

KEY PROJECT INFORMATION & PROJECT DESIGN DOCUMENT (PDD)

PUBLICATION DATE **29.06.2023**

VERSION **v.1.5**

RELATED SUPPORT

- [TEMPLATE GUIDE Key Project Information & Project Design Document](#)

This document contains the following sections

SECTION A. DESCRIPTION OF PROJECT

SECTION B. APPLICATION OF APPROVED GOLD STANDARD METHODOLOGY (IES)
AND/OR DEMONSTRATION OF SDG CONTRIBUTIONS

SECTION C. DURATION AND CREDITING PERIOD

SECTION D. SUMMARY OF SAFEGUARDING PRINCIPLES AND GENDER SENSITIVE
ASSESSMENT

SECTION E. SUMMARY OF LOCAL STAKEHOLDER CONSULTATION

Appendix 1 - Safeguarding Principles Assessment (mandatory)

Appendix 2 - Contact information of project developer(s) (mandatory)

Appendix 3 - LUF Additional Information (project specific)

Appendix 4 - Design Changes

KEY PROJECT INFORMATION

GS ID of Project	GS23423
Title of Project	FS BECCS Project
Time of First Submission Date	19/09/2025
Date of Design Certification	
Version number of the PDD	2.45
Completion date of version	2426/06/2026
Project Developer	FS Industria de Biocombustíveis Ltda
Project Representative	FS Industria de Biocombustíveis Ltda
Project Participants and any communities involved	FS Industria de Biocombustíveis Ltda Future Climate Group
Host Country (ies)	Brazil
Activity Requirements applied	☐ Community Service Activity ☐ Renewable Energy ☐ Land-Use and Forests Activity Requirements /Risks & Capacities ☐ N/A
Scale of the project activity	☐ Micro scale ☐ Small Scale ☒ Large Scale
Other Requirements applied	Engineered Removals Activity Requirements v1.0 PAR_Stakeholder-Consultation-Requirements PAR_Safeguarding-Principles-Requirements
Methodology (ies) applied and version number	Methodology for Biomass Fermentation with Carbon Capture and Geologic storage V2.0
Product Requirements applied	☒ GHG Emissions Reduction & Sequestration ☐ Renewable Energy Label ☐ N/A
Project Cycle:	☐ Regular ☒ Retroactive

Table 1 – Estimated Sustainable Development Contributions

SUSTAINABLE DEVELOPMENT GOALS TARGETED	SDG IMPACT (DEFINED IN B.6)	ESTIMATED ANNUAL AVERAGE	UNITS OR PRODUCTS
13 Climate Action (mandatory)	Climate change mitigation	485,630 ¹	tCO ₂ e (annual average).
02 Zero hunger	Increase productivity	7	Number (of groups of farmers adopted practices promoted by the project)
04 Quality Education	Skill development	10	Number (of people provided skill development training)
07 Affordable and Clean Energy	Renewable energy	650,000	m ³ Biofuel production with Carbon Capture and Storage
08 Decent work and Economic Growth	Number of employments	10	Number (of jobs)
09 Industry, Innovation, and Infrastructure	Companies supported	10	Number (of companies directly engaged in the project value chain)
15 Life on Land	Increased area under tree cover	2,561 ¹⁹⁴	Hectares (ha)

SECTION A. DESCRIPTION OF PROJECT

A.1 Purpose and general description of project

>> The FS BECCS project, proposed under Gold Standard for Global Goals (GS4GG), owned by FS Industria de Biocombustíveis Ltda (FS)², involves capturing carbon dioxide (CO₂) generated during the ethanol fermentation process, at the ethanol production

¹ This is the gross value, before buffer amount deduction. Net amount after deducting the buffer is 466,205 tCO₂/year.

² More details available at: <https://www.fs.agr.br/>

facility, located in Lucas do Rio Verde, Mato Grosso, Brazil. For simplicity, FS Industria de Biocombustíveis Ltda will be referred to as FS throughout the document.

FS started operations in 2017 as a joint venture between Summit Agricultural Group, an investment fund based in the United States, and Tapajós Participações S/A, a company from Mato Grosso with extensive experience in the Brazilian agribusiness sector. The company currently operates three production facilities in the state of Mato Grosso, with a combined annual capacity of approximately 2,400,000 m³ of ethanol, positioning FS as the third-largest ethanol producer in Brazil.

With an annual production capacity of 650,000 m³ of ethanol, FS plant in Lucas do Rio Verde is the first in Brazil to produce ethanol exclusively from second-crop corn, along with a diverse range of animal nutrition products.

The project utilizes technologies to capture the biogenic CO₂ released during the ethanol fermentation process. The CO₂ stream—comprising approximately 98.07%³ carbon dioxide and residual moisture—will be then compressed, dehydrated, and injected into deep geological formations within the Parecis Basin, ensuring secure and long-term storage. As this CO₂ was originally sequestered from the atmosphere through photosynthesis during the corn's growth cycle, its subsequent capture and permanent geological storage constitute a net atmospheric carbon removal.

The Parecis Basin is in the central-western region of Brazil, in the southwest sector of the Amazon Craton, between the Rondônia, Xingu and Guaporé shear belts. It is one of the largest sedimentary basins in Brazil and extends over approximately 355,000 km². It occupies the central region of the Mato Grosso State and the East part of Rondônia State.⁴

This technology will be integrated into the existing production process (**Figure 1****Figure 1**), which currently releases the CO₂ produced during fermentation into the atmosphere.

³ Retrieved from ESTUDOS E PROJETOS PARA SOLICITAÇÃO DA LICENÇA DE INSTALAÇÃO, March, 2025.

⁴ Retrieved from <https://www.gov.br/anp/pt-br/rodadas-anp/oferta-permanente/opc/arquivos/sg/parecis.pdf>

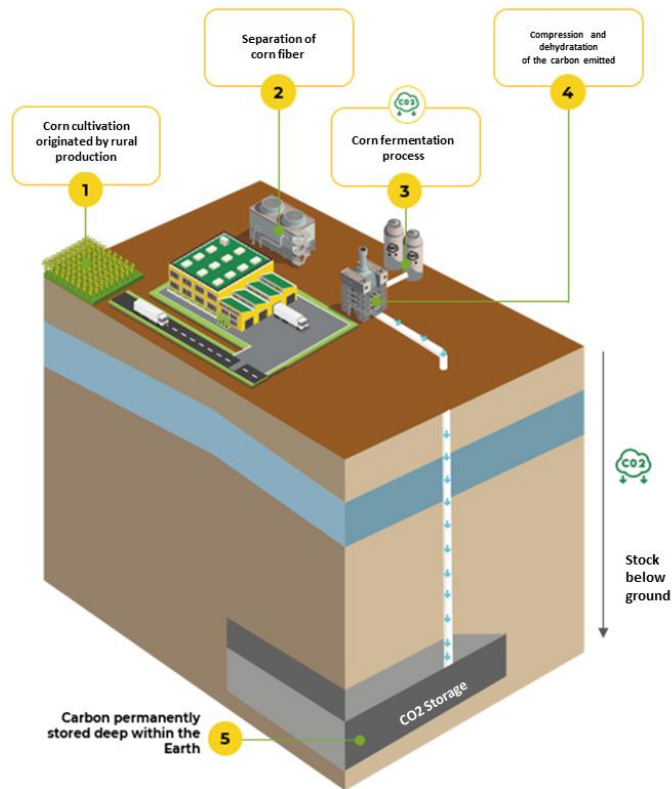


Figure 1. Project summary.

The project was divided in 4 phases: In Phase 1, completed in September 2020, bibliographic data from the Parecis Basin (**Figure 2**) were studied, as well as information from two 2D seismic surveys and 2 stratigraphic wells drilled for the National Agency for Petroleum, Natural Gas and Biofuels (ANP). The preliminary correlation study of well 2-SM-1-MT, located approximately 70 km from the Lucas do Rio Verde plant, demonstrated the existence of sandstone saline reservoirs favorable to the implementation of the BECCS Project in the Diamantino and Sepotuba Formations.

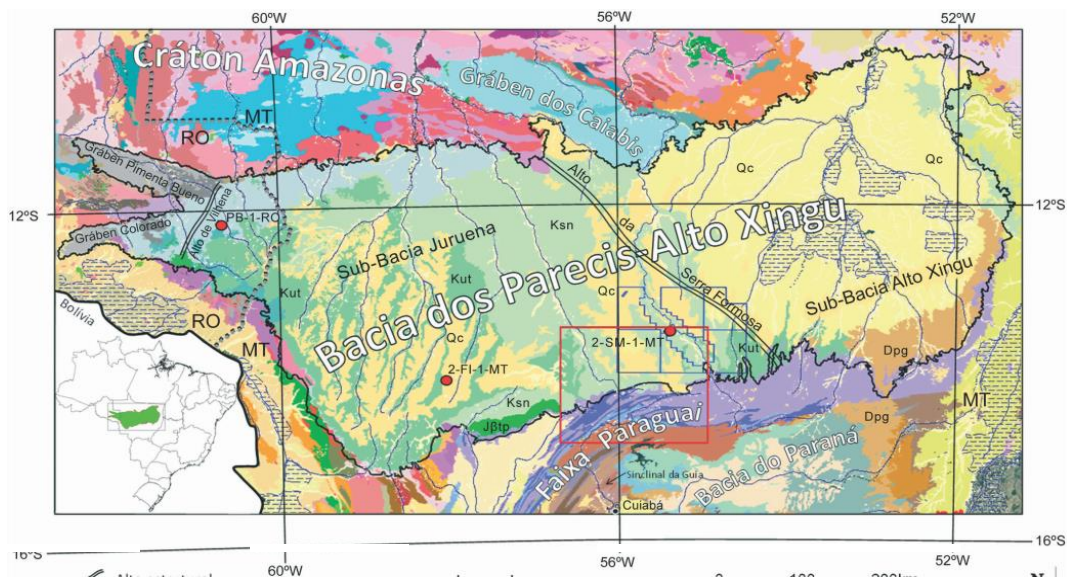


Figure 2. Parecis Basin.

In Phase 2, completed in May 2022, in-depth studies were carried out based on the detailed study of available geological and geophysical data and a new 3D seismic survey acquired in the region of the Lucas do Rio Verde plant. These studies made it possible to model reservoirs to simulate CO₂ injection and sizing of the injection plume, allowing also the planning of a stratigraphic well to further characterize the storage site. At this stage, the Capture Project design was also initiated, comprising all engineering studies and analyzes to define the capture, compression, dehydration and transport system for compressed CO₂ to the injection well.

In Phase 3, completed at the end of July 2024, the stratigraphic well was drilled to obtain detailed information on the local geology. Through this well, side wall cores of the sealing and reservoir rocks were taken as well as cuttings from the drilled rocks. The well was logged with cable tools to identify petrophysical characteristics of the rocks and the collection of pressure and temperature data from specific points, as well as water samples from the target formations for injection. All data obtained in the well and those resulting from laboratory tests carried out with the samples collected served to update the reservoir model, making it possible to define the injection potential in the selected zone and the expected behavior of the CO₂ plume throughout the useful life of the project.

The project is currently in Phase 4, when the stratigraphic well drilled during Phase 3 will be re-entered, and a sidetrack will be drilled to enable, at first, the execution of an

injectivity test. This test, which took place in the last quarter of 2025, from 02/11/2025 to 24/12/2025 was designed to confirm the reservoir's storage capacity and CO₂ injectivity—both of which are critical parameters in FS's evaluation of the final investment decision. The results were positive and confirmed the project viability, this stratigraphic is expected to be converted into an injection well on 31/08/2026.

The monitoring well started to be drilled in February, 2026. Concurrently, the CO₂ capture, compression and dehydration infrastructure is being detailed. A dedicated monitoring system will be deployed to ensure permanence of the CO₂ injected into the storage reservoir and the integrity of the sealing rock. Well integrity will also be monitored to detect any potential leakage or CO₂ release from the injection well and surface equipment.

On the capture side, Trimeric Corporation⁵ has developed project design and major equipment specifications that was the basis to send a RFQ to the market, so FS has already a cost estimate to implement capture and dehydration. As the sister company Summit Carbon has some spare capture and dehydration equipment available to be used by FS, both companies set an agreement on equipment transfer to FS so it avoids leading time for this equipment.

An engineering company (Viena) was hired to develop detailed project design and to construct the capture, compression and dehydration facility. Trimeric will supervise all steps until project operation, providing a "owners engineering" assessment for FS.

The milestones for the project activity are presented in the table below:

Table 2. Project Timeline.

Date	Milestones/Activity
August - September 2020	Phase 1 - Preliminary technical and economic feasibility
September 2020 to May 2022	Phase 2 - Detailed technical and economic feasibility
May 2022 until July 2024	Phase 3 – Stratigraphic well drilling and storage site characterization updated

⁵ Trimeric Corporation serves private industry and government by providing process engineering, chemical engineering, research and development, and other specialized technical services. (<https://www.trimeric.com/>)

04/10/2024	First equipment purchase agreement was signed (start date of the project)
August 2024 to September 2026	Phase 4 – Injection tests, construction and commissioning
28/02/2025	Submission of email communications to identified stakeholders with invitations for the physical meeting of the Local Stakeholder Consultation
02/04/2025	Local Stakeholder Consultation (LSC) physical meeting + stakeholder feedback round
01/09/2026	Expected start of operation (Expected start date of the crediting period)



Figure 3. FS BECCS Project implementation.



Figure 4. Stratigraphic well drilling.

The CO₂ capture and injection (crediting start date) are expected to start in September 2026. The project activity is expected to capture and storage 485,644 tons CO₂/year from the fermentation process and with this project, FS expected to promote an average benefit of 485,630⁶ tCO₂e annually and a total GHG removal of **2,428,153** tCO₂e during the first crediting period (5 years, renewable).

A.1.1. Eligibility of the project under Gold Standard

>> This project complies with the general eligibility criteria outlined in section 3 of the GS4GG Principles Requirement (version 2.1) as described below:

Table 3 - General eligibility criteria as per GS4GG Principles Requirement

Item	Criteria	Description	Explanation
3.1.1 (a)	Types of Project	Eligible projects shall include physical action/implementation on the ground. Pre-identified eligible project types	The project is eligible for Gold Standard Certification since there are Gold

⁶ This is the gross value, before buffer amount deduction. Net amount after deducting the buffer is 465,694466,205 tCO₂/year.

		are identified in the Eligibility Principles and Requirements section.	Standard approved Activity Requirements and/or Impact Quantification Methodologies associated with this type of project
3.1.1 (b)	Location of Project	Projects may be located in any part of the world.	This project is located in Lucas do Rio Verde municipality, Mato Grosso State, Brazil.
3.1.1 (c)	Project Area, Boundary and Scale	The Project Area and Project Boundary shall be defined. Projects may be developed at any scale although certain rules, requirements and limitations may apply under specific Activity Requirements, Impact Quantification Methodologies and Products Requirements. In order to avoid double counting the Project shall not be included in any other voluntary or compliance standards programme unless approved by Gold Standard (for example through dual certification). Also, if the Project Area overlaps with that of another Gold Standard or other voluntary or compliance standard programme of a similar nature, the project shall demonstrate that there is no double counting of impacts at design and performance certification (for example use of similar technology or practices through which the potential arises for	The project area and project boundary were defined as shown in section B.3. The project is developed at any large scale under GS4GG Engineered Removals Activity Requirements v1.0.⁷ We hereby confirm that the proposed project is not included in other voluntary or compliance standards programme. We hereby confirm that the proposed project area does not overlaps with another Gold Standard or other voluntary compliance standard programme of a similar nature. A declaration on Non-Duplication of GHG Benefits is provided as evidence.

⁷ https://globalgoals.goldstandard.org/205_ar_engineered-removals/

double counting or misestimation of impacts amongst projects).

The Brazilian compliance standards programme is still under development, so there is no project submitted yet.

Furthermore, regarding volunteer programs, there are few BECCS projects listed in the main programs, and none of them are about the FS project. FS has no intention of submitting the project to another program at the same time.

A market analysis and a Supporting Note on Ownership of Carbon Credits – BECCS Project were submitted as evidence.

3.1.1
(d)

Host Country
Requirement
s

Projects shall be in compliance with applicable Host Country's legal, environmental, ecological and social regulations.

The project is in compliance with applicable Host Country's legal, environmental, ecological and social regulations. The project already has previous and installation license. The project is intended to have the operation licenses by August 2026. Also, FS has an authorization from

Agência Nacional de
Petróleo (ANP)⁸.

3.1.1 Contact (e) Details	As part of the Project Documentation the Project Developer shall provide (i) name and (ii) contact details of all Project Participants; AND in case of an organisation (iii) the legal registration details and (iv) documentation by the governing jurisdiction that proves that the entity is in good standing (defined as being a legal or other appropriate entity registered in or allowed to operate within the required jurisdiction and with no evidence of insolvency or legal/criminal notices placed against it or any of its Directors). Gold Standard retains the right (at its own discretion) to refuse use of the Standard where reputational concerns are highlighted.	The contact details are available in the Appendix 2. The legal registration details, documentation by the governing jurisdiction that proves that the entity is in good standing (defined as being a legal or other appropriate entity registered in or allowed to operate within the required jurisdiction and with no evidence of insolvency or legal/criminal notices placed against it or any of its Directors) was provided as evidence.
3.1.1 Legal (f) Ownership	Full and uncontested legal ownership of any Products that are generated under Gold Standard Certification, (for example carbon credits) shall be demonstrated. Where such ownership is transferred from project beneficiaries this must be demonstrated transparently and with full, prior and informed consent (FPIC). Note that for certain Project types there is a requirement for full and uncontested legal land	FS has full and uncontested legal ownership of carbon credit generated with this project. There is no transfer of products in this project. Full, prior and informed consent (FPIC) was not carried out because, as reported in the Estudo De Impacto Ambiental (EIA) ⁹ (section 7.3.10.9. DINÂMICA

⁸ All documents were provided to VVB as evidence.

⁹ EIA RIMA for previous license – provided as evidence.

title/tenure to be demonstrated.

These are contained within specific Activity or Product Requirements. All projects shall immediately report to Gold Standard any land title/tenure disputes arising.

SOCIOCULTURAL), there are no affected Indigenous Peoples and Local Communities in the Area of Indirect Influence of the BECCS plant.

The Indirect Area of Influence related to the socioeconomic environment includes the municipality of Lucas do Rio Verde due to the indirect impacts generated both during the implementation and operation phases.

Although the corn planting areas are part of the project boundary, they are not directly controlled by FS. FS has no influence or access to these areas. The relationship between FS and the corn suppliers is restricted to purchase and sale contracts, subject to prior analysis of the corn's eligibility according to FS's internal policies.

Therefore, these corn production areas are not part of the socioeconomic environment analysed

by the EIA, nor is it necessary to analyse these areas to obtain licenses and permits.

