ₂ O	No	Negligible
			Other	No	No other greenhouse gases
	Production, transportation, and disposal of gas cleaning materials and capture materials	Source	CO ₂	Yes	Major source
			CH ₄	No	Negligible
			N ₂ O	No	Negligible
			Other	No	No other greenhouse gases

5.1.3 Module boundary for process CO₂ diversion activities

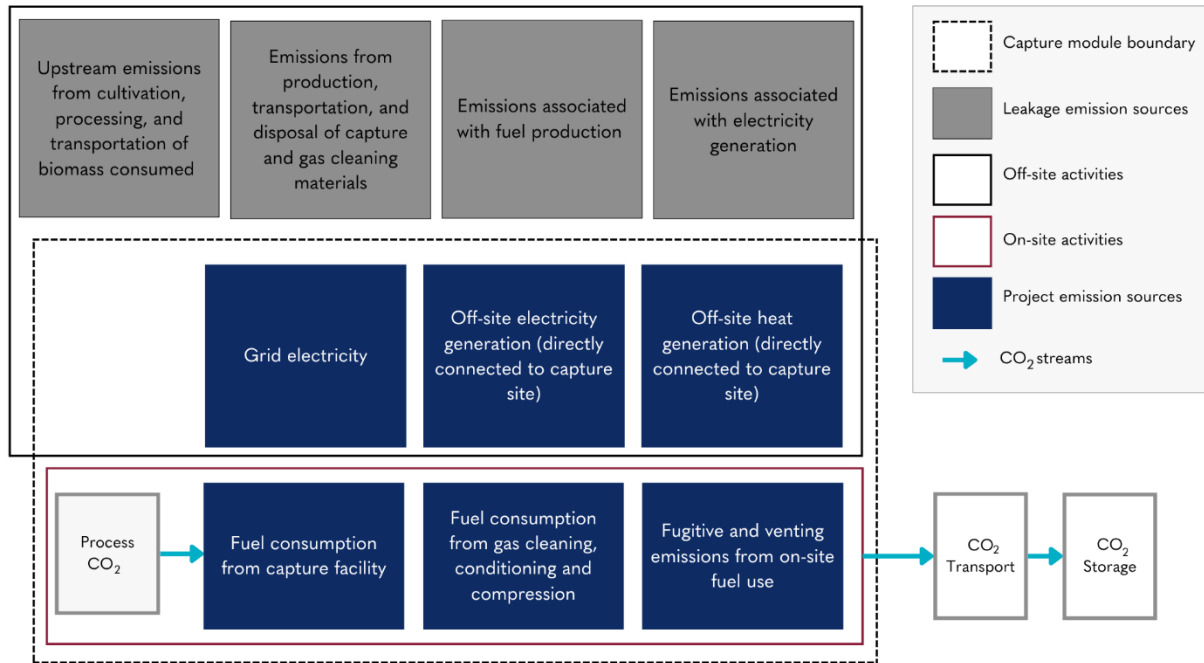
The module boundary for these activities includes at least the industrial facility generating the CO₂ emissions captured and diverted for permanent storage by the project. The boundary for these projects is presented in Figure 3.

Figure 3. Module boundary for process CO₂ diversion activities



Sources of GHG emissions within the module boundary for process CO₂ diversion activities are depicted in Figure 4.

Figure 4. Emission sources within the module boundary for process CO₂ diversion activities



The GHGs included in and excluded from the module boundary for project activities involving diversion of process CO₂ are given in Table 2.

Table 2. GHG sources and sinks accounted for as baseline, project, and leakage emissions for process CO₂ diversion activities.

Source / Sink		Type	Gas	Included?	Justification/Explanation
Baseline	Fugitive and venting emissions from upstream gas production	Source	CO ₂	No	The components of the natural gas service present in the baseline are also present in the project and therefore the emissions are equivalent.
			CH ₄		
			N ₂ O		
			Other		
	Electricity consumption at capture facility	Source	CO ₂	No	The operation of the industrial facility where capture occurs is consistent between the baseline and project scenarios and therefore the emissions are equivalent.
			CH ₄		
			N ₂ O		
			Other		
	Fuel consumption at capture facility	Source	CO ₂	No	The operation of the industrial facility where capture occurs is consistent between the baseline and project scenarios and therefore the emissions are equivalent.
			CH ₄		
			N ₂ O		
			Other		
	Fugitive and venting emissions from on-site fuel use	Source	CO ₂	No	The components of the natural gas service present in the baseline are also present in the project and therefore the emissions are equivalent.
			CH ₄		
			N ₂ O		
			Other		
	Production, transportation, and disposal of capture materials	Source	CO ₂	No	The operation of the industrial facility where capture occurs is consistent between the baseline and project scenarios and therefore the emissions are equivalent.
			CH ₄		
			N ₂ O		
			Other		
Project	Electricity consumption from capture facility	Source	CO ₂	No	The operation of the industrial facility where capture occurs is consistent between the baseline and project scenarios and therefore the emissions are equivalent.
			CH ₄		
			N ₂ O		
			Other		
	Fuel consumption from capture facility	Source	CO ₂	No	The operation of the industrial facility where capture occurs is consistent between the baseline and project scenarios and therefore the emissions are equivalent.
			CH ₄		
			N ₂ O		
			Other		
		Source	CO ₂	No	Negligible

Leakage	Fugitive and venting emissions from on-site fuel use for components not present in baseline		CH ₄	Yes	Major source
			N ₂ O	No	Negligible
			Other	No	No other greenhouse gases
	Electricity consumption for industrial processes not present in baseline	Source	CO ₂	Yes	Major source
			CH ₄	No	Negligible
			N ₂ O	No	Negligible
			Other	No	No other greenhouse gases
	Fuel consumption for industrial processes not present in baseline	Source	CO ₂	Yes	Major source
			CH ₄	Yes	Major source
			N ₂ O	Yes	Major source
			Other	No	No other greenhouse gases
	Fuel consumption for industrial processes not present in baseline	Source	CO ₂	Yes	Major source
			CH ₄	Yes	Major source
			N ₂ O	No	Negligible
			Other	No	No other greenhouse gases
Leakage	Fugitive and venting emissions from upstream gas production	Source	CO ₂	No	The operation of the industrial facility where capture occurs is consistent between the baseline and project scenarios and therefore the emissions are equivalent.
			CH ₄		
			N ₂ O		
			Other		
	Production, transportation, and disposal of capture materials	Source	CO ₂	No	The operation of the industrial facility where capture occurs is consistent between the baseline and project scenarios and therefore the emissions are equivalent.
			CH ₄		
			N ₂ O		
			Other		

5.2 Baseline Scenario

Project proponents must accurately determine the activities and GHG emissions that would have occurred in the absence of the project activity.

Project proponents must accurately determine the activities and greenhouse gas (GHG) emissions that would have occurred in the absence of the project activity.

For the following steps (Sections 5.2.1 - 5.2.2), the applicable geographic area is determined in accordance with VCS tool VT0009 *Combined Baseline and Additionality Assessment*.

5.2.1 Step 1: Identify Alternative Scenarios

Project proponents must identify and assess all credible alternative baseline scenarios to the proposed project activity. This assessment must include at least the alternative baseline scenarios relevant to their project activity as per Section 4 (i.e., PA1, PA2, or PA3).

Baseline scenario B1: No CO₂ is captured for storage, i.e., post-combustion capture does not occur, or process CO₂ is vented or flared.

- a) Sub-scenario B1a: No equipment or systems to capture post-combustion CO₂, or that divert process CO₂ toward permanent storage were in place before the operational start of project activities. This sub-scenario applies to project activity PA1.
- b) Sub-scenario B1b: Equipment or systems to capture post-combustion CO₂, or that divert process CO₂ toward permanent storage were in place but had reached their end of life and ceased operation before the operational start of project activities. The most recent version of CDM *TOOL10 Tool to Determine the Remaining Lifetime of Equipment* must be applied to demonstrate that the remaining lifetime of the capture facility was zero before the operational start of project activities. This sub-scenario applies to project activity PA2.

Baseline scenario B2: CO₂ streams are captured or diverted using capture or diversion facilities that were operational before the project start date. This scenario applies to project activity PA3.

Baseline scenario B3: The proposed project activity occurs without being registered with a GHG program. This scenario could apply to PA1, PA2, and PA3.

5.2.2 Step 2: Check Consistency with Mandatory Applicable Laws and Regulations

Project proponents must use Step 1b, the most recent version of VCS tool VT0008 *Additionality Assessment* to identify the alternative scenarios from Step 1 (Section 5.2.1 in this module) that comply with all mandatory applicable legal and regulatory requirements within the applicable geographic region. All relevant policies and regulations in the applicable geographic region related to the project activity must be assessed, including those with objectives other than GHG emission reductions and/or carbon dioxide removals (e.g., for local air pollution control) and Nationally Determined Contributions (NDC).

5.2.3 Step 3: Establish the Baseline Scenario

Where the only remaining alternative scenario is B3, the project activity represents the baseline scenario, and the project is not eligible to apply this module.

Otherwise, the remaining alternative B1a, B1b, or B2 is the baseline scenario and is used to inform the assessment of project additionality using Section 7 of VM0049.

5.3 Quantification of Project Emissions

The following sections provide guidance for determining the emissions that result from project activities (i.e., $PE_{Cap,y}$). Project emissions are calculated as per Equation (1).

$$PE_{Cap,y} = PE_{Comb_Fuel,y} + PE_{Fuel_FV,y} + PE_{Elec,y} - PE_{nonVCS\ CO_2,y} \quad (1)$$

Where:

- $PE_{Cap,y}$ = Project emissions from capture in year y (t CO₂e)
- $PE_{Comb_Fuel,y}$ = Project emissions from fuel combustion to operate on-site and/or third-party (for off-site heat/steam supply) equipment for CO₂ capture and conditioning processes not present in the baseline in year y (t CO₂e)
- $PE_{Fuel_FV,y}$ = Fugitive and venting from on-site natural gas use to operate equipment not present in the baseline in year y (t CO₂e)
- $PE_{Elec,y}$ = Project emissions from electricity consumption to operate equipment not present in the baseline in year y calculated using VCS tool VT0010 *Emissions from Electricity Consumption and Generation* (t CO₂e)
- $PE_{nonVCS\ CO_2,y}$ = Project emissions from processes and equipment related to non-VCS sources in year y determined using the most recent version of VT0012; equal to zero for projects with no non-VCS CO₂ (t CO₂e)

5.3.1 Project Emissions from Fuel Combustion

Project emissions from fossil fuel combustion for energy within the module boundary are calculated in Equation (2).

$$PE_{Comb_Fuel,y} = \sum_d (Q_{Fuel,d,y} \times EF_{Fuel,CO_2,d}) + (Q_{Fuel,d,y} \times EF_{Fuel,CH_4,d} \times GWP_{CH_4}) + (Q_{Fuel,d,y} \times EF_{Fuel,N_2O,d} \times GWP_{N_2O}) \quad (2)$$

Where:

- $PE_{Comb_Fuel,y}$ = Project emissions from fuel combustion to operate on-site equipment for CO₂ capture and conditioning processes not present in the baseline in year y (t CO₂e)
- $Q_{Fuel,d,y}$ = Quantity of fuel type d used to operate on-site and/or third-party (for off-site heat/steam supply) equipment in year y (m³ or kg or GJ)
- $EF_{Fuel,CO_2,d}$ = Carbon dioxide emission factor for combustion of fuel d ; equal to zero for fuels derived from renewable biomass (t CO₂/m³ or t CO₂/kg or t CO₂/GJ)
- $EF_{Fuel,CH_4,d}$ = Methane emission factor for combustion of fuel d (t CH₄/m³ or t CH₄/kg or t CH₄/GJ)
- $EF_{Fuel,N_2O,d}$ = Nitrous oxide emission factor for combustion of fuel d (t N₂O/m³ or t N₂O/kg or t N₂O/GJ)
- GWP_{CH_4} = Global warming potential for methane (t CO₂e/t CH₄)
- GWP_{N_2O} = Global warming potential for nitrous oxide (t CO₂e/t N₂O)

Where an emission factor that considers only combustion emissions is not available for a given fuel, a combined emission factor for both combustion and upstream emissions may be used as $EF_{Fuel,d}$ in Equation (2).

Off-site Fuel Consumption

The quantity of power and/or heat supplied from a directly connected off-site facility is determined using Equation (3).

$$Q_{Fuel,d,y} = Q_{Cogen,d,y} \times \frac{\left(\frac{Heat_{Project,y}}{\eta_{Heat,y}} + \frac{Electricity_{Project,y}}{\eta_{Elec,y}} \right)}{\left(\frac{Heat_{Cogen,y}}{\eta_{Heat,y}} + \frac{Electricity_{Cogen,y}}{\eta_{Elec,y}} \right)} \quad (3)$$

Where:

$Q_{Fuel,d,y}$	=	Quantity of fuel type d used to operate on-site and/or third-party (for off-site heat/steam supply) equipment in year y (m ³ or kg or GJ)
$Q_{Cogen,d,y}$	=	Quantity of fuel type d used by the cogeneration unit to generate electricity and/or heat in year y (m ³ or kg or GJ)
$Heat_{Project,y}$	=	Quantity of useful thermal energy supplied for the project activity by the cogeneration unit in year y ; equal to zero where only electricity is supplied to the capture facility (MWh)
$Electricity_{Project,y}$	=	Quantity of electricity supplied for the project activity by the cogeneration unit in year y ; equal to zero where only heat is supplied to the capture facility (MWh)
$Heat_{Cogen,y}$	=	Total quantity of useful thermal energy produced by the cogeneration unit in year y (MWh)
$Electricity_{Cogen,y}$	=	Total quantity of electricity produced by the cogeneration unit in year y (MWh)
$\eta_{Heat,y}$	=	Efficiency of thermal energy production from cogeneration unit in year y determined using the most recent version of CDM TOOL09 <i>Determining the Baseline Efficiency of Thermal or Electric Energy Generation Systems</i>
$\eta_{Elec,y}$	=	Efficiency of electricity production from cogeneration unit in year y determined using the most recent version of CDM TOOL09

Waste Heat

Project emissions from the consumption of waste heat may be assumed to be zero for heat sources that meet the definition of waste heat in VM0049. Emissions associated with the generation of heat that does not meet the definition of waste heat must be accounted for in Equations (2) or (3) as appropriate.

5.3.2 Fugitive and Venting Emissions from On-Site Fuel Use

Projects that use natural gas on-site must quantify fugitive and venting emissions from components that are not present in the baseline, using Equation (4).

$$PE_{Fuel_{FV},y} = (\sum_n Count_{n,y} \times EF_n \times T_{n,y} \times 0.001 + \sum_m V_m) \times GWP_{CH_4} \quad (4)$$

Where:

$PE_{Fuel_{FV},y}$	= Fugitive and venting from on-site natural gas use associated with project activities in year y (t CO ₂ e)
$Count_{n,y}$	= Total number of components n in use at the facility during year y that are not present in the baseline (unitless)
EF_n	= Emission factor of fugitive emissions for component n (kg CH ₄ /hr/unit)
$T_{n,y}$	= Time for which component n is pressurized in year y (hr)
V_m	= Vented methane emissions for venting event m (t CH ₄ /event)
0.001	= Conversion from kilograms to tonnes
GWP_{CH_4}	= Global warming potential for methane (t CO ₂ e/t CH ₄)

5.4 Quantification of Leakage

The leakage emissions from project activities are calculated as per Equation (5).

$$LE_{Cap,y} = LE_{Fuel,y} + LE_{Elec,y} + LE_{Mat,y} + LE_{Biomass,y} + LE_{Clean,y} - LE_{nonVCS\ CO_2,y} \quad (5)$$

Where:

$LE_{Cap,y}$	= Leakage emissions from capture in year y (t CO ₂ e)
$LE_{Fuel,y}$	= Leakage emissions from fossil fuel combustion for energy production or processes not present in the baseline, in year y (t CO ₂ e)
$LE_{Elec,y}$	= Leakage emissions from electricity consumption to operate capture equipment or systems in the capture facility not present in the baseline, in year y calculated using VT0010 (t CO ₂ e)
$LE_{Mat,y}$	= Leakage emissions from capture materials used in the capture processes not present in the baseline in year y (t CO ₂ e)
$LE_{Clean,y}$	= Leakage emissions from flue gas cleaning materials not present in baseline used to facilitate the capture processes in year y (t CO ₂ e); equal to zero for process CO ₂ diversion projects
$LE_{Biomass,y}$	= Leakage emissions from the supply of biomass feedstock for energy production or processes in year y (t CO ₂ e)
$LE_{nonVCS\ CO_2,y}$	= Leakage emissions from processes and equipment related to non-VCS CO ₂ streams in year y determined using the most recent version of VT0012; equal to zero for projects with no non-VCS CO ₂ (t CO ₂ e)