A Supporting Note on Ownership of Carbon Credits – BECCS Project was submitted as evidence.

3.1.1
(g)

Other Rights

As well as legal title and ownership, the Project Developer shall also demonstrate where required uncontested legal rights and/or permissions concerning changes in use of other resources required to service the Project (for example, access rights, water rights etc.). Any known disputes or contested rights must be declared immediately to Gold Standard by the Project Developer and resolved prior to further project implementation in affected areas.

FS has full and uncontested legal ownership of all operations and equipment associated with the Project. Also FS is the owner of the superficial land where all the infrastructure will be installed. The Project is subject to environmental licensing and monitoring by the competent authority of Mato Grosso, Secretaria de Estado do Meio Ambiente e Recursos Naturais (SEMA)¹⁰. According to the CONSTITUIÇÃO DA REPÚBLICA FEDERATIVA DO BRASIL DE 1988¹¹, chapter II, Article 20, , mineral resources, including subsurface resources, are assets of the Federal Union.

¹⁰ <http://www.sema.mt.gov.br/site/>

¹¹ Available at: https://www.planalto.gov.br/ccivil_03/Constituicao/Constituicao.htm

Therefore, private ownership of subsurface formations (pore space) is not applicable under the Brazilian legal framework.

Also the Law 14.993/2024, chapter VI)¹², Article 26 states that “the exercise of activities related to carbon dioxide capture for geological storage purposes, its transport through pipelines, and geological storage will be carried out with authorization from the National Agency of Petroleum, Natural Gas and Biofuels (ANP).

In this context, the right to use subsurface formations for CO₂ geological storage is granted through authorization issued by ANP. On 19/12/2024, the ANP Board approved, through Board Resolution No. 859/2024 (SEI 4592818), authorizing the analysis of projects related to carbon capture and storage activities, underway

¹² Available at: https://www.planalto.gov.br/ccivil_03/_ato2023-2026/2024/lei/L14993.htm

or in the process of being implemented, through experimental regulation by pilot project, until the specific regulatory process is completed, The corresponding ANP authorization process is provided as evidence.¹³ There are no known disputes related to subsurface use, access rights, or storage authorization.

3.1.1.1 (h)	Official Development Assistance (ODA) Declaration	All Project Developers applying for project activities located in a country named by the OECD Development Assistance Committee’s ODA recipient list and seeking	Brazil is on the DAC List of ODA Recipients, effective for reporting on aid in 2024 and 2025 ¹⁴ , as an Upper Middle-income territory. The Project Developer will sign and submit the ODA Declaration. As per GHG Emissions Reduction & Sequestration Product Requirements.
		Gold Standard Certification for carbon credits shall declare the Official Development Assistance (ODA) support. The Project Developer shall follow the GHG Emissions Reduction & Sequestration Product Requirements and submit the declaration at the time of Design Certification.	

¹³ ANP Approval Available at: ¹⁴ <https://webfs.oecd.org/oda/DAClists/DAC%20List%20of%20Aid%20Recipients%20-%202024-25%20flows.pdf>

The GS project activity is not registered with any other voluntary or national GHG emissions trading systems.

The project activity meets the specific eligibility criteria of "GS4GG Engineered Removals Activity Requirements v1.0.¹⁵" as described below:

Table 4 - Eligibility criteria as per GS4GG Engineered Removals Activity Requirements v1.0.

SN	Criteria	Description	Explanation
4.1	Eligible Activity type	4.1.1 The following holistic activity types shall be considered eligible: a. Enhanced weathering b. Not applicable Enhanced mineralization c. Ocean alkalinity enhancement	
		4.1.2 The following carbon capture activities shall be considered eligible when the storage-related criteria outlined in the subsequent paragraph are also met: a. Direct air capture (DAC) b. Direct ocean capture (DOC) c. CO ₂ capture in biomass d. CO ₂ capture from the industrial processing of biomass, e.g.: i. Combustion (bioenergy) ii. Anaerobic digestion iii. Fermentation iv. Gasification v. Pyrolysis	The Project Activity is a Bioenergy Carbon Capture and Storage (BECCS) Project. Thus, it can be considered eligible.

¹⁵ https://globalgoals.goldstandard.org/205_ar_engineered-removals/

4.1.3 | The following storage activities shall be considered eligible when the capture-related criteria outlined in the preceding paragraph are also met:

a. Geological storage, whereby either:

i. CO₂ is pressurized to produce a liquid/ supercritical fluid which is injected into a geological reservoir.

ii. CO₂ is dissolved into a solution which is injected into a geological reservoir (this may facilitate subsurface carbonate mineralization).

iii. Biomass is treated to produce bio-oil which is injected into a geological reservoir.

iv. Carbon-rich slurries are injected into a geological reservoir.

b. Storage in products/ materials, whereby:

i. Carbon is used as a feedstock to produce products or materials. The product may not exist in its original form over the extent of the durability timeframe, but the carbon-containing component shall not degrade (e.g., a carbonate mineral contained within a building material, such as

The Project Activity includes Geological Storage where CO₂ is pressurized to produce a liquid/ supercritical fluid which is injected into a geological reservoir.

concrete, can remain stable even if the building is demolished).

ii. Products and materials include, for example, stable carbonate minerals, biochar and biopolymers.

4.1.4 | The list of eligible activity types may be amended or extended in future versions based on the latest scientific understanding. Activity developers are encouraged to contact the Gold Standard Secretariat via standards@goldstandard.org for suggestions on new activities to include.

Not applicable, since the project activity is already included in the list.

4.1.5 | The following activities shall not be eligible under the Engineered Removal Activity Requirements due to uncertainties surrounding the proportion of biogenic carbon that is transferred to deep ocean:

- a. Ocean fertilization
- b. Sinking of biomass in the deep ocean (deep ocean storage)

Not applicable, since this project is not about Ocean fertilization nor sinking of biomass in the deep ocean (deep ocean storage).

4.2 Ineligible activity types

4.2.1 | Activities involving the enhanced recovery of hydrocarbon shall not be considered eligible for Gold Standard certification in line with Gold Standard's Principles & Requirements.

Not applicable, since the project is not about enhanced recovery of hydrocarbon.

A.1.2. Legal ownership of products generated by the project and legal rights to alter use of resources required to service the project

>> While being the registered owner of all project-related infrastructure and while having been granted with all applicable permissions and authorizations for the implementation and operation of the GS project activity, the project owner FS has full and uncontestable legal ownership of all Products that are generated under Gold Standard Certification.

Table 5. Milestones.

Expected Date	Milestones/Activity
07/05/2024	Updated Operation Licensee for ethanol production
11/07/2024	Submission of the EIA/RIMA to the environmental authority (SEMA)
18/09/2024	Public Hearing for Licensing Process
02/07/2025	Preliminary License for FS BECCS Project
14/11/2025	Installation License for FS BECCS Project
24/12/2025	Injector well drilling completion
31/08/2026	Expected Operation License for FS BECCS Project
31/08/2026	Pore space usage authorization - ANP via Law 14.993/2024
15/04/2026	Monitoring well drilling completion

A.2 Location of project

>> The FS BECCS project involves capturing the CO₂ generated from the fermentation process of second-crop corn ethanol at the production plant located in Lucas do Rio Verde, Mato Grosso, Brazil. The Parecis Basin, where the CO₂ will be storage, is located

in the central-western region of Brazil, in the southwestern sector of the Amazon Craton, between the Rondônia, Xingu and Guaporé shear belts. It is one of largest in Brazil and extends over approximately 355,000 km². It occupies the central region of the Mato Grosso State and the East part of Rondônia State.

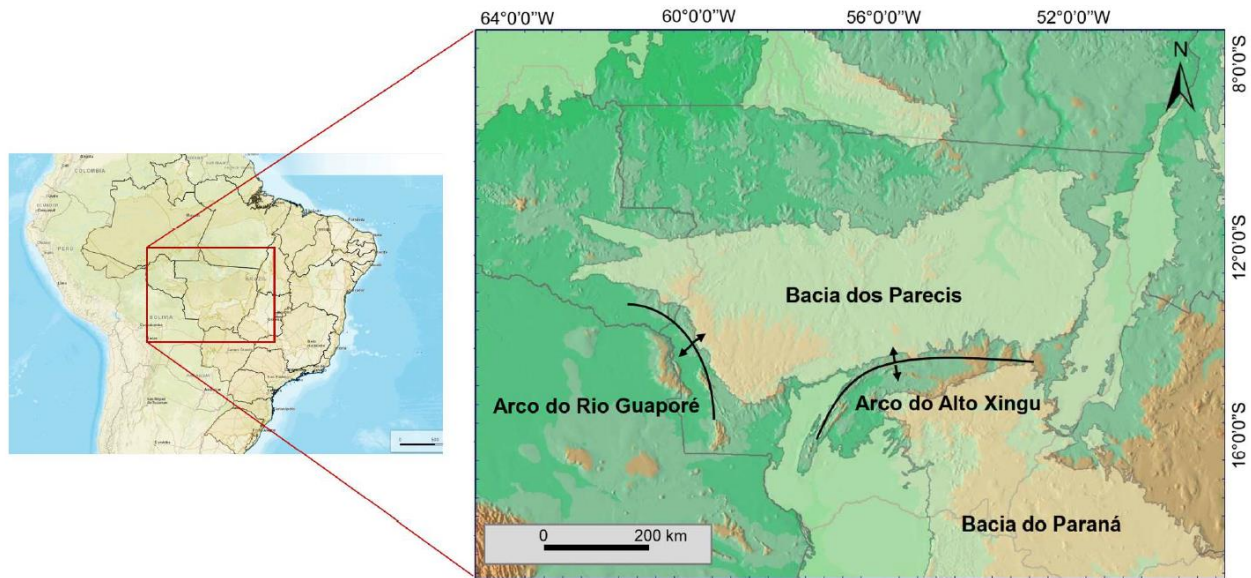


Figure 5. Parecis Basin Location¹⁶

Table 6. Address and coordinates.

Plant	Address	Latitude	Longitude
FS Lucas do Rio Verde facility	Rodovia MT-449, KM 05, Distrito Industrial Senador Atílio Fontana, Lucas do Rio Verde, Mato Grosso, Brazil.	13°0'23.4" S	55°56'53.8" W
Injection well	Rodovia MT-449, KM 05, Distrito Industrial Senador Atílio Fontana, Lucas do Rio Verde, Mato Grosso, Brazil.	13° 0'23.61"S	55°56'53.21"W
Monitoring well	Lote 08B7 – Setor 2 – CEP: 78.467-899 – Projeto Especial de Assentamento Lucas do Rio Verde – Lucas do Rio Verde, Mato Grosso, Brazil.	13°01'22.595" S	55°57'28.966" W

¹⁶ File extracted from the Brazilian Geological Service – CPRM – Geobank (<http://geobank.sa.gov.br/>)

Pipeline	Rodovia MT-449, KM 05, Distrito Industrial	Senador Atilio	13°0'17.621" S	55°56'45.607" W
Origin	Fontana, Lucas do Rio Verde, Mato Grosso, Brazil.			

The azimuthal projection of the storage site's Area of Review delineated with geodetic polygon in a KML file will be provided in section B.3.

The project may expand to additional capture sites in the coming years.

A.3 Technologies and/or measures

>>

Baseline (pre-project) scenario

It is considered that in the baseline scenario the CO₂ is released to the atmosphere.

The previously conceived overall design, operation and management plan of the Fermentation facility is not expected to be compromised or changed as a result of the implementation of the BECCS project.

The fermentation facility was previously designed and has been operated under conformance with its related design, construction, operational and management specifications and requirements (as detailed and specified in the currently valid environmental permit/license applicable for this particular bioethanol unit).

The whole management and operation plan of the fermentation plant has been approved and has been regularly monitored by the competent environmental authority of Mato Grosso, *Secretaria de Estado do Meio Ambiente e Recursos Naturais* (SEMA)¹⁷.

BECCS Project

CCS technologies have three main components: capture, transport and storage. The interconnection of the existing bioethanol process with the BECCS Project will be through the capture of CO₂ in the exhaust of the gas washing column from fermentation, whose composition is around 98.07%¹⁸ CO₂ and the remainder, predominantly, moisture. Therefore, the BECCS Project will be a parallel addition to the current process, without altering its original characteristics and its operation may be interrupted at any

¹⁷ <http://www.sema.mt.gov.br/site/>

¹⁸ Retrieved from ESTUDOS E PROJETOS PARA SOLICITAÇÃO DA LICENÇA DE INSTALAÇÃO, March, 2025.

time without damaging the pre-existing system. The captured CO₂ is transported at low pressure by pipeline to the compression and dehydration system and then to the injection well in supercritical state. The technology of construction and operation of pipelines is the same as that used in the transportation of natural gas, largely dominated by the oil industry. Sedimentary basins cover a large part of all continents. In Brazil, there are more than 6 million km² of sedimentary basins, of which 4.9 million km² are on land and the remainder on the continental shelf. Geological carbon storage requires two primordial conditions: the existence of porous rocks filled with salt water (saline aquifers); and, immediately above them, a layer of impermeable sealing rock. Due to the need to compress CO₂ to reduce its volume and increase its density, the injection is made at a depth of more than 800 meters, where the pressure in pores in the rocks is sufficient to maintain the pressure of the injected CO₂. The CO₂ injected into the saline aquifer laterally displaces the water in the formation and tends to rise over time, due to its lower density. This upward trajectory is impeded by the sealing rock, thus forming a CO₂ plume around the injection well, which is completely contained in the reservoir rock and tends to stabilize over time, including with the mineralization of part of its content by chemical interactions with formation water.

Renewable Biomass

- Second-crop corn with natural rain;
- Sustainable agricultural practices instead of conventional agriculture: double cropping, less fertilizers and pesticides use;
- Use of renewable biomass as an energy source;
- FS developed an internal socio-environmental policy¹⁹.

See appendix 6 for more details.

Facilities

The CO₂ capture facility for the CO₂ source will include the following main process units:

- Booster compression via a centrifugal blower;
- Low pressure pipeline transportation to compression unit
Primary compression using parallel reciprocating compressors, reaching approximately 110 barg;

¹⁹ Available at: <https://api.mziq.com/mzfilemanager/v2/d/34aeec8a-d08e-440f-ad7f-324e1e1e7745/4d69a148-e8e8-2b65-1b49-73ff1e805cfb?origin=1>

- Dehydration of CO₂ with triethylene glycol (TEG) liquid desiccant at an intermediate compressor stage;
- Pumping of dense-phase CO₂ from 110 to 129 barg.
- CO₂ transportation in supercritical state to the injection well.

Booster Compression

The CO₂ from the ethanol plant will be slightly above atmospheric pressure. A blower can handle the low suction pressure more economically than a low-pressure stage in the reciprocating compressor. A blower will provide a discharge pressure of approximately 1.44 barg.

Main Compression Train

The main compression train will be either a low- or medium-speed reciprocating compressor.

Reciprocating compressors are the workhorse for CO₂ compression in enhanced oil recovery (EOR) operations. A key advantage of reciprocating compressors is the relatively favorable economics for flexible capacity. Recent proposals from compressor packages suggest that lead times for delivery of standard reciprocating compressor packages typically are now 60 to 66 weeks. Maintenance requirements for reciprocating compressors are well-established and can be addressed by local shops. The main compression will feature two trains of four-stage reciprocating compressors. These parallel compressors will increase the CO₂ pressure to approximately 110 barg, where it will then be pumped via a multistage horizontal centrifugal pump to the required surface pressure for injection.

Dehydration

CO₂ from the ethanol plant is saturated with water. A TEG dehydration unit will be used to remove water from the CO₂ stream. The TEG contacts the CO₂ counter currently in a packed tower (TEG contactor), where water soluble in the CO₂ is absorbed into the TEG. The TEG from the contactor is routed to the reboiler to "boil" off the water; this is the regeneration section of the TEG unit. After water is removed from the TEG and vented as water vapor to atmosphere, TEG is cooled and pumped back to the TEG contactor to remove more water from the CO₂ again.

TEG dehydration will occur between the third and fourth stages of compression at a pressure of approximately 39 bar(g). The water capacity of CO₂ is decreased in the range of 38 – 63 bar(g), so substantial quantities of water can be knocked out by

upstream compression and interstage cooling to reduce the demand on the TEG dehydration unit. CO₂ dehydration at pressures greater than approximately 70 bar(g) is not recommended because of the high solubility of TEG in CO₂ that leads to uneconomical TEG carryover with high-pressure CO₂ to the pipeline.

The major rotating equipment associated with equipment (such as separators and heat exchangers), and dehydration equipment will be located outdoors. An overhead structure (roof covering) may be installed to protect personnel performing maintenance activities on the blowers and compressors.

The electric motors and instruments for the project will locate in unclassified areas because the CO₂ capture equipment is separated from the main ethanol plant where flammable material is present.

CO₂ Source Characteristics

The flow rate, composition, and operating conditions for CO₂ from the ethanol plant is summarized in the subsections below. The plant generates a nearly pure CO₂ byproduct stream that is saturated with water. The typical conditions at the inlet to the CO₂ capture system are a temperature of 30 - 40°C (with seasonal variations) and pressures ranging from atmospheric to as low as 0.1 bar vacuum. Conditions of 33°C and 1.06 bar(a) will be used as the basis for a standardized process design. The combination of relatively high temperature and low pressure will provide a conservative estimate for blower and compression power requirements and for inlet water content.

The inlet gas composition to the capture plant from the CO₂ scrubbers in the ethanol plant (the fermenter vent downstream of once through water wash) is provided in Table below.

Table 7. Fluid composition.²⁰

Estimated Composition	Mole (%)
Carbon Dioxide	98.07
Water	0.020
Nitrogen	1.490
Oxygen	0.400
Air	0.020

²⁰ Retrieved from ESTUDOS E PROJETOS PARA SOLICITAÇÃO DA LICENÇA DE INSTALAÇÃO, March, 2025.

The specifications for CO₂ delivery to the injection pipeline are summarized in Table below. FS has recently provided guidance on the surface injection pressure based upon recent formation characterization. The design pressure of the pipeline and the discharge conditions of the capture process will meet the reservoir requirement.

Table 8. Parameters of CO₂.²¹

Parameter	Well head specification	Bottom of the well
Temperature (°C)	40	64.8
Pressure (bar)	129	312.9
Density (kg/m ³)	650	843.1
Kmol/h	1,341	1,102.59
t/h	57,980	48,204

Consumption of electricity by the project activity

As per the project design, the electricity demand for the project activity is to be met by consumption of grid-connected captive plant, sourced internally, using biomass in a Combined Heat and Power (CHP) unit.

The backup electricity generator is to be activated automatically (through automatic switching control) from grid, whenever internal electricity production is interrupted.