5.4.1 Leakage Emissions from Fuel Consumption ($LE_{Fuel,y}$)

Upstream emissions related to fossil fuel consumption for process energy are calculated using Equation (6).

$$LE_{Fuel,y} = \sum_d (Q_{Fuel,d,y} \times EF_{Upstream_Fuel,d}) \quad (6)$$

Where:

- $LE_{Fuel,y}$ = Leakage emissions from fossil fuel combustion for process energy not present in the baseline, in year y (t CO₂e)
- $Q_{Fuel,d,y}$ = Quantity of fuel type d used to operate on-site and/or third-party (for off-site heat/steam supply) equipment not present in the baseline, in year y (m³ or kg or GJ)
- $EF_{Upstream_Fuel,d}$ = Emission factor for upstream sources related to fuel type d used in the module boundary (t CO₂e/m³ or t CO₂e/kg or t CO₂e/GJ)

Where power and heat are supplied from an off-site facility, $Q_{Fuel,d,y}$ must be determined as a proportion of the total fuel used to generate the total electricity and heat at the directly connected facility, using Equation (3).

Where a combined emission factor considering both combustion ($EF_{Fuel,d}$) and upstream emissions ($EF_{Upstream_Fuel,d}$) for a given fuel is used in Equation (2), Equation (6) is not required for that fuel.

5.4.2 Leakage Emissions from Consumption of Capture Materials ($LE_{Mat,y}$)

Leakage emissions from regeneration and replacement and the related production of capture materials during subsequent years are calculated using Equation (7).

$$LE_{Mat,y} = \sum_j (Q_{Mat,j,y} \times EF_j) \quad (7)$$

Where:

- $LE_{Mat,y}$ = Leakage emissions from capture materials used in the capture processes not present in the baseline in year y (t CO₂e)
- $Q_{Mat,j,y}$ = Quantity of make-up capture material j consumed by the capture facility in year y (kg or m³ or units)
- EF_j = GHG emissions from the production of capture material j (t CO₂e/kg or t CO₂e/m³ or t CO₂e/unit)

5.4.3 Leakage Emissions from Consumption of Gas Cleaning Materials ($LE_{Clean,y}$)

Leakage emissions from the production of materials used to clean flue gas to a level that facilitates post-combustion capture of CO₂ are calculated using Equation (8)

$$LE_{Clean,y} = \sum_j (Q_{Clean,k,y} \times EF_k) \quad (8)$$

Where:

- $LE_{Clean,y}$ = Leakage emissions from flue gas cleaning materials not present in baseline used to facilitate the capture processes in year y (t CO₂e)

$Q_{Clean,k,y}$	=	Quantity of flue gas cleaning material k consumed by the capture facility in year y (kg or m ³ or units)
EF_k	=	GHG emissions from the production of flue gas cleaning material k (t CO ₂ e/kg or t CO ₂ e/m ³ or t CO ₂ e/unit)

5.4.4 Leakage Emissions from Biomass Feedstock Supply to Emission Source Facility ($LE_{Biomass,y}$)

Leakage emissions from biomass feedstock supply ($LE_{Biomass,y}$) are calculated as per Equation (9).

$$LE_{Biomass,y} = LE_{BC,y} + LE_{BT,y} + LE_{BM,y} + LE_{Pr,y} \quad (9)$$

Where:

$LE_{BC,y}$	=	Leakage emissions from the cultivation of biomass feedstock in year y (t CO ₂ e)
$LE_{BT,y}$	=	Leakage emissions from the transportation of biomass feedstock to a emission source facility in year y (t CO ₂ e)
$LE_{BM,y}$	=	Leakage emissions from market leakage from the use of biomass feedstock in year y (t CO ₂ e)
$LE_{Pr,y}$	=	Leakage emissions from the processing of biomass in year y (t CO ₂ e)

5.4.4.1 Calculating Increase in Biomass Consumption

Leakage emissions from biomass consumption are based on the relative change in biomass consumption at the emission source facility between the project and the baseline and are calculated using Equation (10).

$$\Delta Q_{Bio,b,y} = \text{MAX} (m_{sb,project,b,y} - m_{sb,base,b}, 0) + \text{MAX} (m_{nt,project,b,y} - m_{nt,base,b}, 0) \quad (10)$$

Where:

$\Delta Q_{Bio,b,y}$	=	Change in mass of total biomass type b consumed in year y relative to the pre-project period (t)
$m_{sb,project,b,y}$	=	Mass of sustainable biomass type b used in year y after the project start date (t)
$m_{sb,base,b}$	=	Mass of sustainable biomass type b used in the absence of the project; equal to zero for baseline B1 (t)
$m_{nt,project,b,y}$	=	Mass of non-traceable biomass type b used in year y after the project start date (t)
$m_{nt,base,b}$	=	Mass of non-traceable biomass type b used in the absence of the project; equal to zero for baseline B1 (t)

Where $\Delta Q_{Bio,b,y} = 0$, then $LE_{biomass,y}$ is set to zero and no further leakage calculations are required.

5.4.4.2 Calculating Leakage from Biomass Cultivation ($LE_{BC,y}$)

There are two options for calculating leakage emissions from the cultivation of biomass.

Option 1: Embodied Emissions Factor

Use an embodied emissions factor, determined through a life cycle assessment (LCA), in Equation (11) to calculate leakage emissions from cultivation.

$$LE_{BC,y} = \sum_b (\Delta Q_{Bio,b,y} \times EF_b) \quad (11)$$

Where:

$LE_{BC,y}$	=	Leakage emissions from the cultivation of biomass feedstock in year y (t CO ₂ e)
$\Delta Q_{Bio,b,y}$	=	Change in mass of total biomass type b consumed in year y relative to the pre-project period (t)
EF_b	=	Embodied emissions factor for biomass type b

Option 2: Calculate Leakage Emissions

Use the following steps to calculate leakage emissions.

- 1) Use Equation (12) to calculate the area of land required to produce the mass of biomass type b consumed by project activities ($Area_{cult,b,y}$).

$$Area_{cult,b,y} = \frac{\Delta Q_{Bio,b,y}}{Yield_{b,y}} \quad (12)$$

Where:

$Area_{cult,b,y}$	=	Area required to produce amount of biomass type b consumed in year y (ha)
$\Delta Q_{Bio,b,y}$	=	Change in mass of total biomass type b consumed in year y relative to the pre-project period (t)
$Yield_{b,y}$	=	Mass of biomass produced per unit of area for biomass type b obtained from biomass supplier in year y (t/ha)

- 2) Use $Area_{cult,b,y}$ or relevant emissions data reported under a regulatory framework (e.g., the European Union's Renewable Energy Directive, RED III) to calculate the emissions resulting from biomass cultivation projects using Section 5.1 of CDM TOOL16.
- 3) Use Equation (13) to assign the emissions resulting from biomass cultivation projects as leakage.

$$LE_{BC,y} = \sum_b PE_{BC,b,y} \quad (13)$$

Where:

- $LE_{BC,y}$ = Leakage emissions from the cultivation of biomass feedstock in year y (t CO₂e)
- $PE_{BC,b,y}$ = Emissions resulting from cultivation of biomass type b in year y calculated using Section 5.1 of CDM TOOL16

Note – Section 5.1 of CDM TOOL16 quantifies project emissions resulting from the cultivation of biomass. Project emissions from biomass cultivation, are included to provide a more representative accounting of the emissions that occur outside of the project boundary but are attributable to the BECCS project. Therefore, $PE_{BC,y}$ determined in TOOL16 equals $LE_{BC,y}$ in this module.

5.4.4.3 Calculating Market Leakage ($LE_{BM,y}$)

The process for determining market leakage depends on how the feedstock is categorized in Appendix 1.

For biomass from waste market leakage is considered negligible and therefore $LE_{BM,y} = 0$.

For excess non-traceable biomass feedstock consumed at the source facility, project proponents must use the following sections of CDM TOOL16³ to determine the leakage emissions associated with the market response to the use of additional biomass:

- Section 6.1 of CDM TOOL16 must be used with the following caveats:
 - Paragraph 47 does not apply
 - Paragraph 48 does not apply. Instead, if either of the indicators determined in paragraph 46 is determined to be greater than 50 per cent, the biomass feedstock is considered ineligible and any CO₂ captured must be treated as non-VCS gas as per VT0012.
- Section 6.2 of CDM TOOL16 must be used with the following caveats:
 - Projects must assume that the alternative scenario for the biomass is B4 in CDM TOOL16 and use Equation 15 to determine the leakage emissions associated with the diversion of biomass.

In addition, projects must use Equation (14) of this module to determine the leakage emissions from additional transportation of biomass by market actors in response to changes in biomass availability due to the project activities, using the following assumptions:

³ Section 6.4 of CDM TOOL16 is not included here as the change in emissions from the processing of any additional biomass consumed by the projects is accounted in section 5.4.4.5

- Where the mode of transportation is not known, projects must use DEF_{mode} for transport by Truck (HDV large) of 240 g CO₂/t-km from Section 6 of VCS module VMD0057 CO₂ Transport for CCS Projects.
- Where the distance traveled to transport the non-traceable biomass is not known, projects must assume a transportation distance equal to that of the biomass feedstock used by the project that traveled the furthest to reach the source facility.

5.4.4.4 Calculating Leakage from the Transportation of Biomass ($LE_{BT,y}$)

Project proponents must use Equation (14) to determine leakage emissions from the transportation of biomass.

$$LE_{BT,y} = \sum_b \sum_{mode} (\Delta Q_{Bio,b,y} \times D_{mode,y} \times DEF_{mode} \times 10^{-6}) \quad (14)$$

Where:

- $LE_{BT,y}$ = Leakage emissions from the transportation of biomass feedstock to a source facility in year y (t CO₂e)
- $\Delta Q_{Bio,b,y}$ = Change in mass of total biomass type b consumed in year y relative to the pre-project period (t)
- $D_{mode,y}$ = (km)
- EF_{mode} = Emission factor to transport biomass cargo by different modes (ship, truck, or rail), (g CO₂/t-km)
- 10^{-6} = Conversion from grams to tonnes

5.4.4.5 Calculating Leakage from Processing of Biomass ($LE_{PR,y}$)

Typical processing of biomass and its residues can include mechanical (e.g., sorting, grinding), thermo-chemical (e.g., drying, vapor explosion, acid or alkali treatments), and biological processes. Project proponents must use Equation (15) to determine the leakage emissions from biomass processing.

$$LE_{PR,y} = \sum_b (PE_{BP,b,y} + PE_{BRP,b,y}) \quad (15)$$

Where:

- $LE_{PR,y}$ = Leakage emissions from the processing of biomass in year y (t CO₂e)
- $PE_{BP,b,y}$ = Emissions due to processing of biomass type b outside the project boundary in year y calculated using CDM TOOL16 (t CO₂e)
- $PE_{BRP,b,y}$ = Emissions due to processing of residue from biomass type b outside the project boundary in year y calculated using CDM TOOL16 (t CO₂e)

Note – Section 5.3 of CDM TOOL16 quantifies project emissions resulting from biomass processing. Project emissions from biomass processing provide a more representative accounting of the emissions that occur outside of the project boundary but are attributable to

BECCS project activities. Therefore, $PE_{BP,b,y}$ and $PE_{BRP,b,y}$ determined in TOOL16 equals $LE_{PR,y}$ in this module.

5.5 Uncertainty

The primary sources of uncertainty identified for the project activities covered in this module are measurement error related to fuel combustion and the leakage emissions from the production of capture materials. All other potential sources of uncertainty are either considered de minimis or accounted for in the conservativeness of the default factors.

- Uncertainty of measurement error related to project emissions from fuel combustion for capture activities is considered de minimis where the metering equipment used for determining fuel volumes ($Q_{Fuel,d,y}$) uses a custody transfer meter or fiscal metering for the transaction.
- Uncertainty of measurement error from leakage emissions from the production of capture materials is considered de minimis where the magnitude of the leakage emissions is less than 2% of the net reduction or removal benefit of the project.
- Uncertainty of measurement error from leakage emissions from the production of gas cleaning materials is considered de minimis where the magnitude of the leakage emissions is less than 2% of the net reduction or removal benefit of the project.
- Uncertainty of measurement error from leakage emissions from the production and processing of biomass feedstocks is considered de minimis where the magnitude of the leakage emissions is less than 2% of the net reduction or removal benefit of the project.

Where project proponents cannot demonstrate that the relevant condition above is met, that source of uncertainty must be included in their uncertainty assessment as described in Section 8.5 of VM0049.

6 DATA AND PARAMETERS

Additional data and parameters are defined in VM0049 and related tools (VCS and CDM) as applicable.

6.1 Data and Parameters Available at Validation

Data/Parameter	GWP_{CH4}
Data unit	t CO ₂ e/t CH ₄
Description	Global warming potential for methane

Equations	(2), (4)
Source of data	Version of IPCC Assessment Report required by <i>VCS Standard</i>
Value applied	See the most recent version of the <i>VCS Standard</i> .
Justification of choice of data or description of measurement methods and procedures applied	Required by the <i>VCS Standard</i>
Purpose of data	Calculation of project emissions
Comments	None

Data/Parameter	GWP_{N2O}
Data unit	t CO ₂ e/t N ₂ O
Description	Global warming potential for nitrous oxide
Equations	(2)
Source of data	Version of IPCC Assessment Report required by <i>VCS Standard</i>
Value applied	See the most recent version of the <i>VCS Standard</i> .
Justification of choice of data or description of measurement methods and procedures applied	Required by the <i>VCS Standard</i>
Purpose of data	Calculation of project emissions
Comments	None

Data/Parameter	$m_{sb,base,b}$
Data unit	t
Description	Mass of sustainable biomass type <i>b</i> used in the absence of the project
Equations	(10)
Source of data	On-site measurements
Value applied	N/A
Justification of choice of data or description of measurement methods and procedures applied	Measured on a dry weight basis from belt weigher/weigh bridge or calculated from receipts/invoices. Mass of biomass consumption is calculated as the average annual biomass consumption during the three years immediately prior to the start

	date of the project activity. Where the emissions source facility has been operational for less than three years, the average consumption of biomass may be calculated over the actual operational period.
Purpose of data	Calculation of leakage emissions
Comments	If the monitoring period for the project is less than 12 months, this period for which this parameter is calculated must align with the period used for $m_{sb,project,b,y}$ to facilitate direct comparison. For projects using baseline B1, $m_{sb,base,b} = 0$

Data/Parameter	$m_{nt,base,b}$
Data unit	t
Description	Mass of non-traceable biomass type b used in the absence of the project
Equations	(10)
Source of data	On-site measurements
Value applied	N/A
Justification of choice of data or description of measurement methods and procedures applied	Measured on a dry basis from belt weigher/weigh bridge or calculated from receipts/invoices. Mass of biomass consumption is calculated as the average annual biomass consumption of the three-year period immediately prior to the start date of the project activity. Where a emission source facility has been operational for less than three years, the average consumption of biomass may be calculated over the actual operational period.
Purpose of data	Calculation of leakage emissions
Comments	If the monitoring period for the project is less than 12 months, this period for which this parameter is calculated must align with the period used for $m_{nt,project,b,y}$ to facilitate direct comparison. For projects using baseline B1, $m_{nt,base,b} = 0$

6.2 Data and Parameters Monitored

Data/Parameter	$Q_{Fuel,d,y}$
Data unit	m ³ or kg or GJ

Description	Quantity of fuel type <i>d</i> used to operate on-site and/or third-party (for off-site heat/steam supply) equipment not present in the baseline, in year <i>y</i>
Equations	(2), (3), (6)
Source of data	Fuel receipts/invoices or flow meter readings Where the project proponent does not have access to fuel receipts/invoices and flow meter readings, equipment specifications and conservative runtime information may be used to estimate fuel consumption.
Description of measurement methods and procedures to be applied	Measured from flow meters or calculated from fuel receipts/invoices. Otherwise, equipment specifications and conservative runtime information may be used to estimate fuel consumption.
Frequency of monitoring/recording	Continuous
QA/QC procedures to be applied	Measuring equipment (e.g., flow meters, weighing scale) must operate within the manufacturer's specified operating conditions and must be routinely calibrated, inspected, and maintained according to manufacturer specifications.
Purpose of data	Calculation of project and leakage emissions
Calculation method	Monthly fuel consumption is determined by summing the quantities from calibrated device readings or fuel receipts/invoices.
Comments	None