In summary, the project's electricity demand can be technically met by one of the following sources/approaches:

- Electricity sourced by the project's electricity generation infrastructure (grid-connected captive plant).
- Electricity sourced by national grid-connected electricity generator (grid-connected non-captive plant) (expected to occur only during temporary planned or unplanned circumstances).

²¹ Retrieved from ESTUDOS E PROJETOS PARA SOLICITAÇÃO DA LICENÇA DE INSTALAÇÃO, March, 2025.

Table 9. Utilities details.

Utility	Need for Utility	Utility Availability
Electricity	The compressors will be powered by large electric motors, estimated to be 4.16 KVAC. Most of the other electrical loads, including pumps, cooling tower fans, etc., are expected to be mostly 440 VAC, with a possibility of a few 127/220 VAC users.	Power is available on-site from the CHP unit and associated equipment to meet project requirements.
Cooling Water	Existing cooling water will be used for blower aftercooler heat exchanger. New cooling water system will be used for interstage heat exchangers of the CO ₂ compressor.	CW circulation rate estimated at 163 m ³ /hr (718 gpm) for blower aftercooler and 922 m ³ /hr (4,057gpm) for compressor intercoolers. Average supply and return temperatures from site visit are: CWS: 31.3 C CWR: 39.7 C
Process Heat	Process heat to the reboiler in the dehydration unit will be with an electric resistance heater.	Power is available on site.
Instrument Air	There will be several control valves and actuated open/close valves that require instrument air. The air will need to be dry and supplied at 100 psig.	Instrument air requirement is estimated at 100 scfm at 100 psig supply pressure. Compressor and dehy instrument air will be provided from instrument air package dedicated to this project. Ethanol plant will provide instrument air to blower package.

Plant Water	Plant water will be required for cooling tower makeup.	Cooling tower makeup water is available. Makeup rate estimated at 20 m ³ /hr (85 gpm).
Wastewater Disposal	The process will condense water from compression in the blower and the compressor. The condensate from the blower (0.54 m ³ /hr / 2.3 gpm) can be returned to the Scrubber #1 sump. The condensate from the compressor will have ~2,000 ppm oil without treatment. Treatment can reduce concentration to less than 20 ppm oil and wastewater can be discharged into the treatment lagoon.	Compressor water treatment details to be provided for review.

Process Control and Monitoring Requirements

Reference-standard dedicated programmable logic controllers (PLC) and human-machine interface (HMI) control panels will be provided. The Simplex Controller EthernetIP Standard for FS is attached as a reference for the project. The CO₂ capture facility control system will be a new, standalone system and will not be fully integrated with the existing ethanol plant. Control data from the CO₂ capture facility PLC will likely be transferred by Ethernet for display-only in the main facility control room. The CO₂ capture facility normally will operate unattended but require regular checks by ethanol plant operating staff on rounds.

A custody transfer-quality flow meter will be required at the discharge of the capture facility to the pipeline. Online gas chromatograph and moisture instruments will be used to continuously monitor CO₂ quality. Other instrumentation will be standard pressure, temperature, and flow instruments.

Reliability and Operability Requirements

Blowers and compressors require regular maintenance. The operating interruptions required for maintenance will impact on the annual total CO₂ captured for a given equipment design capacity.

The standard designs will use 350 days per year operation (equivalent to 23 hours per day average) for sizing equipment to deliver the annual CO₂ mass. Annual preventative maintenance can be performed within normally scheduled maintenance outages.

A new atmospheric vent stack will be included with the capture facility to direct regular process venting and emergency relief process venting to a safe location and elevation.

Piping Design (Velocity)

Process piping, in general, will be designed for fluid velocities that comply with API 14E, *Recommended Practice for Design and Installation of Offshore Products Platform Piping Systems*. API 14E is widely used in the process industries as a guideline for maximum fluid velocity in piping systems even though it was originally drafted specifically for piping in offshore systems. A difference with CO₂ is when the fluid is supercritical or dense phase, and the density is between what is typically considered a gas and liquid.

Materials of Construction

The piping and equipment in contact with CO₂ that is saturated with water or has the potential to form a liquid water phase will be 316/316L stainless steel. Equipment and piping in CO₂ service downstream of the dehydration unit or in services that are well above the water dewpoint (discharge of compressor stage before aftercooler) and cannot form a liquid phase will be carbon steel.

Piping and equipment in utility service will be made by carbon steel.

Stratigraphic Well Evaluation

A stratigraphic well is a type of well drilled with the primary objective of characterizing the subsurface by obtaining detailed information on the stratigraphy, lithology, porosity, permeability, and fluid content of the rock formations. It serves as a key tool for understanding the geological architecture of a basin and for assessing the suitability of the site for subsequent development activities.

Following the completion of subsurface analysis and evaluation of formation properties, if the stratigraphic well meets the necessary criteria for CO₂ injection, it will be converted into an injection well, enabling its use for permanent geological storage operations.

The **Monitoring Plan** was developed based on the data acquired during the drilling of the stratigraphic well, to ensure storage containment, well integrity, and adequate monitoring of the storage complex, so that no CO₂ leakage occurs. The full monitoring plan is provided as evidence.

Seismic Analysis

Seismic analysis refers to the interpretation of elastic wave propagation through the subsurface, generated either by controlled sources (e.g., vibroseis or dynamite) or natural events (e.g., tectonic activity). In the context of the oil and gas industry, seismic methods are a critical tool for delineating subsurface geological structures, characterizing stratigraphy, and identifying potential hydrocarbon reservoirs.

By analyzing the reflection, refraction, and amplitude of seismic waves at lithological boundaries, geoscientists can construct high-resolution subsurface models. These models are used to define reservoir geometry, assess seal integrity, and optimize the placement of exploration and development wells. Seismic data is also essential in de-risking drilling operations and informing reservoir simulation and management strategies.

In geotechnical applications, seismic studies contribute to the evaluation of ground stability and structural integrity, supporting the safe design of infrastructure in seismically active or complex geological environments.

The area designated for geological CO₂ storage underwent comprehensive geophysical evaluation, including both 2D seismic surveys and a dedicated 3D seismic acquisition over the Lucas do Rio Verde region. The interpretation of the 3D seismic data enabled a high-resolution definition of the subsurface structural and stratigraphic framework, confirming the presence of porous sandstone formations suitable for storage, overlain by sealing units with excellent structural integrity.

Based on the integrated analysis, the target sequestration reservoir was identified within the Sepotuba 1S (1,100–1,221 m) and Sepotuba 1R (1,221–1,460 m) zones of the Sepotuba formation (Figure 10). The primary caprock was defined within the Sepotuba 1S interval (1,100–1,109 m), offering a 9-meter-thick seal, considered sufficient to ensure vertical containment and storage integrity.

A total of 50 sidewall core (SWC) samples were collected for laboratory analysis, along with two water samples for hydrogeochemical characterization. Laboratory-based permeability tests were performed on cores from the Diamantino 1R formation, showing enhanced porosity, permeability, and irreducible water saturation. These petrophysical properties were extrapolated to the Sepotuba 1S and 1R formations based on lithostratigraphic correlation.

Plume modeling simulations indicated the need to expand the model domain to 50 x 50 km, as the projected CO₂ plume extended beyond the original 3D seismic coverage. Multiple injection scenarios were simulated to identify the configuration with the smallest plume footprint while maximizing injection efficiency. The optimal scenario involves co-injection into the Sepotuba 1S and 1R formations, within an injection window from 1,109 to 1,246 meters depth.

The final simulation results estimate a CO₂ plume with lateral dimensions of approximately 5 km in the north-south direction and 6 km east-west. These findings, combined with the absence of active faulting and the low historical seismicity of the region, reinforce the technical feasibility and geological security of the proposed injection site.

The geophysical monitoring program will be continuously updated to ensure full alignment with international CCS best practices, with particular emphasis on storage integrity, plume containment, and long-term site stewardship.



Figure 67. Vibration truck used to perform Seismic analysis.

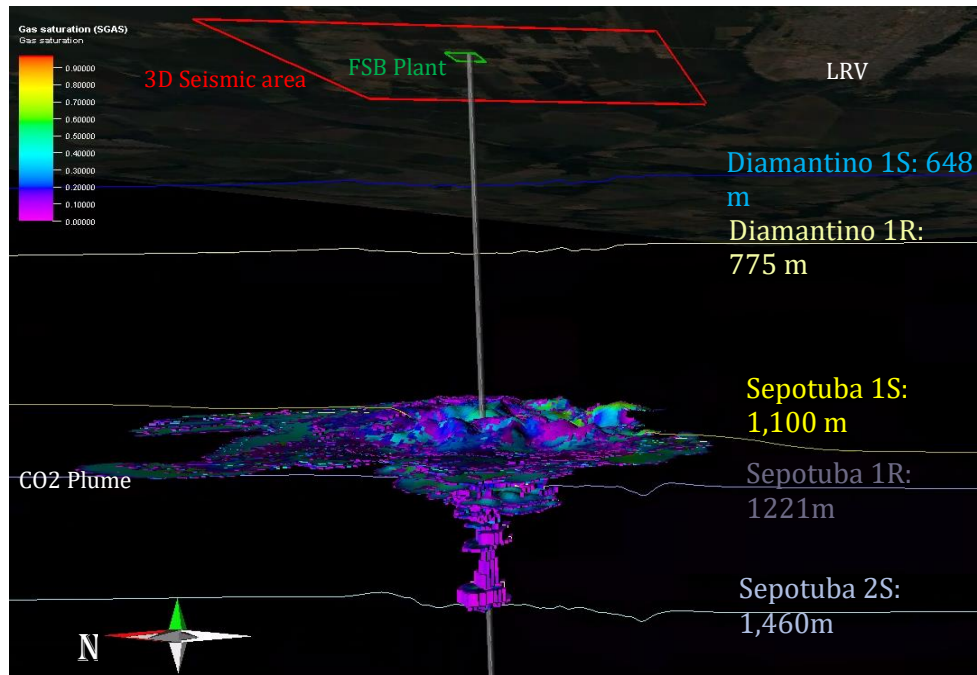


Figure 78. Expected Plume behavior in 30 years side view.

The United States Environmental Protection Agency (EPA)²² defines the Area of Review (AoR) as the region around a CO₂ injection well that may be affected by the injected CO₂ and any mobilized fluids. This area was determined based on computational modeling that considers the physical and chemical properties of the reservoir, the injection rate and volume, and the injection duration. According to EPA criteria, the AoR is the union of the gas saturation and the pressure front (2.3 bar), as illustrated in the following figure. The AoR is a region of 22.54 square miles.

²² <https://www.epa.gov/uic/class-vi-guidance-documents>

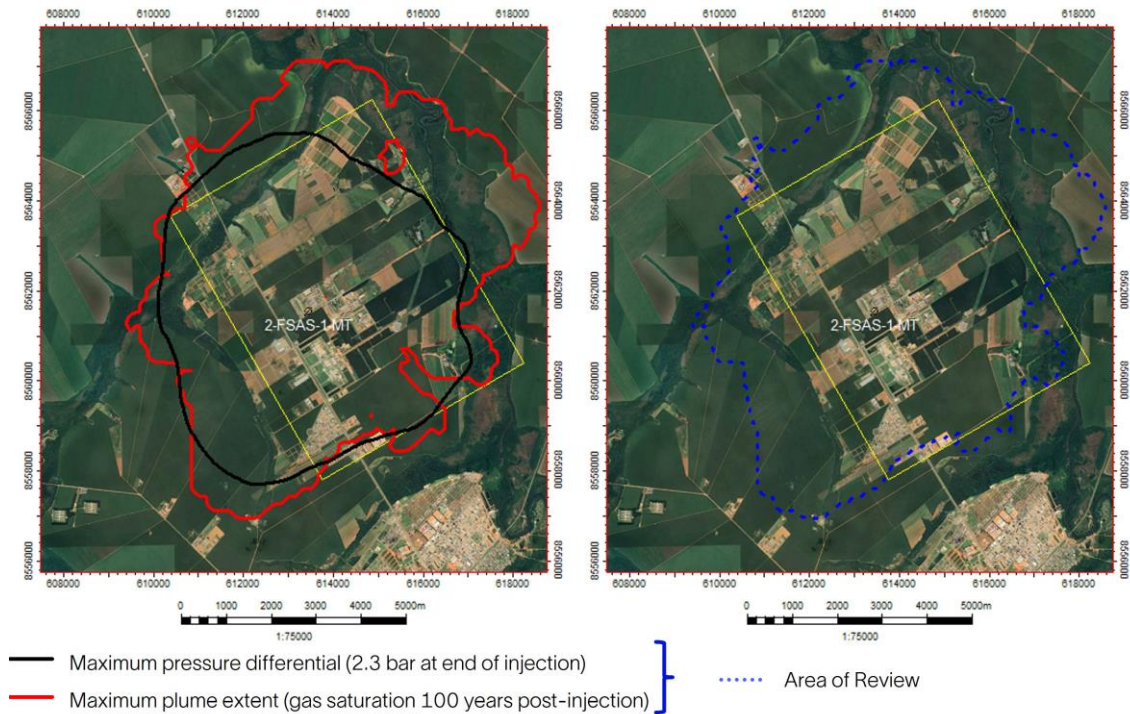


Figure 89. Area of Review (AOR).

Intervention in the stratigraphic well

- Perform side track
- Perform injectivity test
- Complete the well as an injector – CR25

Material Requirements

The pure supercritical condition of the injected carbon dioxide worsens the corrosion experienced and therefore requires the use of more corrosion resistant materials.

The seismic study concluded that there is no evidence of gas leakage in the analyzed area, nor any correlation with seismic events or earthquakes in the vicinity of the project site. Notably, seismic events with magnitudes exceeding 2.7 were recorded more than 10 kilometers away from the selected location, reinforcing the assessment of local tectonic stability.

The interpretation of 3D seismic data did not reveal any significant faults, intrusions, or discontinuities within the targeted injection and storage zone. The presence of thick, laterally continuous shale formations was confirmed, serving as an effective vertical seal against potential CO₂ migration.

In addition, stratigraphic well integrity was validated through cement bond logging of the 13³/₈" casing section, which demonstrated consistent cement quality from 57 meters down to the bottom of the section, with bond indices reaching up to 100%. This substantially reduces the likelihood of CO₂ leakage through existing wellbores.

While the risk assessment conducted during Phase 2 was considered a solid baseline, Phase 3.1 included further modeling and laboratory analyses to reduce residual uncertainty regarding the lateral continuity of sealing formations and the possible presence of sub-seismic faults.

Normative References used:

- Class VI Guidance Documents, EPA²³
- Carbon Capture and Sequestration Protocol under the Low Carbon Fuel Standard, California Air Resources Board (2018)²⁴
- ISO 27914 (2017) – Carbon dioxide capture, Transportation and geological storage – Geological storage²⁵

A.4 Scale of the project

>> This project is large scale since it removes more than 60,000 tCO₂/year.

A.5 Funding sources of project

>> The investments come from FS resources and are partially financed by the Financier of Studies and Projects (FINEP)²⁶ and by Banco Nacional do Desenvolvimento (BNDES)²⁷, and there may also be other sources of financing to be worked on by FS.²⁸ There are no government grants and subsidies for this project.

²³ <https://www.epa.gov/uic/class-vi-guidance-documents>

²⁴ <https://ww2.arb.ca.gov/resources/documents/carbon-capture-and-sequestration-protocol-under-low-carbon-fuel-standard>

²⁵ <https://www.iso.org/standard/64148.html>

²⁶ <http://www.finep.gov.br/>

²⁷ <https://www.bndes.gov.br/wps/portal/site/home>

²⁸ Retrieved from: <https://api.mziq.com/mzfilemanager/v2/d/34aeec8a-d08e-440f-ad7f-324e1e1e7745/8b3acf20-8ad6-1c35-2664-a192f7e3c0ea?origin=2> page 29.

SECTION B. APPLICATION OF APPROVED GOLD STANDARD METHODOLOGY (IES) AND/OR DEMONSTRATION OF SDG CONTRIBUTIONS

B.1. Reference of approved methodology (ies)

>>

- GS4GG Methodology for biomass fermentation with carbon capture and geologic storage, version 2.0²⁹
- GS4GG Activity Requirements - Engineered Removals V 1.0³⁰
- GS4GG Principles & Requirements V2.1³¹
- GS4GG Tool 03 Emissions and Monitoring Requirements for Geological Storage V1.0³²
- GS4GG Tool 04 Reversal Risk Calculations for Geological Storage V1.0³³
- CDM Tool 01 – Tool for the demonstration and assessment of additionality V7.0³⁴.
- CDM Tool 02 – Combined tool to identify the baseline and demonstrate additionality V7.0³⁵
- CDM Tool 07 - Tool to calculate the emission factor for an electricity system V7.0³⁶
- CDM Tool 08 - Tool to determine the mass flow of a greenhouse gas in a gaseous stream V03.0³⁷
- CDM EB 23 Report Annex 18³⁸
- ISO 14044:2006 - Life Cycle Assessment, Requirements and Guidelines.

B.2. Applicability of methodology (ies)

>> The Methodology for biomass fermentation with carbon capture and geologic storage, version 2.0, is applicable to the project activities where carbon dioxide (CO₂) captured from biomass fermentation is captured and permanently stored in geological storage.

²⁹ [Biomass Fermentation with Carbon Capture and Geologic storage – Gold Standard for the Global Goals](https://globalgoals.goldstandard.org/205_ar_engineered-removals/)

³⁰ <https://globalgoals.goldstandard.org/101-par-principles-requirements/>

³¹ https://globalgoals.goldstandard.org/451_tool-3-emissions-and-monitoring-requirements-for-geological-storage/

³² https://globalgoals.goldstandard.org/452_tool-4-reversal-risk-calculations-for-geological-storage/

³³ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf>

³⁴ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-02-v7.0.0.pdf>

³⁵ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.0.pdf>

³⁶ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-08-v3.0.0.pdf>

³⁷ https://cdm.unfccc.int/EB/023/eb23_repan18.pdf

³⁸ https://cdm.unfccc.int/EB/023/eb23_repan18.pdf

The table below summarizes the applicability criteria required by the selected methodology and the explanation that the project activity meets each one of its criterias.