Data/Parameter	$EF_{Fuel,CO_2,d}$ $EF_{Fuel,CH_4,d}$ $EF_{Fuel,N_2O,d}$
Data unit	t CO ₂ /m ³ or t CO ₂ /kg or t CO ₂ /GJ t CH ₄ /m ³ or t CH ₄ /kg or t CH ₄ /GJ t N ₂ O/m ³ or t N ₂ O/kg or t N ₂ O/GJ
Description	Carbon dioxide emission factor for combustion of fuel <i>d</i> Methane emission factor for combustion of fuel <i>d</i> Nitrous oxide emission factor for combustion of fuel <i>d</i>
Equations	(2)
Source of data	The following data sources may be used:

	1) Emission factor from <i>2006 IPCC Guidelines for National Greenhouse Gas Inventories</i>, Volume 2, Chapter 2 Stationary Combustion, Table 2.2⁴ 2) Emission factors published by US EPA (2023)⁵ or similar source 3) Data provided by the fuel supplier 4) Determination of combustion emissions using direct measurement methods, where the measurement approach is consistent with approved guidance from a recognized regulatory authority, such as the US EPA's Electronic Code of Federal Regulations, Title 40, Part 98, Subpart W, § 40 CFR Part 98, Subpart W §98.233(z)⁶
Description of measurement methods and procedures to be applied	Use the most recent data published by the above sources when reporting project emissions.
Frequency of monitoring/recording	Annual
QA/QC procedures to be applied	N/A
Purpose of data	Calculation of project emissions
Calculation method	N/A
Comments	$EF_{Fuel,CO_2,d}$ is equal to zero for fuels derived from sustainable biomass.

Data/Parameter	$Q_{Cogen,d,y}$
Data unit	m ³ or kg or GJ
Description	Quantity of fuel type d used by the cogeneration unit to generate electricity and/or heat in year y
Equations	(3)
Source of data	Fuel receipts/invoices or flow meter readings, as applicable
Description of measurement methods and procedures to be applied	Measured from flow meters or calculated from fuel receipts or invoices
Frequency of monitoring/recording	Continuous or for every invoice, aggregated annually

⁴ Available at: https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf

⁵ Available at: <https://www.epa.gov/climateleadership/ghg-emission-factors-hub>

⁶ Available at: [https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-98/subpart-W#p-98.233\(z\)](https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-98/subpart-W#p-98.233(z))

QA/QC procedures to be applied	Measuring equipment (e.g., flow meters, weighing scale) must operate within the manufacturer's specified operating conditions and must be routinely calibrated, inspected, and maintained according to manufacturer specifications.
Purpose of data	Calculation of project emissions
Calculation method	Monthly fuel consumption is determined by summing the quantities from calibrated device readings or fuel receipts/invoices.
Comments	Invoices and/or contracts with the third party must be in place to allow proper data collection.

Data/Parameter	$Heat_{Project,y}$
Data unit	MWh
Description	Quantity of useful thermal energy supplied for the project activity by the cogeneration unit in year y; equal to zero where only electricity is supplied to the capture facility (MWh)
Equations	(3)
Source of data	Utility receipts/invoices or metered data for heat usage
Description of measurement methods and procedures to be applied	Measured from calorimeters or calculated from receipts/invoices, considering energy content in steam and condensate return as applicable based on steam properties
Frequency of monitoring/recording	Continuous, aggregated annually
QA/QC procedures to be applied	The calorimeter must be routinely calibrated, inspected, and maintained according to manufacturer specifications.
Purpose of data	Calculation of project emissions
Calculation method	Monthly supplied heat is determined by summing the quantities from calibrated device readings or fuel receipts/invoices.
Comments	Invoices and/or contracts with the third party must be in place to allow proper data collection.

Data/Parameter	$Electricity_{Project,y}$
Data unit	MWh
Description	Quantity of electricity supplied for the project activity by the cogeneration unit in year y; equal to zero where only heat is supplied to the capture facility (MWh)
Equations	(3)

Source of data	Utility receipts/invoices or metered data for electricity use
Description of measurement methods and procedures to be applied	Measured from electricity meters or calculated from receipts/invoices
Frequency of monitoring/recording	Continuous, aggregated annually
QA/QC procedures to be applied	Electricity meters must be routinely calibrated, inspected, and maintained according to manufacturer specifications.
Purpose of data	Calculation of project emissions
Calculation method	Monthly supplied electricity is determined by summing the quantities from calibrated device readings or fuel receipts/invoices.
Comments	Invoices and/or contracts with the third party must be in place to allow proper data collection. Value is equal to zero where only heat is supplied to the capture facility.

Data/Parameter	$Heat_{Cogen,y}$
Data unit	MWh
Description	Total quantity of useful thermal energy produced by the cogeneration unit in year y
Equations	(3)
Source of data	Utility receipts/invoices or metered data for heat produced
Description of measurement methods and procedures to be applied	Direct measurement of steam flows (or other heat transfer fluid) and characteristics at the cogeneration facility, considering energy content in steam and condensate return
Frequency of monitoring/recording	Continuous, aggregated monthly
QA/QC procedures to be applied	Calorimeters must be routinely calibrated, inspected, and maintained according to manufacturer specifications.
Purpose of data	Calculation of project emissions
Calculation method	Monthly heat production is determined by summing the quantities from calibrated device readings.
Comments	Invoices and/or contracts with the third party must be in place to allow proper data collection.

Data/Parameter	<i>Electricity_{Cogen,y}</i>
Data unit	MWh
Description	Total quantity of electricity produced by the cogeneration unit in year <i>y</i>
Equations	(3)
Source of data	Utility receipts/invoices or metered data for off-grid use
Description of measurement methods and procedures to be applied	Measured from electricity meters or calculated from receipts or invoices
Frequency of monitoring/recording	Continuous, aggregated monthly
QA/QC procedures to be applied	Electricity meters must be routinely calibrated, inspected, and maintained according to manufacturer specifications.
Purpose of data	Calculation of project emissions
Calculation method	Monthly electricity production is determined by summing the quantities from calibrated device readings.
Comments	Invoices and/or contracts with the third party must be in place to allow proper data collection.

Data/Parameter	<i>Count_{n,y}</i>
Data unit	unitless
Description	Total number of components <i>n</i> in use at the facility during year <i>y</i> that are not present in the baseline (unitless)
Equations	(4)
Source of data	Records of capture facility (e.g., pipe and instrument drawing, parts lists)
Description of measurement methods and procedures to be applied	Quantification is based on component counts and respective emission factors. Fugitive emissions are quantified following the approach in the US EPA's Electronic Code of Federal Regulations, Title 40, Part 98, Subpart W, § 98.233 (r).⁷ Examples of emission sources for fugitive emissions include components such as valves, pipe fittings/connectors, open-ended pipes, pressure relief valves, flanges, meters, and instruments.
Frequency of monitoring/recording	Annual

⁷ Available at: [https://www.ecfr.gov/current/title-40/part-98/subpart-W#p-98.233\(r\)](https://www.ecfr.gov/current/title-40/part-98/subpart-W#p-98.233(r))

QA/QC procedures to be applied	Use the most recent data available from the capture facility.
Purpose of data	Calculation of project emissions
Calculation method	Annually count all n components in use at the facility from facility records (e.g., drawings, parts lists).
Comments	Potential sources for fugitive emissions in the capture facility include components such as valves, pipe fittings/connectors, open-ended pipes, pressure relief valves, flanges, meters, and instruments.

Data/Parameter	$T_{n,y}$
Data unit	hours
Description	Time for which component n is pressurized in year y
Equations	(4)
Source of data	Records of capture facility (e.g., control systems, recorded operational data)
Description of measurement methods and procedures to be applied	Option 1: Data from capture facility records Option 2: A default of 8760 hours, based on the assumption that components remain pressurized at all times throughout the year
Frequency of monitoring/recording	Annual
QA/QC procedures to be applied	Use the most recent data available from the capture facility.
Purpose of data	Calculation of project emissions
Calculation method	Use annual operational records to determine $T_{n,y}$ of each component n or use default value.
Comments	None

Data/Parameter	V_m
Data unit	t CH ₄ /event
Description	Vented CH ₄ emissions for venting event m
Equations	(4)
Source of data	Data from the capture facility
Description of measurement methods	Option 1: Direct measurement of venting

and procedures to be applied	Option 2: Estimated based on isolated volumes of pipes and equipment Option 3: Estimated based on non-isolated volumes of pipes and equipment. The project proponent must determine the quantity of vented CH ₄ by transient flow rate calculations for compressible fluids appropriate for the expected evolving conditions in the pipeline or component, based on the approximate geometry of the escaping flow and pipelines/components connected to the venting.
Frequency of monitoring/recording	Annual
QA/QC procedures to be applied	Cross-checked based on energy balance related to metered fuel use
Purpose of data	Calculation of project emissions
Calculation method	Determine V_m by direct measurement or estimate using isolated or non-isolated volumes of pipes and equipment. Use appropriate transient flow rate calculations for CH ₄ venting events.
Comments	None

Data/Parameter	EF_n
Data unit	kg CH ₄ /hr/unit
Description	Emission factor of fugitive emissions for component n
Equations	(4)
Source of data	Emission factor derived from subpart W of US EPA. 2023. <i>Mandatory GHG Reporting Program</i> ⁸ or equivalent nationally appropriate regulations
Description of measurement methods and procedures to be applied	Use the most recent data published by the above sources at the time of reporting project emissions.
Frequency of monitoring/recording	Annual
QA/QC procedures to be applied	N/A
Purpose of data	Calculation of project emissions
Calculation method	N/A
Comments	None

⁸ For more information see: <https://www.epa.gov/ghgreporting/subpart-w-petroleum-and-natural-gas-systems>

Data/Parameter	$EF_{Upstream_Fuel,d}$
Data unit	t CO ₂ e/m ³ or t CO ₂ e/kg or t CO ₂ e/GJ
Description	Emission factor for upstream sources related to fuel type <i>d</i> used in the module boundary
Equations	(6)
Source of data	1) An LCA conducted by a qualified third party in accordance with the most recent versions of ISO 14064 and 14067, that uses either primary or published and peer-reviewed data⁹ 2) A compliance market-approved tool (e.g., CA-GREET,¹⁰ GHGenius¹¹) 3) Emission factors published in peer-reviewed literature¹² representative of the fuels used in plant operation both temporally and geographically 4) Data provided by the fuel supplier or manufacturer where the data used are consistent with that reported to a regulatory body
Description of measurement methods and procedures to be applied	Use the most recent data published by the above sources when reporting project emissions.
Frequency of monitoring/recording	Emission factors determined using LCA must be updated at least every three years or when there is a material change in any of the sensitive parameters. Regulatory program defaults must be updated annually
QA/QC procedures to be applied	Where peer-reviewed literature is used, it must have been published within a year of reporting project emissions and must be temporally and geographically representative of the capture facility.
Purpose of data	Calculation of project emissions
Calculation method	N/A
Comments	None

⁹ State or national government data on the carbon intensity of a fuel are also acceptable sources of data for determining emission factors for fuels used by the project.

¹⁰ The Greenhouse Gases, Regulated Emissions and Energy use in Technologies (GREET) model. Available at: <https://greet.es.anl.gov/>

¹¹ Model for Life Cycle Assessment of Transportation Fuels. Available at: <https://www.ghgenius.ca/>

¹² Peer-reviewed literature must be indexed in the Web of Science: Science Citation Index (SCI; available at <https://mil.clarivate.com>), as specified in the VCS Methodology Requirements.

Data/Parameter	$Q_{Mat,j,y}$ $Q_{Clean,k,y}$
Data unit	kg or m ³ or units
Description	Quantity of make-up capture material j consumed by the capture facility in year y Quantity of flue gas cleaning material k consumed by the capture facility in year y
Equations	(7) (8)
Source of data	Receipts/invoices or flow meter or weighing scale/equipment readings, depending on capture material type
Description of measurement methods and procedures to be applied	Measured from material flow meters or weighing equipment or calculated from receipts/invoices
Frequency of monitoring/recording	Aggregated annually. As per the flow meter or weighing equipment specification by the manufacturer. Manufacturers must be compliant with relevant ISO standards. Alternatively, the sum of all receipts/invoices for capture materials in year y is used.
QA/QC procedures to be applied	Flow meters must be routinely calibrated, inspected, and maintained according to manufacturer specifications.
Purpose of data	Calculation of leakage emissions
Calculation method	N/A
Comments	None

Data/Parameter	EF_j EF_k
Data unit	t CO ₂ e/kg or t CO ₂ e/m ³ or t CO ₂ e/unit
Description	GHG emissions from the production of capture material j GHG emissions from the production of gas cleaning material k (t CO ₂ e/kg or t CO ₂ e/m ³ or t CO ₂ e/unit)

Equations	(7) (8)
Source of data	The value of this parameter may be obtained from the following sources: 1. A life cycle assessment (LCA) conducted by a qualified third party in accordance with the most recent version of ISO 14040, that uses either primary or published and peer-reviewed data¹⁴ 2. Emission factors published in peer-reviewed literature¹⁵ representative of the materials used in BECCS plant operation both temporally and geographically 3. Data provided by the manufacturer where the data used are consistent with that reported to a regulatory body
Description of measurement methods and procedures to be applied	In line with sources of data
Frequency of monitoring/recording	Annual
QA/QC procedures to be applied	Use the most recent data published by the above sources when reporting project emissions. Where peer-reviewed literature is used, it must have been published within a year of reporting project emissions.
Purpose of data	Calculation of leakage emissions
Calculation method	N/A
Comments	None

Data/Parameter	$m_{sb,project,b,y}$
Data unit	t
Description	Mass of sustainable biomass type <i>b</i> used after the project start date in year <i>y</i>
Equations	(10)
Source of data	On-site measurement
Description of measurement methods and procedures to be applied	Measured on a dry weight basis from belt weigher/weigh bridge or calculated from receipts or invoices

Frequency of monitoring/recording	Aggregated annually or the length of the monitoring period if less than 12 months.
QA/QC procedures to be applied	Flow or weight meters must be operated within the manufacturer's specified operating conditions and must be routinely calibrated, inspected, and maintained according to manufacturer specifications.
Purpose of data	Calculation of leakage emissions
Calculation method	Load cells measure the feedstock weight on the belt and send a signal to the integrator, which receives the input in the form of electrical pulses from a belt speed sensor. From the data sources of weight and speed, the mass rate of feedstock is calculated and the total mass of feedstock in the whole year is obtained.
Comments	N/A

Data/Parameter	$m_{nt,project,b,y}$
Data unit	t
Description	Mass of non-traceable biomass type b used after the project start date in year y
Equations	(10)
Source of data	On-site measurement
Description of measurement methods and procedures to be applied	Measured from belt weigher/weigh bridge or calculated from receipts or invoices
Frequency of monitoring/recording	Aggregated annually or the length of the monitoring period if less than 12 months.
QA/QC procedures to be applied	Flow or weight meters must be operated within the manufacturer's specified operating conditions and must be routinely calibrated, inspected, and maintained according to the manufacturer's specifications.
Purpose of data	Calculation of leakage emissions
Calculation method	Load cells measure the feedstock weight on the belt and send a signal to the integrator, which receives the input in the form of electrical pulses from a belt speed sensor. From the data sources of weight and

	speed, the mass rate of feedstock is calculated and the total mass of feedstock in the whole year is obtained.
Comments	N/A

Data/Parameter	EF_b
Data unit	t CO ₂ e/kg or t CO ₂ e/m ³ or t CO ₂ e/unit
Description	Embodied emissions factor for biomass type <i>b</i>
Equations	(11)
Source of data	Output of LCA modeling tool or default values approved under a regulatory program
Description of measurement methods and procedures to be applied	1) An LCA conducted by a qualified third party in accordance with the most recent versions of ISO 14064 and 14067, that uses either primary or published and peer-reviewed data 2) A compliance market-approved tool (e.g., CA-GREET, GHGenius) 3) Emission factors published in peer-reviewed literature representative of the fuels used in plant operation both temporally and geographically 4) Data provided by the fuel supplier or manufacturer where the data used are consistent with that reported to a regulatory body 5) Default values used by a regulatory program which covers the emission source facility
Frequency of monitoring/recording	Emission factors determined using LCA must be updated at least every three years or when there is a material change in any of the sensitive parameters. Regulatory program defaults must be updated annually
QA/QC procedures to be applied	The LCA must be performed by a qualified third party, in accordance with the most recent version of ISO 14040 using a functional unit appropriate to the form of biomass (i.e., solid, gaseous, or liquid). A sensitivity analysis of the LCA results must be conducted to identify the life cycle stages, material, or energy inputs (sensitive parameters) that have the most significant impact on overall emissions intensity and to identify the threshold of materiality for changes in those sensitive parameters.