Table 10. Applicability criteria - GS4GG Methodology for biomass fermentation with carbon capture and geologic storage, version 2.0

Item	Criteria	Description	Explanation
(a)	Sources of Biomass	3.2.2 Source of CO ₂ shall be demonstrable renewable biomass.	The project applies two distinct biomass renewability demonstrations under the methodology: (i) renewability of biomass fermented (Parameter 42), which is relevant to the captured CO ₂ stream and is demonstrated through Option 1, based on CDM EB23 Annex 18; and (ii) renewability of biomass beneficially combusted (Parameter 48), which is demonstrated through the monitoring procedures defined for that parameter, based on operating records evidencing the type and source of biomass consumed by the combustion equipment during the monitoring period.
(b)	Capturing of CO ₂	3.2.3 The project shall capture CO ₂ emitted during the fermentation of renewable biomass at new or existing	The project shall capture biogenic CO ₂ emitted during the fermentation of renewable biomass at an

		biomass fermentation facilities, where a facility is defined as: - An existing facility if fermentation of biomass at facility starts before the project start date. - A new facility if fermentation of biomass at facility starts after the project start date.	existing biomass fermentation facility since the fermentation of biomass at facility starts before the project start date.
(c)	Transportation of CO ₂	3.2.4 The project shall transport captured CO₂ to the injection site(s) through one or a combination of connected transport sites, each consisting of infrastructure which continuously transport captured CO₂ along a fixed path. - A transport site shall have only one mode: either pipeline, rail or truck - Where captured CO₂ is conveyed via pipeline, the fixed path comprises the surveyed route of the pipeline network which allows for the continuous transmission of captured CO₂ between, and is bounded by, the maximal independent set of origins and termini and is bounded by those points. - Where captured CO₂ is conveyed via railway, the fixed path comprises the specific combination of railways that	The injection well is located next to the ethanol production, approximately 100m. Thus, the project will transport captured CO₂ to the injection site only via pipeline. The fixed path comprises the surveyed route of the pipeline network which allows for the continuous transmission of captured CO₂ between, and is bounded by, the maximal independent set of origins (fermentation chimney) and termini (BECCS plant) and is bounded by those points (Figure 10). The project design was submitted as evidence.

are transited to convey captured CO₂ between, and is bounded by, a single origin and a single terminus and is bounded by those points.

iii. Where captured CO₂ is conveyed via truck, the fixed path comprises the specific combination of roads that are transited to convey captured CO₂ between, and is bounded by, a single origin and a single terminus and is bounded by those points.

3.2.5 A transport site origin refers to the following locations, in order of applicability:

- | | |
|---|---|
| <ul style="list-style-type: none"> a. An international boundary; b. A documented custody transfer point, per 3.2.8 and 3.2.9 , c. A pipeline injection station or similar; d. A railway car loading station, or e. A truck loading station. | <p>The transport site origin of this project will be a pipeline injection station at the fermentation plant. See Table 6 and Figure 10 for details.</p> |
|---|---|

3.2.6 A transport site terminus refers to the following locations, in order of applicability:

- | | |
|---|--|
| <ul style="list-style-type: none"> a. A project injection site; b. An international boundary; c. A documented custody transfer point, per 3.2.8 and 3.2.9 , | <p>The transport site terminus of this project will be a project injection site, the Parecis Basin. See Figure 10 for details.</p> |
|---|--|

		d. A pipeline delivery station or similar; e. A railway car unloading station, or f. A truck unloading station.	
(d)	Storage of CO ₂	3.2.7 The project injects the captured CO₂ into one or more secure geologic storage complex. Refer to GS4GG Tool 03 - Project emissions calculation and monitoring requirements for geological storage complex for requirements applicable to the storage complex.	The project will inject the captured CO₂ into a secure geologic storage complex, the Parecis Basin. See SLB document for details.
(e)	Project Configurations	3.2.8 Projects may include multiple capture sites, transport sites, injection sites, and/or storage sites such as those participating in a carbon capture and sequestration hub. a. A project may have multiple transport sites only where the transport site's equipment and processes are connected such that there is no spatial and temporal overlap with other transport sites. b. The project developer shall provide documentation of the custody of streams captured from each CO₂ source and, if applicable, any transfers of custody which occur	The project includes one capture site, one transport site and one storage site. FS owns the fermentation plant (capture site) where the CO₂ is being generated and captured. There are no transfers of custody which occur downstream of the point of capture. FS is responsible for the capture site, the transport site and the storage site. The project developer provides documentation such as licenses and ANP

downstream of the point of capture.	authorization to prove the custody of streams captured.
-------------------------------------	---

3.2.9 Project infrastructure may be used to capture, transport, and store non-project streams only where each of the following requirements are met:

- a. Non-project streams supplied to project capture, transport, and storage infrastructure shall be monitored using methods prescribed or permitted in this methodology, and
- b. The project developer shall provide documentation of the custody of non-project streams captured from each CO₂ source, and if applicable, any transfers of custody which occur downstream of the point of capture.

There is no non-project streams supplied to the project capture.

3.2.10 Project infrastructure may be used to capture, transport, and export captured fluids outside of the project boundary only where each of the following requirements are met:

- a. The fluid is exported outside of the project boundary at the location of a transport site terminus, and

Not applicable. There will not have fluids exported outside of the project boundaries.

- b. Fluids exported outside of the project boundary are monitored using methods prescribed or permitted in this methodology, and
- c. The project developer shall provide documentation of the custody of exported fluids captured from each CO₂ source, including transfers of custody which occur downstream of the point of capture.

3.2.11 The Project may expand over time by addition of capture, transport, injection, and/or storage sites. Project developer shall follow latest version of Design Change requirements for approval of proposed and/or implemented design changes.

If applicable, the Project developer will follow latest version of Design Change requirements for approval of proposed and/or implemented design changes.

(f) Permanence

3.2.12 Project developers shall assess the potential Reversal Risk associated with the project and implement the measure to address the potential reversals as per the GS4GG Tool 04 - Reversal Risk Calculations for Geological Storage.

Project developers will assess the potential Reversal Risk associated with the project and implement the measure to address the potential reversals as per the GS4GG Tool 04 - Reversal Risk Calculations for Geological Storage.

Table 11. Applicability criteria - tools and activity.

Tool	Criteria	Description	Explanation
Activity Requirements - Engineered removals V 1.0		The Engineered Removal Activity Requirements document is applied in conjunction with the Principles & Requirements, Safeguarding Principles & Requirements, an approved GS4GG Methodology, GHG Emissions Reductions & Sequestration Product Requirements and any other applicable standard requirements.	The project applies to activity types specified eligible in 4.1 of Activity. The Activity is applied in conjunction with the Principles & Requirements, Safeguarding Principles & Requirements, an approved GS4GG Methodology, GHG Emissions Reductions & Sequestration Product Requirements, and any other applicable standard requirements.
GS4GG Tool 03	General Applicability	2.1.1 Tool 3 shall be used in conjunction with the GS4GG methodology for Biomass Fermentation with Carbon Capture and Geologic Storage.	Applicable, since tool 3 is used in conjunction with the GS4GG methodology for Biomass Fermentation with Carbon Capture and Geologic Storage.
GS4GG Tool 03	General Applicability	2.1.2 Tool 3 is applicable only to activities which inject CO ₂ as a gas, supercritical fluid, dissolved in water, or in a liquid state into saline aquifers or depleted hydrocarbon reservoirs	Applicable, since the project is an activity which injects CO ₂ as a gas, supercritical fluid, into saline aquifers reservoirs.
GS4GG Tool 03	General Applicability	2.1.3 The eligible activity shall demonstrate compliance with tAe requirements outlined in Annex 1.	Applicable, since the project has compliance with the requirements outlined in Annex 1.

GS4GG Tool 03 Storage site eligibility	2.2.1 The eligible project shall demonstrate - either through regulatory approval requirements and regulatory oversight provisions, or through independent certification - that the project has followed necessary procedures and provisions to ensure that the storage site: a. has sufficient capacity to accept the required CO₂ injection volumes, and b. has sufficient injectivity to allow CO₂ injection at the required rates, and will provide long-term containment of CO₂ in a geologic reservoir (i.e., geologic storage), and c. operations shall not induce seismicity or earth deformation which may cause an adverse impact, and design and/or operating procedures which ensure safety and environmental protection. The safeguards, which are considered within the scope of this Tool are in addition to the scope of GS4GG <u>Safeguarding Principles & Requirement</u>.	The project has followed necessary procedures and provisions to ensure that the storage site has sufficient capacity to accept the required CO₂ injection volumes, and has sufficient injectivity to allow CO₂ injection at the required rates, and will provide long-term containment of CO₂ in a geologic reservoir (i.e., geologic storage), and operations shall not induce seismicity or earth deformation which may cause an adverse impact, and design and/or operating procedures which ensure safety and environmental protection. The safeguards, which are considered within the scope of this Tool are in addition to the scope of GS4GG <u>Safeguarding Principles & Requirement</u>.
--	--	--

GS4GG Tool 03	Storage site eligibility	2.2.2 An eligible activity involving more than one storage site shall demonstrate compliance with the requirements for each storage site.	Currently, the project consists of only 1 storage site. If applicable, should new storage sites be considered, compliance with the requirements of tool 03 will be demonstrated.
GS4GG Tool 03	Storage site eligibility	2.2.3 Tool 3 is not applicable to activities which involve the injection of captured CO₂ into the following: a. Active hydrocarbon reservoirs. For avoidance of doubt, this includes reservoirs used for injection for secondary recovery and/or enhanced hydrocarbon recovery. b. Reservoirs located below marine environments. c. Reservoirs for which the Area of Review spans an international boundary.	This project deals with an aquifer reservoir located below FS plant. The reservoir is neither an active hydrocarbon reservoir nor a reservoir located below marine environments.
GS4GG Tool 03	Activity Ownership Eligibility	2.3.1 The activity developer - by means of direct ownership or contractual arrangement or other such arrangement between the project developer and the storage site operator(s) for project activity - shall have: a. Valid licenses and/or permits issued by the regulator(s) described throughout, or other	The activity developer, FS as the direct ownership and storage site operator for project activity has valid licenses and permits issued by the regulator(s) to drill and install the injection and monitoring wells. The operating license has not yet been issued. It is expected to be issued in

such authorizations to drill injection and monitoring wells; and,

b. Valid licenses and/or permits issued by the regulator(s) described throughout, or other such authorizations to operate the storage site; and,

c. Surface access rights to the storage site's injection and monitoring wells to allow monitoring during the injection period, closure period and post-closure period, as documented in the storage site monitoring program document and closure plan.

d. Access to the required monitoring data and supporting documentation set forth in Tool 3.

08/2026. FS has full surface access rights to the storage site's injection and monitoring wells to monitoring during the injection period, closure period and post - closure period, as documented in the storage site monitoring program document and closure plan.

FS is responsible for controlling and has full access to the required monitoring data and supporting documentation set forth in this Tool.

GS4GG
Tool 03

2.3.2 | The activity developer shall, at validation and each verification, fulfil the following conditions:

a. Activity developer shall be the pore space tenure holder or have an enforceable and irrevocable agreement with the pore space tenure holder(s) which grants the activity developer the right to seek activity certification and

The activity developer will, at validation and each verification, fulfil the following conditions:

a. Within the Brazilian legal framework, there is currently no specific legal regime that assigns formal ownership of *pore space* for the purposes of geological CO₂ storage. Nevertheless, the development of such

ownership of Gold Standard Verified Emissions Reductions (GS-VERs) generated.

i. The pore space tenure holder shall possess title(s) or lease(s) for the relevant pore space within the geologic formations comprising the storage complex, spanning the anticipated extent of the CO₂ storage area.

b. Activity developer shall be the storage site operator or joint operator or have an enforceable and irrevocable agreement with the storage site operator(s) that grants the activity developer the right to seek activity certification and ownership of GS-VERs generated.

c. When an agreement grants the activity developer the right to seek activity certification and ownership of GS-VERs generated, the agreement shall include clauses that clearly assign responsibility for each of the following at the storage site:

- i. Remedial liability
- ii. Climate liability
- iii. Tort liability

activities is supported by the applicable regulatory framework governing energy and subsurface operations, under the authority of the Brazilian National Agency for Petroleum, Natural Gas and Biofuels (ANP), as established within the context of the *Fuel of the Future* legislation.

The Project is formally recognized as a pilot project by the ANP and has obtained both the Preliminary License (Licença Prévia – LP) and the Installation License (Licença de Instalação – LI) under the Brazilian environmental licensing regime.

i. The Operation License (Licença de Operação – LO), expected in August 2026, constitutes the mandatory authorization for the commencement of CO₂ injection. The issuance of the LO is contingent upon full compliance with all applicable technical, environmental, and regulatory requirements, including formal authorization from the ANP. In this context, the right to

iv. The qualifying criteria and/or conditions for storage site closure acceptance v. Storage site closure activities as provided in the closure plan vi. Funding for storage site closure activities as provided in the closure plan d. When ownership of the activity or storage site or parties to the agreements change, the activity developer shall have an executed assignment and novation agreement which serves to transfer all rights and obligations in the original agreements and title(s) and lease(s) to the relevant pore space to the new owners and new parties to the agreement.

implement geological CO₂ storage activities derives from the combined effect of sectoral regulatory authorization (ANP), environmental licensing, and legally enforceable agreements governing land access and use, rather than from a specific pore space ownership regime. Current Brazilian legislation does not require the establishment of formal pore space title or lease arrangements as a condition for project implementation.

Accordingly, the Project demonstrates full compliance with the applicable legal and regulatory framework in Brazil, thereby ensuring the right to carry out the activity and to claim ownership of the resulting environmental attributes, including the generation and issuance of Gold Standard Verified Emission Reductions (GS-VERs).

b. The Activity Developer, FS, is also the storage site operator and, as such, holds full responsibility for the

implementation and operation of the storage site. This includes the right to seek project certification and ownership of GS-VERs generated. As the Activity Developer and storage site operator are the same legal entity (FS), the allocation of responsibilities related to the storage site is governed by applicable Brazilian regulatory and environmental frameworks. These frameworks establish obligations regarding environmental liability, operational responsibility, and site closure requirements, including those arising from environmental licensing and ANP oversight.

c. Responsibilities related to remediation, liability, and site closure are therefore inherently assigned to FS in its capacity as project proponent and operator, in accordance with applicable laws, licensing conditions, and regulatory approvals.

In the event of any change in ownership of the activity, storage site, or contractual

arrangements, FS will ensure that all rights and obligations are duly transferred through legally enforceable assignment and novation agreements, in accordance with applicable Brazilian law and regulatory requirements.

GS4GG Tool 3 – Annex 1	A1.1 Storage Site Approvals	A1.1.1 The activity developer shall obtain the necessary regulatory permits, licenses, certifications, or other authorisations for the storage site from the appropriate national or subnational entities and/or certification bodies.	In compliance. FS has obtained all the necessary regulatory permits, licenses, certifications and authorisations for the storage site from the national entities (ANP and SEMA). All documents were provided as evidence.
GS4GG Tool 3 – Annex 1	A1.1 Storage Site Approvals	A1.1.2 The scope of the regulatory approval and/or independent certification process shall address the below requirements and include an evaluation of the specified information. Required information shall be included as part of activity documentation and shall be submitted before validation.	In compliance. The scope of the regulatory approval process addressed the requirements below and an evaluation of the specified information and was submitted to VVB before validation. In case of lack of specification for certain items in Brazilian regulations, FS has adopted international protocols such as the "Class VI Wells

			Guidance Document" by USA Environmental Protection Agency (EPA)³⁹ and the "Carbon Capture and Sequestration Protocol under the Low Carbon Fuel Standard" by California Air Resources Board (CARB)⁴⁰
GS4GG Tool 3 – Annex 1	A1.1 Storage Site Approvals	A1.1.3 When the scope of the regulatory approval and/or independent certifications process does not align with the below requirements or does not include an evaluation of the specified information, or when the host country lacks an applicable regulatory framework, the activity shall follow the U.S. or EU regulations.	In compliance. It is important to emphasize that Brazilian regulation for CCS is still under development, and FS's BECCS project is used as a benchmark for its development. In case of lack of specification for certain items in Brazilian regulations, FS has adopted international protocols such as the "Class VI Wells Guidance Document" by USA Environmental Protection Agency (EPA)⁴¹ and the "Carbon Capture and Sequestration Protocol under the Low Carbon Fuel Standard" by California Air Resources Board (CARB)⁴²

³⁹ <https://www.epa.gov/uic/class-vi-wells-used-geologic-sequestration-carbon-dioxide>

⁴⁰ <https://ww2.arb.ca.gov/resources/documents/carbon-capture-and-sequestration-protocol-under-low-carbon-fuel-standard>

⁴¹ <https://www.epa.gov/uic/class-vi-wells-used-geologic-sequestration-carbon-dioxide>

⁴² <https://ww2.arb.ca.gov/resources/documents/carbon-capture-and-sequestration-protocol-under-low-carbon-fuel-standard>

GS4GG Tool 3 – Annex 1	a.Storage Site and Reservoir Characteris ation	A1.1.4 The requirements and information specified for storage site characterisation are as follows. a. The capacity and injectivity of the storage complex shall be sufficient to receive the total anticipated quantity and rate of injected CO₂, as noted below: i. The identified boundaries, areal extent, thickness, and geologic heterogeneity of the storage site’s geologic reservoir(s), and ii. Intrinsic petrophysical properties, such as porosity, permeability, pressure, and temperature within the storage site’s geologic reservoir(s), and iii. Petrophysical properties, including capillary pressure for CO₂, and reservoir fluids identified as present within the storage site’s geologic reservoir(s), and iv. The mineralogical composition of the storage	In compliance. All requirements below were addressed by FS, supported by Schlumberger (SLB) before the validation. The document was developed considering two international protocols such as the "Class VI Wells Guidance Document" by USA Environmental Protection Agency (EPA)⁴³ and the "Carbon Capture and Sequestration Protocol under the Low Carbon Fuel Standard" by California Air Resources Board (CARB)⁴⁴ The capacity and injectivity of the storage complex were checked and are sufficient to receive the total anticipated quantity and rate of injected CO₂. For that, the boundaries, lateral extent, thickness, and geologic heterogeneity of the storage site’s geologic reservoir (Sepotuba formation) were identified.
---	---	--	--

⁴³ <https://www.epa.gov/uic/class-vi-wells-used-geologic-sequestration-carbon-dioxide>

⁴⁴ <https://ww2.arb.ca.gov/resources/documents/carbon-capture-and-sequestration-protocol-under-low-carbon-fuel-standard>

site's geologic reservoir(s) and the composition of fluids identified as present therein.

b. The integrity of the geologic reservoir and confining strata are sufficient to confine the total anticipated quantity and rate of injected CO₂ in the storage complex, as noted below:

i. Identified potential natural or manmade pathways within the Area of Review that could allow for the migration or leakage of CO₂ outside the storage site's geologic reservoir(s), which include fractures, faults, legacy wells (whether abandoned or not), and boreholes

ii. The stratigraphy, lithology, mineralogy, areal extent and continuity, thickness, and geologic heterogeneity of the storage site's primary seal

iii. The intrinsic petrophysical properties of the storage site's primary seal, including its porosity and permeability

Also, intrinsic petrophysical properties, such as porosity, permeability, pressure, and temperature within the storage site's geologic reservoir (Sepotuba formation) were analyzed.

The mineralogical composition of the storage site's geologic reservoir (Sepotuba formation) and the composition of fluids were identified.