Purpose of data	Calculation of project emissions
Calculation method	N/A
Comments	None

Data/Parameter	$Yield_{b,y}$
Data unit	t/ha
Description	Mass of biomass produced per unit of area for biomass type b obtained from biomass supplier in year y
Equations	(12)
Source of data	Yield data for individual feedstock provided by feedstock producer
Description of measurement methods and procedures to be applied	Yield data should be obtained through direct measurements or estimates based on historical yield data, adjusted for known factors affecting yield (e.g., weather conditions, agronomic practices). Where direct measurements are not feasible, estimates should be derived from comparable regions or cultivation practices.
Frequency of monitoring/recording	Annually, at the end of each growing season, to capture the yield data for that year's harvest
QA/QC procedures to be applied	Yield data provided by feedstock producers must be verified through a combination of random sampling and comparison with regional averages or historical data for similar biomass types and cultivation conditions. Any significant deviations must be investigated and justified.
Purpose of data	Calculation of leakage emissions
Calculation method	Calculated by dividing the total harvested biomass by the cultivated area for each biomass type b . This should reflect the actual yield realized during the year, incorporating any adjustments for losses or gains in biomass quality or quantity.
Comments	None

Data/Parameter	$m_{b,y}$
Data unit	tonnes

Description	Mass of biomass type <i>b</i> transported in year <i>y</i>
Equations	(14)
Source of data	Receipts or invoices from supplier or transporter of biomass, or on-site measurements
Description of measurement methods and procedures to be applied	Measured from belt weigher/weigh bridge or calculated from receipts/invoices.
Frequency of monitoring/recording	Aggregated annually
QA/QC procedures to be applied	Metering equipment must be operated within the manufacturer's specified operating conditions and must be routinely calibrated, inspected, and maintained according to the manufacturer's specifications.
Purpose of data	Calculation of leakage emissions
Calculation method	Load cells measure the feedstock weight on the belt and send a signal to the integrator, which receives the input in the form of electrical pulses from a belt speed sensor. From the data sources of weight and speed, the mass rate of feedstock is calculated and the total mass of feedstock in the whole year is obtained.
Comments	None

Data/Parameter	$D_{mode,y}$
Data unit	km
Description	Total distance traveled to transport biomass type <i>b</i> by mode (ship, truck, or rail) in year <i>y</i>
Equations	(14)
Source of data	Determined for each delivery of biomass to the emissions point source for a reference trip using the vehicle odometer or equivalent measurement device (e.g., using handheld/mounted global positioning systems (GPS), online sources (maps)).

Description of measurement methods and procedures to be applied	For transport via trucks, rail, barges, or ships, the distance must consider both outbound and empty return trips. Where other freight is transported on the return trip, the distance associated with the return trip need not be accounted for. The company transporting the biomass must provide data to the project proponent about the mode(s) of transportation used, the total number of tonnes delivered, and the total distance traveled. Where the transportation process incurs stops that are not part of the direct trip, their added distances must be included (e.g., a ship transporting CO₂ that detours to collect another cargo from another site before arriving at the storage site).
Frequency of monitoring/recording	Continuous Where the mode of transport, origin, and destination are the same, the distance between the origin and the destination may be multiplied by the total number of trips taken during the monitoring period.
QA/QC procedures to be applied	To be updated when the distance changes. Devices used (such as odometers and GPS) must be calibrated as per manufacturer specifications. When using online sources (e.g., maps), the distance between the start and end destination must not be less than the actual distance traveled between those two points.
Purpose of data	Calculation of project emissions
Calculation method	Where distances are measured through devices such as odometers, the distance is the difference between the reading at the start of the trip and the reading at the end of the trip.
Comments	None

Data/Parameter	EF_{mode}
Data unit	g CO ₂ /t-km
Description	Emission factor to transport biomass cargo by different modes (ship, truck, or rail)
Equations	(14)
Source of data	Determined using ISO 14083:2023 Greenhouse gases — Quantification and reporting of greenhouse gas emissions arising from transport chain operations; or an aligned framework that based on the procedures and

	requirements of ISO 14083, such as the Smart Freight Centre Global Emissions Council (GLEC) Framework ¹³ . Biomass feedstocks demonstrating sustainability through an eligible regulatory program under section A1.2.1 of this module, may use the transportation emission factor(s) used in compliance reporting.
Description of measurement methods and procedures to be applied	Determined according to ISO 14083:2023 or taken from the GLEC Framework based on the relevant mode and region.
Frequency of monitoring/recording	Annually
QA/QC procedures to be applied	Most recent version of data source must be used.
Purpose of data	Calculation of project emissions
Calculation method	As per the data source
Comments	None

6.3 Description of Monitoring Plan

6.3.1 Data Collection

The project proponent must design and implement a comprehensive and robust monitoring plan to ensure collection of all data and information required for each parameter listed in Sections 6.1–6.2.

6.3.2 Regulatory Limits on Carbon Dioxide Emissions

Project proponents must monitor and report any new or amended legal or regulatory framework that has been imposed and directly or indirectly limits GHG emissions from the production facilities from which the CO₂ captured or diverted is sourced, or the products of those facilities.

Where such new frameworks exist, the project proponent must reassess the additionality of the project using a project baseline based on the situation on the date on which the new framework was introduced, using Section 7 of VM0049.

¹³ Current version: Smart Freight Centre. (2025). *Global Logistics Emissions Council (GLEC) Framework for Logistics Emissions Accounting and Reporting (Version 3.2)*. Amsterdam, Netherlands: Smart Freight Centre.

6.3.3 Monitoring of biomass consumption

The project proponent must compile the data evidencing the traceability and categorization of each biomass feedstock consumed at the emission source facility in the monitoring period as outlined in Appendix 1.

7 REFERENCES

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APPENDIX 1: DEMONSTRATING THE SUSTAINABILITY OF BIOMASS FEEDSTOCKS

Traceability Requirements

For a biomass feedstock to be considered traceable, the project proponent must provide relevant data to the validation/verification body (VVB) about biomass feedstocks used at the emissions source facility in each monitoring period, including biomass type and category, volumes, origin, modes of transportation employed, certification, and chain of custody information as applicable.

Where such information is unavailable for a given quantity of biomass feedstock, that quantity is considered non-traceable biomass and its use by the project is subject to the restrictions outlined in the most recent version of VT0013 Differentiating Reductions and Removals in CCS Projects.

Where biomass types are mixed, a sufficient level of information about each component biomass must be available to allow for a mass-balance approach to determine the properties of the mixture, categorize the biomass, and determine the relevant sustainability requirements for each type.

Categorization

The sections that follow describe the general categories of biomass expected to be used as feedstocks for the activities covered in this module. Categorization of biomass is necessary to determine the applicable sustainability principles and documentation requirements.

The examples of biomass types listed in sections below are illustrative, not exhaustive. Where a biomass type is not listed, project proponents must demonstrate which category the biomass belongs in and provide justification for that categorization.

A1.1 Categorization of biomass feedstocks

Biomass feedstocks that meet the traceability requirements of this module and meet the definition of biomass from waste through one of the following scenarios are considered sustainable biomass.

Biomass from waste is not required to meet the sustainability requirements in Section A1.2.

For the purposes of this module, a biomass feedstock is considered biomass from waste if it:

- is listed in section A1.1.1, or
- meets the requirements in A1.2.1.

A1.1.1 Biomass from waste

The following biomass feedstocks considered to meet the definition of biomass from waste¹⁴ (1 – VCS definitions) without further justification.

- Municipal solid waste or food waste originating from waste collection, mixed or sorted.
- Waste originating from the feeding or processing of animals, includes manure and abattoir residuals.
- Waste from green space management including invasive species management from gardens, parks, and nature areas.
- Sludge and biosolids from wastewater treatment and sludge and black liquor from wastewater treatment at pulp & paper facilities using recycled fibers

For biomass feedstocks in this category, project proponents must:

- 1) Identify the origin of the feedstocks as the facility or the area from which the waste was collected (e.g. for municipal solid waste) or generated (e.g. from an abattoir), and
- 2) Demonstrate that the materials were handled in accordance with the relevant waste handling and management requirements governing the operation of the relevant facility or area.