All potential natural or manmade pathways within the Area of Review that could allow for the migration or leakage of CO₂ outside the storage site's geologic reservoir (Sepotuba formation), which include fractures, faults, legacy wells (whether abandoned or not), and boreholes were identified.

The stratigraphy, lithology, mineralogy, areal extent and continuity, thickness, and geologic heterogeneity of the storage site's primary seal (also Sepotuba formation)

iv. The composition of the injected CO₂ stream, the mineralogical composition of the storage site's geologic reservoir(s) and primary seal, and the composition of reservoir fluids identified within the storage complex

v. Information on any secondary seals and overlying permeable strata

vi. In situ stress regimes and rock mechanical properties of the storage reservoir and the primary seal

vii. Primary seal that is free of transmissive faults or fractures.

viii. Information on natural seismicity and tectonic activity in the region where the storage site is located

c. Underground sources of drinking water shall be sufficiently protected from the migration of injected CO₂ or other reservoir fluids into the source or between sources, as noted below:

i. The stratigraphy, lithology, mineralogy, areal extent and continuity,

were analyzed.

The intrinsic petrophysical properties of the storage site's primary seal, including its porosity and permeability were identified.

The composition of the injected CO₂ stream, the mineralogical composition of the storage site's geologic reservoir and primary seal, and the composition of reservoir fluids identified within the storage complex were analyzed.

Information on any other seals and overlying permeable strata was provided.

In situ stress regimes and rock mechanical properties of the storage reservoir and the primary seal were analyzed.

Primary seal was analyzed and is free of transmissive faults or fractures.

Information on natural seismicity and tectonic activity in the region where the storage site is located were analyzed.

thickness, and geologic heterogeneity of relevant permeable strata overlying the storage site's geologic reservoir(s)

d. The location and operation of the storage site shall not pose an unacceptable risk to other surface and subsurface activities or to valuable resources, as noted below:

i. Proximity to, and impacts to or from, other surface and subsurface activities, including waste fluid disposal operations, geothermal energy generation operations, hydrocarbon extraction, mining, dissolved mineral extraction, and natural gas or other geologic storage operations

ii. Proximity to, and impacts to or from, valuable resources including, geothermal energy resources, hydrocarbons, mines, and minerals

Regarding underground sources of drinking water, it will be sufficiently protected from the migration of injected CO₂ or other reservoir fluids into the source or between sources.

The stratigraphy, lithology, mineralogy, areal extent and continuity, thickness, and geologic heterogeneity of relevant permeable strata overlying the storage site's geologic reservoir was considered.

The location and operation of the storage site do not pose an unacceptable risk to other surface and subsurface activities or to valuable resources.

Proximity to, and impacts to or from, other surface and subsurface activities, including waste fluid disposal operations, geothermal energy generation operations, hydrocarbon extraction, mining, dissolved mineral extraction, and natural gas or other geologic

storage operations were analyzed.

Proximity to, and impacts to or from, valuable resources including, geothermal energy resources, hydrocarbons, mines, and minerals were analyzed.

A robust document with all the detailed information was shared as evidence⁴⁵.

GS4GG Tool 3 – Annex 1	a. Storage Site and Reservoir Characterisation	A1.1.5 The activity developer and storage site operators are encouraged to refer to the relevant materials for further guidance.	In compliance. The study developed by FS was based of relevant materials such the "Class VI Wells Guidance Document" by USA Environmental Protection Agency (EPA) ⁴⁶ and the "Carbon Capture and Sequestration Protocol under the Low Carbon Fuel Standard" by California Air Resources Board (CARB) ⁴⁷
GS4GG Tool 3 – Annex 1	b. Well Infrastructure Design, Construction, and	A1.1.6 The requirements and information specified for well infrastructure design, construction, and operating limits are as follows.	In compliance. A robust document with all the detailed information was shared as evidence ⁴⁸ .

⁴⁵ SLB site Certification Report

⁴⁶ <https://www.epa.gov/uic/class-vi-wells-used-geologic-sequestration-carbon-dioxide>

⁴⁷ <https://ww2.arb.ca.gov/resources/documents/carbon-capture-and-sequestration-protocol-under-low-carbon-fuel-standard>

⁴⁸ SLB site Certification Report

- | | |
|------------------|---|
| Operating Limits | <p>a. The design and mechanical integrity of legacy wellbores and boreholes shall be sufficient to confine fluids in the subsurface and protect underground sources of drinking water from the migration of injected CO₂ or other reservoir fluids into the source or between sources, as noted below:</p> <p>i. Identified legacy wellbores and boreholes (including unrecorded wellbores) within the Area of Review which could provide for the migration of CO₂ outside of the storage complex as well as their status and characteristics, and</p> <p>ii. The construction type and material composition of legacy wellbores and boreholes and their potential interactions with injected CO₂ and other reservoir fluids, and</p> <p>iii. The type and extent of mechanical defects in legacy wellbore and borehole casings, tubings, and packers as well as</p> |
|------------------|---|

information regarding the quality of the cement sheath and/or plug, and

iv. The ability of legacy wellbore and borehole components, materials, cement sheaths, and/or plugs to endure exposure to the expected formation and wellbore/borehole loads and fluids as well as to prevent the movement of fluid into the wellbore or borehole or through cement, and

v. Remedial and/or corrective action plans for the timely abandonment or recompletion of legacy wellbores or boreholes to isolate the wellbore or borehole from the storage complex and/or underground sources of drinking water.

b. The mechanical integrity and quality of the storage site's injection well(s) and monitoring well(s) shall be sufficient to confine fluids in the storage complex and protect underground sources of drinking water from the migration of injected CO₂ or other reservoir fluids into the

source or between sources,
as noted below:

i. The injection well design shall provide injection at depths and rates appropriate for the storage site and provide sufficient strength and extent to prevent the movement of fluids into or between underground sources of drinking water as well as to endure exposure to the anticipated storage site conditions for the lifetime of the storage site until closure.

ii. The well casings, cements, tubing strings, liners, and associated surface equipment (from the toe of the injection well through to the point of delivery of CO₂ to the injection site) used to construct injection and monitoring wells shall be of sufficient grade, weight, size, and geometry to endure exposure to the anticipated storage site conditions for the lifetime of the storage site until closure, including temperature,

pressure, corrosivity, and mechanical stresses.

iii. The injection well and any monitoring wells shall be constructed with both a surface casing extending from the ground surface through the base of the lowermost underground source of drinking water and, unless otherwise approved by the regulator, at least one long-string casing extending from the ground surface through to the injection depth which is distinct from the surface casing.

iv. The cementing programs for the injection well and any monitoring wells shall provide a well-bonded cement sheath placed in the casing annuli sufficient to endure exposure to the anticipated injection and post-injection conditions and which, unless otherwise approved by the regulator, span the entire length of each casing string. A cement sheath is well-bonded only if its quality and continuity are verified to prevent the movement of fluids into or

between underground sources of drinking water using technology capable of evaluating the quality and continuity of a cement sheath.

GS4GG			
Tool 3			
–			
Annex 1	b. Well Infrastructure Design, Construction, and Operating Limits	A1.1.7 The activity developer and storage site operators are encouraged to refer to the relevant materials for further guidance.	In compliance. The study developed by FS was based of relevant materials such the "Class VI Wells Guidance Document" by USA Environmental Protection Agency (EPA) ⁴⁹ and the "Carbon Capture and Sequestration Protocol under the Low Carbon Fuel Standard" by California Air Resources Board (CARB) ⁵⁰
GS4GG			
Tool 3			
–			
Annex 1	c. Storage Site Monitoring	A1.1.8 The monitoring program for the storage site which facilitates the identification, evaluation, and implementation of measures to manage storage site risks and enables the prediction, detection, and quantification of CO ₂ migration beyond the storage complex shall: a. include storage site monitoring activities throughout the injection and	In compliance. The Monitoring Plan developed by FS includes the monitoring activities throughout the injection, provide assignment of responsibility, facilitate the identification of storage site risks and the evaluation of risk mitigation practices and support the demonstration of attainment of the acceptance criteria required for the storage site's closure, and

⁴⁹ <https://www.epa.gov/uic/class-vi-wells-used-geologic-sequestration-carbon-dioxide>

⁵⁰ <https://www2.arb.ca.gov/resources/documents/carbon-capture-and-sequestration-protocol-under-low-carbon-fuel-standard>

post-injection periods and provide unambiguous assignment of responsibility for those monitoring activities, and

b. facilitate the identification of storage site risks and the evaluation of risk mitigation practices and support the demonstration of attainment of the acceptance criteria required for the storage site's closure, and

c. establish the detection thresholds, spatial resolution, location, sampling frequency, and duration of monitoring activities which facilitate the identification and quantification of CO₂ migration beyond the storage complex.

establish the detection thresholds, spatial resolution, location, sampling frequency and duration of monitoring activities which facilitate the identification and quantification of CO₂ migration beyond the storage complex. Post-injection activities are discussed in the Post-Injection Site Care and Closure Plan.

GS4GG Tool 3 – Annex 1	c. Storage Site Monitoring	A1.1.9 The activity developer and storage site operators are encouraged to refer to the relevant materials for further guidance.	In compliance. The Monitoring Plan developed by FS was based on relevant materials such as the "UIC Program Class VI Wells" guidance documents by USA Environmental Protection Agency (EPA).
GS4GG Tool 3 – Annex 1	d. Storage Site Closure	A1.1.10 The requirements and information specified for storage site closure are as follows. a. The integrity of the storage site at end of life and ability to confine fluids in the storage	In compliance. The PISC and Site Closure Plan includes the timeline for closure, the conditions for closure, the site closure activities, the closure activity costs, the post-closure liabilities, and

	complex is established according to a closure qualification process that allows closure of storage sites only when: i. the specified timeline, if any, defined by statute or regulation has elapsed, and ii. the conditions required at 12.1.3 et. seq. and any qualifying criteria and/or conditions for closure acceptance defined by statute or regulation or specified by the regulator are met, and iii. the site closure activities, closure activity costs, and post-closure liabilities are unambiguously defined and responsibilities for each are unambiguously assigned. Post-closure liabilities include tort liability (i.e., liability for harm to third parties), remedial liability (e.g., liability for ongoing monitoring, re-abandonments, or site reclamation), and climate liability (i.e., liability for greenhouse gases released from the storage complex).	the definition of responsibilities. These elements may be updated over time to reflect project development, operational experience, and regulatory requirements. Any such updates will be reflected in the monitoring and verification process, ensuring that closure-related costs and obligations remain accurate and up to date.
GS4GG Tool 3 –	A1.1.11 The activity developer and storage site operators are encouraged to	In compliance. The study developed by FS was based on relevant materials such the "Class VI Wells Guidance

Annex 1	refer to the relevant materials for further guidance.	Document" by USA Environmental Protection Agency (EPA) ⁵¹ and the "Carbon Capture and Sequestration Protocol under the Low Carbon Fuel Standard" by California Air Resources Board (CARB) ⁵²
GS4GG Tool 04	2.1.1 Tool 4 shall be used in conjunction with the GS4GG methodology for Biomass Fermentation with Carbon Capture and Geologic Storage.	Applicable, since the tool is used in conjunction with the GS4GG methodology for Biomass Fermentation with Carbon Capture and Geologic Storage.
GS4GG Tool 04	2.1.2 Tool 4 is applicable only to activities which inject CO ₂ as a gas, supercritical fluid, dissolved in water, or in a liquid state into saline aquifers or depleted hydrocarbon reservoirs.	Applicable, since the project is an activity which injects CO ₂ as a gas, supercritical fluid, into saline aquifers reservoirs.
CDM Tool 01	The use of the "Tool for the demonstration and assessment of additionality" is not mandatory for project participants when proposing new methodologies. Project participants may propose alternative methods to demonstrate additionality for consideration by the Executive	The tool is applicable to the project activity, since the tool is included in the applied methodology.

⁵¹ <https://www.epa.gov/uic/class-vi-wells-used-geologic-sequestration-carbon-dioxide>

⁵² <https://ww2.arb.ca.gov/resources/documents/carbon-capture-and-sequestration-protocol-under-low-carbon-fuel-standard>

	Board. They may also submit revisions to approved methodologies using the additionality tool. Once the additionally tool is included in an approved methodology, its application by project participants using this methodology is mandatory.	
CDM Tool 02	The tool is applicable to all types of proposed project activities. However, in some cases, methodologies referring to this tool may require adjustments or additional explanations as per the guidance in the respective methodologies. This could include, inter alia, a listing of relevant alternative scenarios that should be considered in Step 1, any relevant types of barriers other than those presented in this tool and guidance on how common practice should be established.	The tool is applicable to all types of proposed project activities, so it is applicable to this project.
CDM Tool 07	This tool may be applied to estimate the OM, BM and/or CM when calculating baseline emissions for a project activity that substitutes grid electricity that is where a project activity supplies electricity to a grid or a project activity that results in savings of electricity that would	Not applicable. This tool will be used to calculating project emissions for a project activity.

have been provided by the grid (e.g. demand-side energy efficiency projects).

CDM
Tool 07

Under this tool, the emission factor for the project electricity system can be calculated either for grid power plants only or, as an option, can include off-grid power plants. In the latter case, two sub-options under the step 2 of the tool are available to the project participants, i.e. option IIa and option IIb. If option IIa is chosen, the conditions specified in "Appendix 1: Procedures related to off-grid power generation" should be met. Namely, the total capacity of off-grid power plants (in MW) should be at least 10 per cent of the total capacity of grid power plants in the electricity system; or the total electricity generation by off-grid power plants (in MWh) should be at least 10 per cent of the total electricity generation by grid power plants in the electricity system; and that factors which negatively affect the reliability and stability of the grid are primarily due to constraints in generation and not to other

This tool will be used to calculating emission factor from grid-connected non-captive power plants only, if applicable.

	aspects such as transmission capacity.	
CDM Tool 07	In case of CDM projects the tool is not applicable if the project electricity system is located partially or totally in an Annex I country.	This project is not located partially or totally in an Annex I country.
CDM Tool 07	Under this tool, the value applied to the CO ₂ emission factor of biofuels is zero.	For the grid-connected captive plant (biomass), the CO ₂ emission factor will be zero. For grid-connected non captive plant, the emission factor is calculated based on this tool.
CDM EB 23 Annex 18	Biomass is “renewable” if one of the following five conditions applies: 1. The biomass is originating from land areas that are forests where: (a) The land area remains a forest; and (b) Sustainable management practices are undertaken on these land areas to ensure, in particular, that the level of carbon stocks on these land areas does not systematically decrease over time (carbon stocks may temporarily decrease due to harvesting); and (c) Any national or regional forestry and nature conservation regulations are complied with.	The biomass fermented in this project is 2nd crop corn, a non-woody biomass. So, to be aligned with CDM EB 23 Annex 18 and be considered as renewable it must be originated from croplands and/or grasslands where: (a) The land area remains cropland and/or grasslands or is reverted to forest; and (b) Sustainable management practices are undertaken on these land areas to ensure in particular that the level of carbon stocks on these land areas does not systematically decrease over time (carbon stocks may temporarily decrease due to harvesting); and

2. The biomass is woody biomass and originates from croplands and/or grasslands where: (a) The land area remains cropland and/or grasslands or is reverted to forest; and (b) Sustainable management practices are undertaken on these land areas to ensure in particular that the level of carbon stocks on these land areas does not systematically decrease over time (carbon stocks may temporarily decrease due to harvesting); and (c) Any national or regional forestry, agriculture and nature conservation regulations are complied with.

3. The biomass is non-woody biomass and originates from croplands and/or grasslands where: (a) The land area remains cropland and/or grasslands or is reverted to forest; and (b) Sustainable management practices are undertaken on these land areas to ensure in particular that the level of carbon stocks on these land areas does not systematically decrease over time (carbon stocks may temporarily decrease due to

(c) Any national or regional forestry, agriculture and nature conservation regulations are complied with.

See appendix 6 for details.

harvesting); and (c) Any national or regional forestry, agriculture and nature conservation regulations are complied with.

4. The biomass is a biomass residue and the use of that biomass residue in the project activity does not involve a decrease of carbon pools, in particular dead wood, litter or soil organic carbon, on the land areas where the biomass residues are originating from. For example, if bagasse from sugar production would in the absence of the CDM be dumped or left to decay and is used for energy generation under the CDM, it can be assumed that the use of the bagasse does not affect the sugar cane cultivation practices and hence the carbon pools of the respective soils. In contrast, where a CDM project involves the collection of dead wood from a forest, which would not be collected in the absence of the CDM, the extracted biomass cannot be regarded as renewable, since it would result in a decrease of carbon stocks.

5. The biomass is the non-fossil fraction of an industrial or

municipal waste. Otherwise, where none of these conditions applies, the biomass is considered as “nonrenewable”.

B.3. Project boundary

>> As per methodology the spatial extent of the project boundary encompasses the items presented below:

Table 12. project boundary description as per methodology and Tool 03

Item	Description	Explanation
Methodology 5.1.1 (a)	encompasses the physical, geographical site(s) where CO ₂ generated by biomass fermentation is captured by the project, the site(s) where the captured CO ₂ is processed, the site(s) where the processed CO ₂ , is compressed and dehydrated, the site(s) of the CO ₂ transport system, the site(s) where CO ₂ is injected for storage, and the geological storage complex where the injected CO ₂ is stored, and	The project encompasses one site where CO ₂ generated by biomass fermentation is captured by the project, one site where the captured CO ₂ is processed, one site where the processed CO ₂ , is compressed and dehydrated, one site of the CO ₂ transport system, one site where CO ₂ is injected for storage, and the geological storage complex where the injected CO ₂ is stored. See Figure 10.
Methodology 5.1.1. (b)	includes the site(s) where biomass fermented by the CO ₂ source facility(ies) is cultivated in dedicated plantations, and the site(s) where biomass and/or biomass residues are transported and/or processed.	The project doesn't include the sites where biomass fermented by the CO ₂ source facility is cultivated in dedicated plantations. The project includes the site where biomass and/or biomass residues are transported and/or processed. It is important to emphasize that these farms, where biomass (e.g.,

corn)and that supply biomass to FS are third-party farms (not FS farms), and vary according to contracts established between suppliers and FS at a given time. These plantations are not dedicated exclusively to ethanol production or to FS, and may also supply the broader market. Therefore, FS does not have direct legal control over these farms, only robust contracts for the sale and purchase of biomass for a specific period according to internal policy. See appendix 6A for more details about the fermented biomass renewability. Additionally, the CO₂ considered in the project is exclusively the CO₂ generated during the corn fermentation process within FS industrial facilities (fermenters). This CO₂ is not related to agricultural activities or plantation cultivation.