A1.1.2 Biomass from waste from production

This section provides procedures to demonstrate that a biomass feedstock generated as the byproduct or residue of the harvest of forests or cultivated agricultural lands or processing of biomass harvested from forests or cultivated agricultural lands can be considered to meet the definition of biomass from waste.

Examples of this type of biomass feedstock include:

- Harvest slash from forested areas
- Field residues from agriculture include straw, stalks and other unharvest parts of crops and those arising from pruning or other maintenance activities

Project proponents must:

- 1) Identify the origin of the feedstocks as the area, with the most granularity possible, from which the biomass waste was collected, and
- 2) Demonstrate that there is a sufficient supply of the biomass available in the area from which it originates to satisfy project-related demand without compromising non-project demand¹⁵. This can be demonstrated through:
 - a. Historical management plans, receipts, or other records from the areas where the biomass is sourced from showing that the biomass supply is sufficient to satisfy project demand without compromising future non-project biomass delivery commitments. This

¹⁴ Defined in the VCS Program Definitions

¹⁵ This section is based on VM0044 *Biochar Utilization in Soil and Non-Soil Applications*, v1.2

must be demonstrated through an analysis of historical biomass volumes delivered annually in the five years preceding the project start date combined with expected project- and non-project-related volumes for the duration of the project crediting period.

OR

- b. Substantiation via a signed attestation from the manager/landowner or supplier stating that the available biomass supply is sufficient to satisfy project-related demand without compromising future biomass delivery commitments. This must be supplemented by an analysis of historical biomass volumes delivered annually in the five years preceding the project start date combined with expected project- and non-project-related volumes for the duration of the project crediting period. The attestation must not deviate from other available evidence such as remote sensing (e.g., satellite imagery) or documentation from comparable sourcing areas.

OR

- c. An analysis showing that the total biomass quantity available is at least 25 per cent larger than the total biomass quantity used (including by the project facility) for that type of biomass. The analysis should be based on an annual assessment of biomass availability and use in the five years preceding the project start date. Where historical data is not available on an annual basis for the five years preceding the project start date, at least one year of data may be used as evidence. This should be complemented with additional evidence demonstrating that the available data is representative of the five years preceding the project start date. The project region should be adjusted to reflect characteristics specific to the biomass type and markets (e.g., wood residues for bioenergy production) where the project is located.

A1.2 Biomass Products Used as Feedstocks

For a product derived from biomass to be considered a sustainable biomass feedstock, the project proponent must demonstrate that the biomass complies with one of the following:

1. An eligible regulatory program (Section A1.2.1)
2. A regulatory program that is not listed below as eligible, provided the project proponent demonstrates that the regulatory program meets or exceeds the requirements of Section A1.2.3
3. An eligible sustainability certification program (Section A1.2.2)
4. A sustainable certification program that is not listed below as eligible, provided the project proponent demonstrates that the certification program meets or exceeds the requirements of Section A1.2.3
5. The set of sustainability requirements in Section A1.2.3

A1.2.1 Regulatory Compliance

The following are eligible regulatory programs:

1. UK Renewables Obligation Order¹⁶ 2015 (as amended)
2. EU Renewable Energy Directive (EU) 2023/2413¹⁷ of the European Parliament (as amended)

Biomass must always comply with the most recent applicable regulations in the jurisdiction where it is produced.

A1.2.2 Sustainability Certification

The following are eligible sustainability certifications:

1. Forest biomass:
 - a. Forest Stewardship Council (FSC 100% and FSC Mix)
 - b. Program for the Endorsement of Forest Certification (100% PEFC)
 - c. Sustainable Biomass Program (SBP-Compliant Biomass)
2. Agricultural biomass:
 - a. International Sustainability and Carbon Certification (ISCC)
 - b. Roundtable on Sustainable Biomaterials (RSB)
 - c. RenovaBio

A1.2.3 Sustainability Requirements

Projects must demonstrate that the production and sourcing of each biomass product used as a feedstock meets all of the following sustainability requirements, unless otherwise specified.

1. **Biodiversity:** Biomass feedstock sourcing must respect land use patterns, specifically avoiding regions with high biodiversity or high carbon stocks, and peatlands that have been converted or disturbed. This includes primary or highly biodiverse forests (identified by national authorities), designated nature protection areas (by national laws, international agreements, or the International Union for the Conservation of Nature), highly biodiverse grasslands, wetlands, and continuously forested areas.
2. **Sustainable forest management:** Biomass feedstock management must balance growth and harvesting to ensure long-term forest resource sustainability, implement adaptive measures to maintain forest health and vitality, conserve biodiversity by protecting ecosystems, habitats, and species, protect and restore threatened species and habitats, support genetic diversity through the use of native species and local provenances, and maintain and enhance protective functions, including soil conservation and water quality. Forest regeneration must always occur,

and feedstock must not be sourced from primary or old-growth forests. This requirement does not apply to biomass from agriculture.

3. **Soil health:** Biomass feedstock production must maintain or improve soil health. Soil health must at least include soil carbon.
4. **Water:** Feedstock production practices must be employed to preserve or improve water quality, as well as to use water efficiently and prevent the over-extraction of surface or groundwater resources beyond their renewal capacities.
5. **Food security:** Feedstock production must not compromise food security. Feedstock production activities, including agricultural, silvicultural, commercialization, and exploitation activities, must not be conducted in areas with restrictions or embargoes placed due to deforestation.
6. **Social sustainability:** Biomass feedstock sourcing must ensure respect for free, prior, and informed consent (FPIC) and must identify and mitigate negative impact on local communities and economic opportunities. This includes impacts on tenure, Indigenous Peoples, and workers' rights.
7. **Land use, land-use change, and forestry (LULUCF):** For biomass sourced from a country party to the Paris Agreement, that has submitted a Nationally Determined Contribution (NDC) covering emissions and removals from agriculture, forestry, and other land use, and that accounts for changes in carbon stock towards the country's commitment, the following applies:
 - a. The biomass must not be produced from a converted ecosystem such as where forest or wetland has been converted to agriculture/cropland 10 years or more before the start of the project.¹⁸
 - b. The country must have laws that address the conservation of carbon stocks and provide evidence that emissions from the LULUCF sector do not exceed removals. Alternatively, a management system that ensures the long-term preservation of carbon stocks and sinks is acceptable.

For biomass from a country/region that is not party to the Paris Agreement, compliance with appropriate management systems (e.g., Green Gold Label (GGL) S5, Sustainable Biomass Program (SBP) or similar) must be demonstrated.

8. **Cascading use:** Project proponents using biomass products from forestry must demonstrate that those feedstocks are used in a manner that reduces resource extraction and maximizes resource efficiency. This requirement does not apply to biomass from agriculture.

A1.3 Ineligible Biomass

Ineligible biomass cannot generate credits under VM0049 and must not be reported as non-traceable biomass. Emissions captured from the combustion or conversion of ineligible biomass feedstocks must

be accounted for and reported as a non-VCS stream in accordance with the most recent version of VT0012.

APPENDIX 2: JUSTIFICATION OF COMPATIBILITY WITH TRANSITION TO NET ZERO

This module is directly aligned with the transition to net-zero emissions because it creates a credible incentive to install, restore, or expand CO₂ capture systems at heat and power generation facilities and at emissions-intensive industrial facilities.

This module does not provide an incentive for increasing or prolonging consumption of emissions intensive products including fossil fuels. Consumers use the industrial and energy products related to the production facilities covered by this module out of necessity and there are few applications where alternatives can reliably displace this consumption. As such, the module will help to reduce emissions associated with the use of products that would be used anyway.

This module does provide an incentive to capture previously unabated CO₂ emissions. The module provides a clear economic signal for facilities to adopt and scale CCS, mobilizing investment in the capture capacity needed to reduce emissions from industrial and energy infrastructure.

However, while carbon revenue generated by a project using this module may improve the economics of CO₂ management for eligible facilities by covering the costs of CCS-related infrastructure, it will not create a revenue stream that is significant enough to incent additional production.

DOCUMENT HISTORY

Version	Date	Comment
Draft v1.0	22 Sept 2026	Initial version.