Methodology 5.1.2	The location of each project site shall be uniquely identified using global positioning system (GPS) coordinates (five decimals), or in the case of a pipeline, using a map that allows for the determination of the GPS coordinates to five decimal places for any location along the pipeline.	The location of this project site was uniquely identified using global positioning system (GPS) coordinates (five decimals), and for pipeline, using a map that allows for the determination of the GPS coordinates to five decimal places. See Table 6.
Methodology 5.1.3	Project developer shall provide supporting documentation demonstrating the project	Project developer provided as supporting documentation (shape files, aerial photographs, maps, or

	location(s) which includes one of the following: shape files, aerial photographs, maps, or satellite imagery. The supporting documentation shall clearly indicate the project boundary.	satellite imagery) demonstrating the project location(s) and clearly indicating the project boundary.
Tool 03 5.2.1	The activity boundary shall include the following: Surface locations specified by global positioning system (GPS) coordinates (five decimals) for all injection and monitoring wells and, if applicable, any identified wellbores in the Area of Review - Bottomhole locations specified by GPS coordinates (five decimals) for all injection and monitoring wells and, if applicable, any identified wellbores in the Area of Review - An azimuthal projection of the storage site’s Area of Review delineated with geodetic polygons in a KML file - The total area of the storage site’s Area of Review	The activity boundary includes the surface and bottomhole locations specified by global positioning system (GPS) coordinates (five decimals) for the injection well, the monitoring well, an azimuthal projection of the storage site’s Area of Review delineated with geodetic polygons and the total area of the storage site’s Area of Review. See Table 6 and Figure 10.

The project boundary scheme presented below following applicability of the items above:

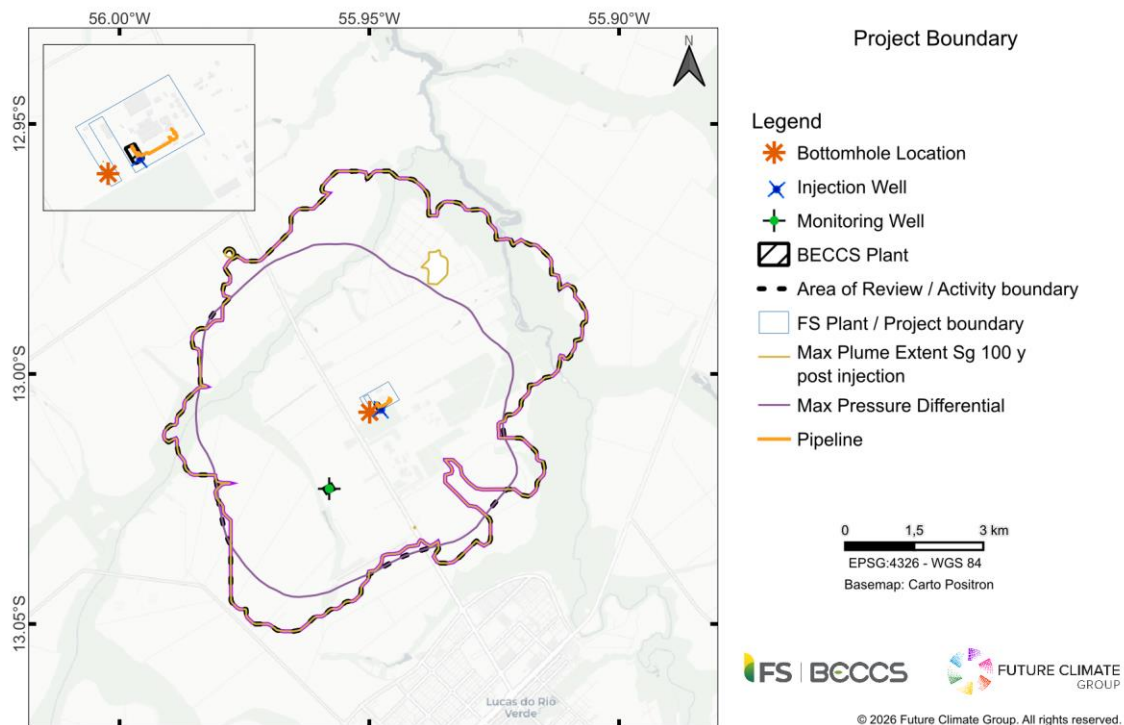


Figure 910. Project boundary and Activity boundary.

Table 13 shows the project boundary description as per methodology.

Table 13. project boundary description as per methodology.

Source	GHGs	Included?	Justification/Explanation
Baseline scenario	B1 - Injection of captured CO ₂ that would have been emitted to the atmosphere in the absence of the project	CO ₂ Included	Baseline CO ₂ emissions are dynamic and determined based on data from the direct measurement of the injected fluid streams which are measured upstream of the injection wellhead in the project. Major emissions source
		CH ₄ Excluded	It is conservative to exclude non-CO ₂ emissions in the baseline as storage site permitting and permanence are undertaken and assessed in the context of permanent geological sequestration of CO ₂ .
		N ₂ O Excluded	As above
Project scenario	P1 – Emissions from biomass	CO ₂ Excluded	According to section 5.2.3 (a) (i) from methodology, emissions from biomass due to cultivation of biomass in dedicated plantations, and processing and transportation of

			biomass and biomass residues are considered relevant for assessment only if biomass which is fermented at the following facility types are included:
			a. A facility which is new and ferments renewable biomass which is either cultivated in dedicated plantations or is derived from biomass residues; or,
			b. A facility that does not receive revenue for products (excluding CO ₂) manufactured at the facility via fermentation of the same renewable biomass which emits CO ₂ that is captured by the project.
			So, following section 5.2.3 (a) (i), this is not applicable in this project, since:
			a. The fermentation facility is not a new fermentation facility and b. The fermentation facility receives revenue from the sale of products (ethanol, DDGs, others, excluding CO ₂) manufactured at the facility via fermentation of the same renewable biomass which emits CO ₂ that is captured by the project.
	CH ₄	Excluded	As above
	N ₂ O	Excluded	As above
	P2 - Production and delivery of materials used for construction of carbon capture and storage	CO ₂	Excluded Materials used in the construction of CO₂ capture, CO₂ transportation, and CO₂ storage facilities such as steel and concrete shall need to be manufactured and delivered to the site. Emissions are attributed to fossil fuel and electricity consumption for material manufacture and fossil fuel consumption for material delivery.

				Minor emissions source; excluded for simplicity
				CH ₄ Excluded As above
				N ₂ O Excluded As above
	P3- Land clearing and soil carbon loss from installation of carbon capture, transportation, storage, and injection facilities	CO ₂	Excluded	It is important to note that the drilling activities will be carried out in an area that has already been affected by human activity and it will not be necessary to remove the zones. Furthermore, no new access roads will be opened for vehicles, so there will be no interference with native vegetation. (EIA, 2024)
			CH ₄ Excluded	As above
			N ₂ O Excluded	As above
	P4 - Construction of carbon capture, transportation, and storage facilities and well drill and service	CO ₂	Included	Site construction shall require a variety of heavy equipment, smaller power tools, cranes, generators and well drilling operations. The operation of this equipment shall have associated GHG emissions from the use of fossil fuels and electricity and from the potential kick or blowout event which could release hydrocarbons during the drilling or servicing of injection and monitoring wells.
				Site construction shall require a variety of heavy equipment, smaller power tools, cranes, generators and well drilling operations. The operation of this equipment shall have associated GHG emissions from the use of fossil fuels and electricity and from the potential kick or blowout event that could release hydrocarbons during the drilling or servicing of injection and monitoring wells.
				Minor emissions source
			N ₂ O Excluded	Not applicable
	P5 – Production and delivery of material inputs	CO ₂	Included	Material inputs, including specialized chemicals or additives such as amine-based sorbents, glycols, or

	consumed by carbon capture, transportation, and storage equipment			lubricants are required for CO ₂ capture, CO ₂ transportation, and CO ₂ storage. Emissions are attributed to the fossil fuel consumption for transport and delivery of these materials, and the electricity and fossil fuel inputs for their production. Minor emissions source
		CH ₄	Included	As above
		N ₂ O	Included	As above
	P6 - Fuel extraction, processing, and delivery	CO ₂	Excluded	Not applicable, as there is no intention to use fossil fuel in this project.
		CH ₄	Excluded	As above
		N ₂ O	Excluded	As above
	P7 - Off-site electricity generation	CO ₂	Included	Major emissions source. Emissions from grid-connected captive source.
		CH ₄	Included	As above
		N ₂ O	Included	As above
	P8 - On-site electricity generation		Excluded	Electricity inputs may be required for CO ₂ capture, CO ₂ compression, CO ₂ transportation, and CO ₂ injection. Electricity may be generated independently or from cogeneration within the project boundary. The quantity and type of fuels consumed to generate electricity and the quantity of electricity consumed by the project from each generating source would be tracked. Major emissions source
		CO ₂		
		CH ₄	Excluded	As above
		N ₂ O	Excluded	As above
	P9 - Fuel consumption	CO ₂	Excluded	Not applicable, as there is no intention to use fossil fuel in this project
		CH ₄	Excluded	As above
		N ₂ O	Excluded	As above
	P10 - Venting at capture site	CO ₂	Included	Some CO ₂ is vented during the project. CO ₂ venting may also be necessary for equipment maintenance or emergency shutdowns. CO ₂ vented upstream of

P11 - Fugitive emissions at capture site			injection metering is accounted for in the baseline scenario, thus no monitoring or quantification of this source is required. Identified and included within the project boundary for completeness.
	CH ₄	Excluded	Non-CO ₂ GHGs are conservatively excluded from the baseline as storage site permitting and permanence are undertaken and assessed in the context of permanent geological sequestration of CO ₂ . Any venting emissions of non-CO ₂ GHG are necessarily a portion of those ultimately injected by the project but not accounted for within the project boundary. Non-CO ₂ GHG vented upstream of injection metering is excluded for consistency and relevance.
	N ₂ O	Excluded	As above
	CO ₂	Included	Unintended leaks of gas from the CO ₂ capture and processing unit may occur through faulty seals, loose fittings, or equipment. Fugitive emissions of CO ₂ upstream of injection metering are accounted for in the baseline scenario, thus no monitoring or quantification of this source is required. Identified and included within the project boundary for completeness.
	CH ₄	Excluded	Non-CO ₂ GHGs are conservatively excluded from the baseline as storage site permitting and permanence are undertaken and assessed in the context of permanent geological sequestration of CO ₂ . Any fugitive emissions of non-CO ₂ GHG are necessarily a portion of those ultimately injected by the project, but not accounted for within the project boundary. Fugitive emissions of non-CO ₂ GHG upstream

	P12 - Venting during compression/dehydration	of injection metering are excluded for consistency and relevance.	
		N ₂ O	Excluded
		As above	
		CO ₂	Included
	P13 – Fugitive emissions during compression/dehydration	Some CO ₂ is vented during the project. CO ₂ venting may also be necessary for equipment maintenance or emergency shutdowns. CO ₂ vented upstream of injection metering is accounted for in the baseline scenario, thus no monitoring or quantification of this source is required. Identified and included within the project boundary for completeness.	
		Non-CO ₂ GHGs are conservatively excluded from the baseline as storage site permitting and permanence are undertaken and assessed in the context of permanent geological sequestration of CO ₂ . Any venting emissions of non-CO ₂ GHG are necessarily a portion of those ultimately injected by the project, but not accounted for within the project boundary. Non-CO ₂ GHG vented upstream of injection metering is excluded for consistency and relevance.	
		CH ₄	Excluded
		N ₂ O	Excluded
		As above	
		CO ₂	Included
		Unintended leaks of gas from the compressor and/or dehydrator may occur through seals, loose fittings, equipment, or compressor packing. These gases shall be composed primarily of CO ₂ with trace amounts of other gases. Fugitive emissions of CO ₂ upstream of injection metering are accounted for in the baseline scenario, thus no monitoring or quantification of this source is required. Identified and included within the project boundary for completeness.	
		CH ₄	Excluded
		Non-CO ₂ GHG are conservatively excluded from the baseline as	

			storage site permitting and permanence are undertaken and assessed in the context of permanent geological sequestration of CO ₂ . Any fugitive emissions of non-CO ₂ GHG are necessarily a portion of those ultimately injected by the project, but not accounted for within the project boundary. Fugitive emissions of non-CO ₂ GHG upstream of injection metering are excluded for consistency and relevance.
	N ₂ O	Excluded	As above
	CO ₂	Included	Some CO ₂ is vented during the project. CO ₂ venting may also be necessary for equipment maintenance or emergency shutdowns. CO ₂ vented upstream of injection metering is accounted for in the baseline scenario, thus no monitoring or quantification of this source is required. Identified and included within the project boundary for completeness.
	CH ₄	Excluded	Non-CO ₂ GHG are conservatively excluded from the baseline as storage site permitting and permanence are undertaken and assessed in the context of permanent geological sequestration of CO ₂ . Any venting emissions of non-CO ₂ GHG are necessarily a portion of those ultimately injected by the project, but not accounted for within the project boundary. Non-CO ₂ GHG vented upstream of injection metering is excluded for consistency and relevance.
	N ₂ O	Excluded	As above
P14 – Venting at transportation			
	CO ₂	Included	Unintended leaks of gas from CO ₂ pipelines, stations loading and unloading CO ₂ transported by truck or rail, CO ₂ transportation equipment, and additional compressors may occur through
P15 – Fugitive emissions at transportation			
	CO ₂	Included	

			seals, loose fittings, equipment, or compressor packing. These gases will be composed primarily of CO ₂ with trace amounts of other gases. Fugitive emissions of CO ₂ upstream of injection metering are accounted for in the baseline scenario, thus no monitoring or quantification of this source is required. Identified and included within the project boundary for completeness.
	CH ₄	Excluded	Non-CO ₂ GHG are conservatively excluded from the baseline as storage site permitting and permanence are undertaken and assessed in the context of permanent geological sequestration of CO ₂ . Any fugitive emissions of non-CO ₂ GHG are necessarily a portion of those ultimately injected by the project, but not accounted for within the project boundary. Fugitive emissions of non-CO ₂ GHG upstream of injection metering are excluded for consistency and relevance.
	N ₂ O	Excluded	As above
P16 – Venting at injection sites	CO ₂	Included	Planned and emergency venting may be necessary for injection well work overs, mechanical integrity checks, and maintenance. Instances of venting shall be logged, including the duration of the venting event and the estimated quantities and makeup of gases vented. GHG vented upstream of injection metering are accounted for in the baseline scenario, thus no monitoring or quantification of these emissions are required. Only vented GHG which are emitted from injection surface facility instrumentation and piping located downstream of the injection metering point are included.
	CH ₄	Included	As above

		N ₂ O	Included	As above
	P17 – Fugitive emissions at injection sites	CO ₂	Included	Unintended or unplanned leaks of gas at the CO ₂ injection sites may occur through valves, flanges, pipe connections, mechanical seals, or related equipment. Fugitive emissions of GHG upstream of injection metering are accounted for in the baseline scenario, thus no monitoring or quantification of these emissions are required. Only fugitive emissions of GHG which are emitted from injection surface facility instrumentation and piping located downstream of the injection metering point are included.
		CH ₄	Included	As above
		N ₂ O	Included	As above
	P18 – Decommissioning carbon capture and storage facilities	CO ₂	Excluded	Infrastructure is decommissioned at the end of project operations. This involves the disassembly of the equipment, demolition of on-site structures, landfill disposal of some materials, environmental restoration, re-grading, planting or seeding, and transportation of materials off-site. Emissions result from fossil fuels combustion and electricity use. Excluded for simplification
		CH ₄	Excluded	As above
		N ₂ O	Excluded	As above
	P19 – Emissions from subsurface to atmosphere	CO ₂	Included	Major source of emissions Accidental emissions to the atmosphere may occur from gas migration through undetected faults, fractures and/or subsurface equipment resulting from compromised casing/cement/wellhead or packer/tubing. CO ₂ that migrates from the intended geological storage complex but remain subsurface are considered the same as if they had

Leakage				leaked to the atmosphere and shall be quantified accordingly.
				Non-CO ₂ GHGs are conservatively excluded from the baseline as storage site permitting and permanence are undertaken and assessed in the context of permanent geological sequestration of CO ₂ . As the methodology prohibits usage of hydrocarbon reservoirs for CO ₂ storage purposes, non-CO ₂ GHG emissions from subsurface releases to atmosphere are necessarily a portion of those ultimately injected by the project, but not accounted for within the project boundary. Project emissions of non-CO ₂ GHG from subsurface to atmosphere are excluded for consistency and relevance.
		CH ₄	Excluded	
		N ₂ O	Excluded	As above
	L1 - Leakage from biomass L1 - Leakage from biomass	CO ₂	Included	Potential leakage source
		CH ₄	Included	Potential leakage source
		N ₂ O	Included	Potential leakage source

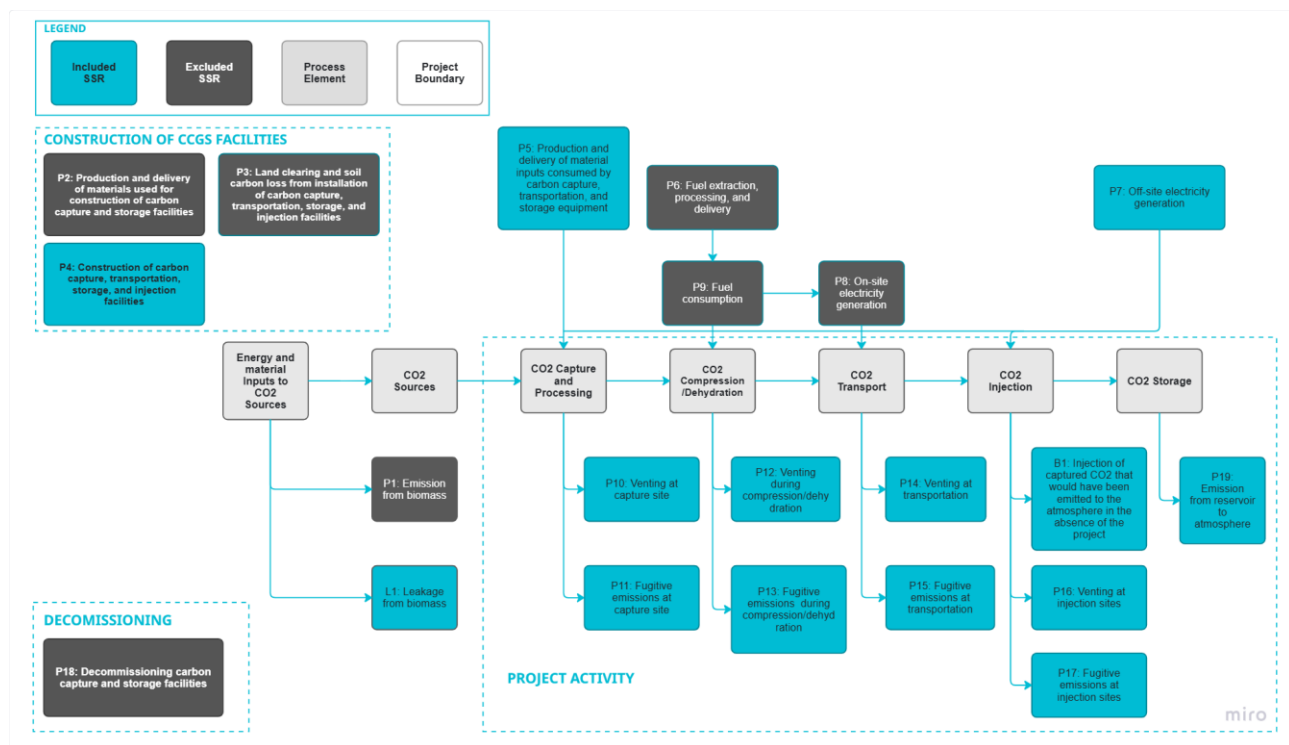


Figure 10-11. Project Process Flow Diagram and Baseline, Project, Leakage Emissions Sources and Sinks.

B.4. Establishment and description of baseline scenario

>> The baseline scenario for the project activity is defined according to the Methodology for biomass fermentation with carbon capture and geologic storage, version 2.0.

Table 14. baseline definition as per methodology.

Item	Description	Explanation
	Project developers shall apply the latest approved version of CDM Tool 02 – Combined tool to identify the baseline and demonstrate additionality and additional requirements defined by GS4GG to identify the most plausible baseline scenario among all realistic and credible alternatives.	It is being applied the latest approved version of CDM Tool 02 – Combined tool to identify the baseline and demonstrate additionality and additional requirements defined by GS4GG to identify the most plausible baseline scenario among all realistic and credible alternatives.

a. If more than one credible and plausible alternative scenario remains, project developers shall select the scenario corresponding with the lowest baseline emissions as the baseline scenario.

The CO₂ emissions in the baseline scenario are dynamic and determined based on data from the direct measurement of the injected fluid streams which are measured upstream of the injection wellhead in the project.

The CO₂ emissions in the baseline scenario will be determined based on data from the direct measurement of the injected fluid streams which are measured upstream of the injection wellhead in the project.

The project activity promotes removal of GHG emissions by the implementation of the BECCS Project, introducing technology for capturing, compressing, dehydrating, transporting and injecting CO₂ for safe and permanent storage in deep geological reservoirs in the Parecis Basin. This technology will be coupled to the existing production process, which, prior the project, vents the CO₂ produced during fermentation into the atmosphere.

Applying CDM Tool 02 – Combined tool to identify the baseline and demonstrate additionality:

Project participants shall apply the following four Steps:

- (a) STEP 0. Demonstration that a proposed project activity is the first-of-its-kind;
- (b) STEP 1. Identification of alternative scenarios;
- (c) STEP 2. Barrier analysis;
- (d) STEP 3. Investment analysis (if applicable);
- (e) STEP 4. Common practice analysis

- (a) STEP 0. Demonstration that a proposed project activity is the first-of-its-kind;
Optional, not applied.

According to tool 02, if the proposed ~~CDM~~-project activity apply measure that are listed in the "Methodological tool: Additionality of first-of-its-kind project activities", then the latest version of the "Methodological tool: Additionality of first-of-its-kind project activities" available on the UNFCCC website shall be applied to demonstrate that the project activity is the first-of-its-kind.

The project activity is considered First-of-its-Kind (FOIK). See section B.5 for more information.

(b) STEP 1. Identification of alternative scenarios;

This Step serves to identify all alternative scenarios to the proposed ~~CDM~~-project activity(s) which can be the baseline scenario:

Step 1a: Define alternative scenarios to the proposed ~~CDM~~-project activity.

Identify all alternative scenarios that provide the **same output** (service or product) as the proposed ~~CDM~~-project activity.

According to Tool 02, Output is good/services produced by the project activity including, among other things, heat steam, electricity, methane, and biogas unless otherwise specified in the applied methodology. In this project, the output is the carbon captured and storage.

These alternative scenarios shall include:

S1: The proposed project activity undertaken without being registered as a ~~CDM~~-project activity:

S1 result: The CO₂ produced during fermentation captured and storage without being registered as a GS project.

S2: Where applicable, no investment is undertaken by the project participants, i.e., the same output as that produced by the proposed ~~CDM~~-project activity can also be provided by others than the project proponent (i.e., the PP is not the only output provider).

For example:

(i) In the case of a Greenfield power project, an alternative scenario may be that the project participants would not invest in the Greenfield power plant

but that power would be generated in existing and/or new power plants in the electricity grid;

- (ii) (ii) In the case of a transportation project, an alternative scenario may be that the project participants would not invest in alternative modes (e.g. rail or pipelines), but these alternatives would be implemented by third parties.

S2 result: the same output as that produced by the proposed GS project activity **cannot** be provided by others than the project proponent since the PP is the fermentation plant owner.

S3: Where applicable, the continuation of the current situation, not requiring any investment or expenses to maintain the current situation, such as, inter alia:

- (i) The continued venting of methane from a landfill;
- (ii) (ii) The continued release of N₂O from adipic or nitric acid production.

S3 result: no CO₂ captured, venting the CO₂ produced during fermentation into the atmosphere.

S4: Where applicable, the continuation of the current situation, requiring an investment or expenses to maintain the current situation, such as, inter alia:

- (i) The continued use of an existing boiler involving expenses for operation and maintenance;
- (ii) (ii) The continued use of a specific fuel mix for power generation in an existing power plant;
- (iii) (iii) The continued use of existing transportation infrastructure for transporting a product.

S4 result: not applicable.

S5: Other plausible and credible alternative scenarios to the project activity scenario, including the common practices in the relevant sector, which deliver the same output considering examples of scenarios identified in the underlying methodology where relevant;

CO₂ from ethanol fermentation presents several use alternatives that can generate immediate commercial value, as an alternative to the proposed project activity, i.e., its capture and storage.

Among the alternatives some can be considered realistic:

- (i) Use in the Carbonated Beverage Industry: The captured CO₂ can be purified and used to carbonate soft drinks, beers, and other beverages.
- (ii) Production of Biofuels and Electrofuels: CO₂ can be combined with green hydrogen to produce methanol, synthetic ethanol, or synthetic fuels.
- (iii) Fertilizer Production: CO₂ can be used for urea production, which is an agricultural input.

All the alternatives for the project activity would end in the CO₂ emission in the end of the chain. In the beverage industry application, the captured CO₂ is used to carbonate products but is quickly released back into the atmosphere after consumption. In biofuels and electrofuels production, CO₂ is converted into fuels that, when burned, result in the re-emission of CO₂. In the case of agricultural greenhouse enrichment, CO₂ is absorbed by plants but is eventually re-emitted through natural processes of respiration or decomposition. Similarly, in urea manufacturing, CO₂ is transformed into fertilizer but is released into the atmosphere during soil decomposition. These routes offer commercial alternatives and not guarantee permanent removal of CO₂ from the atmosphere, limiting their long-term impact on climate change mitigation.

In contrast, the proposed Project Activity is the only alternative that offers the possibility of permanent removal of CO₂ from the atmosphere. By opting for this route, the Project Developer ensures that CO₂ does not return to the atmospheric cycle, making a real contribution to reducing greenhouse gas emissions.

Furthermore, CO₂ capture and storage involves significant technical challenges, such as identifying suitable sites for geological storage, ensuring long-term process safety, and meeting stringent regulatory requirements. Additionally, the CCS process presents high costs and operational risks, which makes its adoption more complex and less common compared to the commercial alternatives for CO₂ use.

Another alternative assessed is that the project activity would be undertaken without being registered as a Gold Standard project activity. Given that the only project's incentive is linked to participation in carbon markets, and considering that it does not

provide additional benefits beyond carbon credit generation, the most plausible scenario is that the project would not be implemented without the absence of registration under a Gold Standard Project Activity would undermine the project's financial feasibility and impact, making it unlikely to proceed.

S5 result: not applicable, since the common practice is the scenario identified in S3. No CO₂ captured, venting the CO₂ produced during fermentation into the atmosphere.

S6: Where applicable, the “proposed project activity undertaken without being registered as a CDM-project activity” to be implemented at a later point in time (e.g. due to existing regulations, end-of-life of existing equipment, financing aspects).

S6 result: not applicable, since there are no existing regulations and this project activity is not an obligation in Brazil. There is no other incentive besides the CDMGS.

Outcome of Step 1a:

The alternative scenarios identified are as follow:

- 1. The CO₂ produced during fermentation captured and storage without being registered as a GS project.**
- 2. No CO₂ captured, venting the CO₂ produced during fermentation into the atmosphere.**
- 3. Use in the Carbonated Beverage Industry: The captured CO₂ can be purified and used to carbonate soft drinks, beers, and other beverages.**
- 4. Production of Biofuels and Electrofuels: CO₂ can be combined with green hydrogen to produce methanol, synthetic ethanol, or synthetic fuels. (iii) Fertilizer Production: CO₂ can be used for urea production, which is an agricultural input.**

Of these alternative scenarios identified, scenario 1 is not applicable because there is no other incentive (tax or market) other than carbon credit. Scenarios 2, 3 and 4 result in CO₂ emissions. However, scenarios 3 and 4 are less likely, as this is not common practice. Therefore, scenario 2 will be the baseline for the project.

Step 1b: Consistency with mandatory applicable laws and regulations

The alternative scenario is the current practice in Brazil where there are no mandatory law or regulation to be applied.

Outcome of Step 1b: No CO₂ captured, venting the CO₂ produced during fermentation into the atmosphere.

B.5. Demonstration of additionality

The project developer shall demonstrate that the project is additional, meaning that it reduces anthropogenic emissions of GHGs below those that would have occurred in the absence of the proposed project.

According to the Methodology for biomass fermentation with carbon capture and geologic storage, version 2.0, the project developer shall demonstrate additionality, in accordance with the Principles & Requirements, by using the latest version of one of the following UNFCCC-approved or Gold Standard-approved additionality tools:

- a. CDM TOOL 01 – Tool for the demonstration and assessment of additionality; or
- b. CDM TOOL 02 – Combined tool to identify the baseline and demonstrate additionality; or
- c. An approved Gold Standard additionality tool

The additionality of the Project Activity was assessed using the additionality tool CDM TOOL 01, version 7.0. This tool follows a step-by-step approach, and the demonstration of additionality is outlined below.

- **Step 0: Demonstration whether the proposed project activity is the first-of its-kind**

The project activity is considered First-of-its-Kind (FOIK).

The project applies a BECCS approach under the methodology Biomass Fermentation with Carbon Capture and Geologic Storage, Version 2.0, involving the capture and permanent geological storage of biogenic CO₂ from ethanol fermentation.

Although CDM Tool 23 ("Methodological tool: Additionality of first-of-its-kind project activities", Version 03.0) was originally developed for conventional GHG emission reduction activities and does not explicitly include engineered carbon dioxide removals among its defined measures, the Project Developer submitted a formal deviation request to Gold Standard seeking confirmation that the proposed BECCS activity could be treated as a FOIK measure.

Gold Standard approved the deviation request under reference DEVRQ-368, confirming that the project qualifies as a First-of-its-Kind activity in Brazil. Gold Standard recognized that:

- the project represents a technologically novel BECCS activity;
- there was no equivalent commercial-scale BECCS activity delivering the same output operational in Brazil prior to the relevant date;
- the project received special authorization from the Brazilian National Agency of Petroleum, Natural Gas and Biofuels (ANP) to operate as a pilot project in an experimental regulatory environment; and
- the distinct technology pathway and absence of prior implementation justify FOIK classification.

Furthermore, the approved deviation explicitly states that:

"The deviation request to classify the FS BECCS Project as an eligible 'First-of-its-Kind' (FOIK) measure under CDM Tool 23 and apply a 45-year crediting period is approved." Therefore, in accordance with Step 0 of CDM Tool 01 and the approved Gold Standard deviation decision (DEVRQ-368), the project activity is demonstrated to be First-of-its-Kind in the applicable geographical area (Brazil).

As the project successfully demonstrates FOIK status under Step 0, the project activity is considered additional.

B.5.1 Prior Consideration

>> According to section 4.1.49 from the Core Document- Principles and Requirements about Prior Consideration, the following requirements are applicable for the demonstration of prior consideration of revenues from Gold Standard certification for standalone projects:

Retroactive projects shall submit the required documents for preliminary review (time of first submission) within one year of the project start date. Retroactive Project

submitted at a date later than one year from the project start date will not be eligible for Gold Standard certification.

FS were studying possible voluntary standards, given that not all documents have been released yet. Meanwhile, they were preparing themselves better to present more real data about the project.

Table ~~15~~16. Prior consideration.

Date	Event
First public hearing	18/09/2024
Project start date	04/10/2024
First submission date	22/09/2025

The FS, under the coordination of the State Secretariat for the Environment of Mato Grosso (SEMA MT), held a public hearing to present the Environmental Impact Studies of the BECCS implementation and operation projects, also publicizing the interest in obtaining carbon credits in this project.

FS invited the population to participate in the event, which was held both online and in person. The in-person hearing took place on September 18th, from 8am to 11am Cuiabá time (9am to 12pm Brasília time), at Av. da Fé, 180 N – Tessele Junior, Lucas do Rio Verde, Brazil, CEP 78460-473.

B.5.2 Ongoing Financial Need
 >> Not applicable

B.6. Sustainable Development Goals (SDG) outcomes

Relevant Target/Indicator for each of the three SDGs

		SDG IMPACT
SUSTAINABLE DEVELOPMENT GOALS TARGETED	MOST RELEVANT SDG TARGET	INDICATOR (PROPOSED OR SDG INDICATOR)

13 Climate Action (mandatory)	13.2 Integrate climate change measures into national policies, strategies and planning	SDG Impact: Climate change mitigation Indicator: Amount of GHGs emissions avoided or sequestered
02 Zero Hunger	2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality	SDG Impact: Natural resource and Sustainable Forest Management Indicator: Number of groups of farmers adopted practices promoted by the project
04 Quality Education	4.4 By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship	SDG Impact: Capacity building Indicator: Number of people provided skill development training
07 Affordable and Clean Energy	7.2 By 2030, increase substantially the share of renewable energy in the global energy mix	SDG Impact: renewable energy Indicator: Amount of biofuel (ethanol) with Carbon Capture and Storage
08 Decent work and Economic Growth	8.5 By 2030, achieve full and productive employment for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value	SDG Impact: Employment Indicator: Total number of jobs

09 Industry, Innovation and Infrastructure	9.3 Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets	SDG Impact: Companies supported for integration into the project value chain and markets Indicator: Total number of companies supported for their integration into value chains and markets
15 Life on Land	15.2 By 2030, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally	SDG Impact: Natural resource and Sustainable Forest Management Indicator: Area of trees planted (hectares)

B.6.1 Explanation of methodological choices/approaches for estimating the SDG Impact

>>

SDG 13: Climate Action

High positive impact: The project activity results in CO₂ emission reduction by capturing CO₂ emission from fermentation process, avoiding that to be released to the atmosphere.

As mentioned above, the project activity uses Methodology for biomass fermentation with carbon capture and geologic storage, version 2.0 and applicable tools. The methods for calculating baseline emissions, project emissions, leakage emissions and emission reductions are presented below:

Baseline Emissions (BE_y):

According to the Methodology for biomass fermentation with carbon capture and geologic storage, version 2.0, the baseline emissions (BE_y) from the project in year y are determined as follows:

Equation 1

$$BE_y = \sum_s BE_{B1s,y}$$

Where:

BE_y = Baseline emissions in year y (t CO₂e)

$BE_{B1s,y}$ = Baseline emissions from the injection of captured CO₂ at injection site s that would have been emitted to the atmosphere in the absence of the project in year y (t CO₂e)

Baseline emissions from the injection of captured CO₂ at injection site i in year y ($BE_{B1i,y}$) shall be determined as follows:

Equation 2

$$BE_{B1s,y} = Q_{inj,s,y} \times w_{CO_2inj,s,y} \times Allocation_{Project,s,y}$$

Where:

$Q_{inj,s,y}$ = Mass of fluid injected at injection site s in year y (tonnes)

$w_{CO_2inj,s,y}$ = Mass fraction of CO₂ in fluid injected at injection site s in year y (% CO₂ by mass)

$Allocation_{Project,s,y}$ = Portion of CO₂ supplied to injection site s which is attributable to CO₂ captured by the project in year y (unitless)

The project shall monitor the mass or volume and density of project and non-project streams of captured, or transported, or injected fluids through direct measurement. Equations 3 and 4 below shall be applied to determine the quantity of stream injected or project or non -project, where the stream is an injected stream $Q_{Fluid} = Q_{inj,i,y}$, where the stream is a project capture stream $Q_{Fluid} = Q_{Project,i,y}$, $Q_{Non-project,i,y}$.

- a. Where volume and density of the fluid are monitored, the mass of the fluid, Q_{fluid} shall be determined as follows:

$$Q_{\text{Fluid}} = V_{\text{Fluid}} \times \rho_{\text{Fluid}}$$

Equation 3

Where:

V_{Fluid} = Volume of fluid (m^3) at project developer's chosen references conditions, T_{ref} and P_{ref}

ρ_{Fluid} = Density of fluid (kg/m^3) at project developer's chosen references conditions, T_{ref} and P_{ref}

The project shall monitor the mass fraction or mole fraction of CO_2 in captured and injected quantities of fluid through direct measurement.

- b. Where mole fraction of a fluid is monitored, the mass fraction of component z of the fluid, w_z , shall be determined as follows:

$$w_z = \frac{MM_z \times X_z}{\sum_{y=1}^N MM_y \times X_y}$$

Equation 4

Where:

MM_z = Molar Mass of component z (kg/kmol or other)

X_z = Mole fraction of component z (% CO_2 by mol)

MM_y = Molar Mass of component y (kg/kmol or other)

X_y = Mole fraction of component y (% component y by mol)

The project infrastructure may be used to transport and store non-project CO_2 and/or fluid from project and non-project capture sites. When non-project CO_2 streams commingle with streams of CO_2 captured by the project, developers shall determine the portion of injected CO_2 which is attributable to the project.

- a. Where emissions from the fermentation of both renewable and non-

renewable biomass at a facility commingle prior to the point of capture, project developers shall apportion the quantities measured downstream of the point of capture to the project and non-project streams based on the quantities of renewable and other biomass fermented at that facility during the monitoring period, respectively.

If a developer is unable to substantiate the quantities of renewable biomass fermented at that facility, the developers shall conservatively assume that the total quantity captured at that facility is a non-project stream.

- i. The quantities measured at or downstream of the point of capture shall be apportioned to the project stream based on the ratio of the dry mass of renewable biomass to the total dry mass (renewable and non-renewable) of biomass. The balance of the captured quantities less the project quantities shall be considered the non-project stream.
- b. The portion of CO₂ supplied to injection site i which is attributable to CO₂ captured by the project in year y , $Allocation_{Project,i,y}$, is determined as follows:

$$\begin{aligned}
 & Allocation_{Project,s,y} \\
 &= \left(\frac{\sum_{i \in C_{s,y}} \left(Q_{Project,i,y} \times w_{CO_2 Project,i,y} \right)}{\sum_{i \in C_{s,y}} \left(\left(Q_{Project,i,y} \times w_{CO_2 Project,i,y} \right) + \left(Q_{Non-project,i,y} \times w_{CO_2 Non-project,i,y} \right) \right)} \right) \\
 & \quad \text{Project Fraction} \\
 & \times \left(1 - \frac{\sum_{k \in E_{s,y}} \left(Export_{k,y} \times w_{CO_2 Export,k,y} \right)}{\sum_{s \in I_{s,y}} \left(Q_{inj,s,y} \times w_{CO_2 inj,s,y} \right) + \sum_{k \in E_{s,y}} \left(Export_{k,y} \times w_{CO_2 Export,k,y} \right)} \right) \\
 & \quad \text{Export Fraction} \\
 & \times \left(\frac{\sum_{s \in I_{s,y}} \left(Q_{inj,s,y} \times w_{CO_2 inj,s,y} \right) + \sum_{k \in E_{s,y}} \left(Export_{k,y} \times w_{CO_2 Export,k,y} \right)}{\sum_{i \in C_{s,y}} \left(\left(Q_{Project,i,y} \times w_{CO_2 Project,i,y} \right) + \left(Q_{Non-project,i,y} \times w_{CO_2 Non-project,i,y} \right) \right)} \right) \\
 & \quad \text{Shrinkage Factor}
 \end{aligned}
 \tag{Equation 5}$$

Where S is the set of capture sites from which fluids injected at injection site i are sourced, and:

$Q_{\text{Project},i,y}$	=	Mass of fluid captured at project capture site i in year y (kg, tonnes, or other)
$w_{\text{CO}_2 \text{ Project},i,y}$	=	Mass fraction of CO ₂ in fluid captured at project capture site i in year y (% CO ₂ by mass)
$Q_{\text{Non-project},i,y}$	=	Mass of non-project fluid captured at site i in year y (kg, tonnes, or other)
$w_{\text{CO}_2 \text{ Non-project},i,y}$	=	Mass fraction of CO ₂ in non-project fluid captured at site i in year y (% CO ₂ by mass)
$\text{Export}_{k,y}$	=	Total mass of CO ₂ (or fluid, see note below) exported at export site k in year y
$C_{s,y}$	=	The set of capture sites upstream of injection site s in year y
$E_{s,y}$	=	The set of export sites downstream of capture sites in set $C_{s,y}$
$I_{s,y}$	=	The set of injection sites downstream of capture sites in set $C_{s,y}$

Project Emissions (PE_y):

Total emissions from the project in year y (PE_y) are determined as follows:

$$\begin{aligned} \text{PE}_y = & \text{PE}_{\text{P1}y} + \text{PE}_{\text{P3}y} + \text{PE}_{\text{P4}y} + \text{PE}_{\text{P5}y} + \text{PE}_{\text{P6}y} + \text{PE}_{\text{P7}y} + \text{PE}_{\text{P8}y} + \text{PE}_{\text{P9}y} \\ & + \text{PE}_{\text{P16}y} + \text{PE}_{\text{P17}y} + \text{PE}_{\text{P19}y} \end{aligned} \quad \text{Equation 6}$$

Where:

PE_y	=	Project emissions in year y (t CO ₂ e)
$\text{PE}_{\text{P1}y}$	=	Project emissions from biomass in year y (t CO ₂ e)
$\text{PE}_{\text{P3}y}$	=	Project emissions from land clearing and soil carbon loss from installation of carbon capture, transportation, storage, and injection facilities in year y (t CO ₂ e)
$\text{PE}_{\text{P4}y}$	=	Project emissions from construction of carbon capture, transportation, and storage facilities and well drill and service in year y (t CO ₂ e)

PE_{P5y}	=	Project emissions from production and delivery of material inputs used carbon capture, transportation, and storage equipment in year y (t CO ₂ e)
PE_{P6y}	=	Project emissions from fuel extraction, processing, and delivery in year y (t CO ₂ e)
PE_{P7y}	=	Project emissions consumption of electricity from grid-connected captive and non-captive power sources in year y (t CO ₂ e)
PE_{P8y}	=	Project emissions from grid-disconnected captive power sources in year y (t CO ₂ e)
PE_{P9y}	=	Project emissions from fuel consumption in year y (t CO ₂ e)
PE_{P16y}	=	Project emissions from venting at injection sites in year y (t CO ₂ e)
PE_{P17y}	=	Project emissions from fugitive emissions at injection sites in year y (t CO ₂ e)
PE_{P19y}	=	Project emissions from the subsurface to atmosphere in year y (t CO ₂ e)

The project infrastructure may be used to transport and store non-project CO₂ and/or fluid from project and non-project capture sites or to export captured CO₂ outside of the project boundary. The quantification of project emissions shall consider only those emissions from sources associated with the capture, transport, and storage of project fluid streams.

- a. Project developers shall apply the apportionment factor $AF_{Project,i,y}$ for the quantification of project emissions from PE_{P5y} , PE_{P6y} , PE_{P7y} , PE_{P8y} , PE_{P9y} , PE_{P16y} , and PE_{P17y} as follows:
 - i. Where an emission is caused, either directly or indirectly, by activity at a capture site supplying both project and non-project fluids to project transport and storage infrastructure or where a capture site supplies captured fluids to project transport infrastructure from which fluid is exported, the apportionment factor applied in the quantification of project emissions from that source shall be $AF_{Capture_Project,i,y}$ (i.e.,

$$AF_{Project,i,y} = AF_{Capture_Project,c,y}.$$

The portion of emissions attributable to the project at capture site i in year y , $AF_{Capture_Project,c,y}$, is determined as follows:

$$\begin{aligned}
 & AF_{Project_Capture_{c,y}} \\
 &= \left(\frac{\sum_{i=c} Q_{Project_{i,y}}}{\sum_{i=c} (Q_{Project_{i,y}} + Q_{Non-project_{i,y}})} \right) \\
 & \quad \text{Project Fraction} \\
 & \times \left(1 - \frac{\sum_{k \in E_{c,y}} Export_{k,y}}{(\sum_{s \in I_{c,y}} Q_{inj_{s,y}}) + (\sum_{k \in E_{c,y}} Export_{k,y})} \right) \\
 & \quad \text{Export Fraction} \\
 & \times \left(\frac{(\sum_{s \in I_{c,y}} Q_{inj_{s,y}}) + (\sum_{k \in E_{i,y}} Export_{k,y})}{\sum_{i \in C_{i,y}} (Q_{Project_{i,y}} + Q_{Non-project_{i,y}})} \right) \\
 & \quad \text{Shrinkage Factor}
 \end{aligned}
 \tag{Equation 7}$$

Where:

- $E_{c,y}$ = The set of export sites downstream of capture site c in year y
- $I_{c,y}$ = The set of injection sites downstream of capture site c in year y
- $C_{i,y}$ = The set of capture sites upstream of injection sites in set $I_{c,y}$
- $E_{i,y}$ = The set of export sites downstream of capture sites in set $C_{i,y}$

- ii. Where an emission is caused, either directly or indirectly, by activity at a transport site conveying both project and non-project fluids or where a transport site supplies captured fluids to or exports captured fluids from project transport infrastructure, the apportionment factor applied in the quantification of project emissions from that source shall be $AF_{Transport_Project,j,y}$ (i.e.,

$$AF_{Project,i,y} = AF_{Transport_Project,j,y}.$$

- a. The portion of emissions attributable to the project at transportsite j in year y , $AF_{Transport_Project,j,y}$, is determined as follows:

$$\begin{aligned}
 & AF_{\text{ProjectTransport}_{i,j,y}} \\
 &= \left(\frac{\sum_{i \in C_{j,y}} Q_{\text{ProjectTransport}_{i,j,y}}}{\sum_{i \in C_{j,y}} (Q_{\text{ProjectTransport}_{i,j,y}} + Q_{\text{Non-projectTransport}_{i,j,y}})} \right) \\
 & \quad \text{Project Fraction} \\
 & \times \left(1 - \frac{\sum_{k \in E_{j,y}} \text{Export}_{k,y}}{\left(\sum_{s \in I_{j,y}} Q_{\text{inj}_{s,y}} \right) + \left(\sum_{k \in E_{j,y}} \text{Export}_{k,y} \right)} \right) \\
 & \quad \text{Export Fraction} \\
 & \times \left(\frac{\left(\sum_{s \in I_{i,y}} Q_{\text{inj}_{s,y}} \right) + \left(\sum_{k \in E_{i,y}} \text{Export}_{k,y} \right)}{\sum_{i \in C_{i,y}} (Q_{\text{Project}_{i,y}} + Q_{\text{Non-project}_{i,y}})} \right) \\
 & \quad \text{Shrinkage Factor}
 \end{aligned}
 \tag{Equation 8}$$

Where:

$Q_{\text{ProjectTransport}_{i,j,y}}$	=	Mass of project fluid transported from capture site i through transport site j in year y
$Q_{\text{Non-projectTransport}_{i,j,y}}$	=	Mass of non-project fluid transported from capture site i through transport site j in year y
$C_{j,y}$	=	The set of capture sites upstream of transport site j in year y
$I_{j,y}$	=	The set of injection sites downstream of transport site j in year y
$E_{j,y}$	=	The set of export sites downstream of transport site j in year y
$C_{i,y}$	=	The set of capture sites upstream of injection sites in set $I_{j,y}$
$E_{i,y}$	=	The set of export sites downstream of capture sites in set $C_{i,y}$
$I_{i,y}$	=	The set of injection sites downstream of capture sites in set $C_{i,y}$

- iii. Where an emission is caused, either directly or indirectly, by activity at an injection site which is supplied with both project

and non-project streams, the apportionment factor applied in the quantification of project emissions from that source shall be $AF_{ProjectInjection_{s,y}}$ (i.e., $AF_{Project_{i,y}} = AF_{ProjectInjection_{s,y}}$).

- a. The portion of emissions attributable to the project activity at injection site s in year y , $AF_{ProjectInjection_{s,y}}$, is determined as follows:

$$AF_{ProjectInjection_{s,y}} = \left(\frac{\sum_{i \in C_{s,y}} Q_{Project_{i,y}}}{\sum_{i \in C_{s,y}} (Q_{Project_{i,y}} + Q_{Non-project_{i,y}})} \right) \times \left(1 - \frac{\sum_{k \in E_{s,y}} Export_{k,y}}{\sum_{s \in I_{s,y}} Q_{inj_{s,y}} + \sum_{k \in E_{s,y}} Export_{k,y}} \right) \times \left(\frac{\sum_{s \in I_{s,y}} Q_{inj_{s,y}} + \sum_{k \in E_{s,y}} Export_{k,y}}{\sum_{i \in C_{s,y}} (Q_{Project_{i,y}} + Q_{Non-project_{i,y}})} \right)$$

Equation 9

Project Fraction
Export Fraction
Shrinkage Factor

Where:

- $C_{s,y}$ = The set of capture sites upstream of injection site s in year y
- $E_{s,y}$ = The set of export sites downstream of capture site s in set $C_{s,y}$
- $I_{s,y}$ = The set of injection sites downstream of capture site s in set $C_{s,y}$

- iv. In all other cases, the apportionment factor applied in the quantification of project emissions shall be 1 (i.e., $AF_{Project,i,y} = 1$)

Project emissions from biomass in year y , $PE_{P1,y}$, are determined as follows:

$$PE_{P1,y} = \sum_i PE_{P1i,y}$$

Equation 10

Project developers shall determine project emissions from biomass at biomass fermentation facility i in year y , $PE_{P1i,y}$, according to CDM Tool 16 for any biomass fermentation facility to which either of the following apply:

- a. The facility is new and ferments renewable biomass which is either cultivated in dedicated plantations or derived from biomass residues. Project developers may allocate emissions from biomass to the project

using a suitable method per ISO 14044 or similar product LCA standards; otherwise, the biomass emissions are conservatively attributed solely to the CO₂ captured by the project at the facility, or

- b. The facility does not receive revenue for products (excluding CO₂) manufactured at the facility via fermentation of the same renewable biomass which emits CO₂ is captured by the project.
- c. In all other cases, project emissions from biomass at biomass fermentation facility i in year y, $PE_{P1i,y}$, are assumed to be zero.

Project emissions from land clearing and soil carbon loss from installation of carbon capture, transportation, storage, and injection facilities in year y, PE_{P3y} , are determined as follows:

$$PE_{P3y} = \sum_i \sum_{GHG} (M_{dLUC_i, GHG} \times GWP_{GHG}) \quad \text{Equation 11}$$

And:

$$M_{dLUC_i, GHG} = Area_{dLUC_i} \times EF_{dLUC_i, GHG} \quad \text{Equation 12}$$

Where:

$M_{dLUC_i, GHG}$	=	GHG emissions from land clearing and soil carbon loss from installation of carbon capture, transportation, storage, and injection facilities in at site i in year y (t GHG)
GWP_{GHG}	=	Global warming potential of GHG (t CO ₂ e per t GHG)
$Area_{dLUC_i}$	=	Area affected by direct land use changes from construction of project infrastructure at site i in year y (m ² , ha, acre, or other)
$EF_{dLUC_i, GHG}$	=	Soil and aboveground land use change GHG emissionsfactor for site i (t GHG per m ² , ha, acre, or other)

- a. Project emissions from land clearing and soil carbon loss shall be amortised over the project's remaining crediting period.

Project emissions from construction of carbon capture, transportation, and storage

facilities and well drill and service in year y , PE_{P4y} , are determined as follows:

$$PE_{P4y} = \sum_i \sum_{GHG} (Q_{DS,i,y} \times w_{GHG} \times GWP_{GHG}) \quad \text{Equation 13}$$

Where:

$Q_{DS,i,y}$ = Mass of vent gas emitted during well drill and service at site i in year y (kg, tonnes, or other)

w_{GHG} = Mass fraction of GHG in vent gas (% GHG by Mass)

- a. Project emissions from construction of carbon capture, transportation, and storage facilities and well drill and service which occur before the crediting period start date shall be amortised over the project crediting period.

Project emissions from production and delivery of material inputs (such as amine-based sorbents, glycols, or lubricants) consumed in year y , PE_{P5y} , are determined as follows:

$$PE_{P5y} = \sum_i (PE_{P5i,y} \times AF_{Project_{i,y}}) \quad \text{Equation 14}$$

And:

$$PE_{P5i,y} = \sum_j \sum_{GHG} (MI_{i,j} \times EF_{MI_{j,GHG}} \times GWP_{GHG}) \quad \text{Equation 15}$$

Where:

$MI_{i,j}$ = Quantity of material inputs of type j consumed at site I in year y (kg, tonnes, L, m^3 or other)

$EF_{MI_{j,GHG}}$ = GHG emission factor for material input of type j (t GHG per kg, tonnes, L, m^3 or other)

Project emissions from fuel extraction, processing, and delivery in year y, $PE_{P6,y}$, are determined as follows:

$$PE_{P6,y} = \sum_i (PE_{P6,i,y} \times AF_{Project,i,y}) \quad \text{Equation 16}$$

And:

$$PE_{P6,i,y} = \sum_j \sum_{GHG} \left(\left(Fuel_{j,i,y} \times EF_{EPD_{Fuel_j,GHG}} \times GWP_{GHG} \right) + \left(Fuel_{j,Generation,i,y} \times \right. \right. \\ \left. \left. Generation_{CCGS_{i,j,y}} \times EF_{EPD_{Fuel_j,GHG}} \times GWP_{GHG} \right) \right) \quad \text{Equation 17}$$

And:

$$Generation_{CCGS_{i,j,y}} = \frac{\left(\frac{Electricity_{CCGS_{i,j,y}}}{\eta_{Electricity_j}} \right) + \left(\frac{Heat_{CCGS_{i,j,y}}}{\eta_{Heat_j}} \right)}{\left(\frac{Electricity_{Total_{j,y}}}{\eta_{Electricity_i}} \right) + \left(\frac{Heat_{Total_{j,y}}}{\eta_{Heat_i}} \right)} \quad \text{Equation 18}$$

Where:

$Fuel_{j,i}$ = Quantity of fuel of type j consumed at site i by the project for purposes other than generation of electricity and/or co-generation of heat in year y (L, m³, kg, or other)

$Fuel_{j,Generation,i,y}$ = Quantity of fuel of type j consumed at site i by grid-disconnected captive sources to generate electricity and/or co-generate heat in year y (L, m³, kg, or other)

$EF_{EPD_{Fuel_j,GHG}}$ = Emission factor associated with the extraction, processing, and delivery of fuel j (t GHG per L, m³, kg or other)

$Generation_{CCGS_{i,j,y}}$ = Portion of the generation of energy (electrical and thermal) supplied to the project at site i by grid-disconnected captive power source j in year y (unitless)

Electricity _{CCGS_{i,j,y}}	=	Quantity of electricity supplied to the project at site i by grid-disconnected captive power source j in year y (MWh _E , GJ, or other)
Heat _{CCGS_{i,j,y}}	=	Quantity of heat supplied to the project at site i and co- generated by captive power source j in year y (MWh _T , GJ, or other)
$\eta_{\text{Electricity}_j}$	=	Efficiency of electricity production of captive power source j in year y (unitless)
η_{Heat}	=	Efficiency of heat production of captive power source j in year y (unitless)
Electricity _{Total_{j,y}}	=	Total quantity of electricity generated by grid- disconnected captive power source j in year y (MWh, GJ, or other)
Heat _{Total_{j,y}}	=	Total quantity of heat co-generated by captive power source j in year y (MWh _T , GJ, or other)

Project emissions from consumption of electricity from grid-connected captive and non-captive power sources in year y, PE_{P7_y} , are determined as follows:

$$PE_{P7_y} = \sum_i (PE_{P7_{i,y}} \times AF_{\text{Project}_{i,y}})$$

Equation 19

And:

$$PE_{P7_{i,y}} = \sum_j \left(\text{Electricity}_{i,j,y} \times (1 + TDL_{i,y}) \times EF_{GCPP_{j,y}} \right)$$

Equation 20

Where:

Electricity _{i,j}	=	Quantity of electricity consumed at site i from the grid-connected power source j in year y (MWh _E)
EF _{GCPP_{j,y}}	=	Emissions factor associated generation of electricity at the grid-connected power source j in year y (t CO ₂ e per MWh _E)
TDL _{i,y}	=	Average transmission and distribution losses for provided electricity to site i in year y (unitless)

- b. Where project consumption of electricity from grid-connected captive and non-captive power sources is measured using a single meter, the project developer shall assign to the grid-connected non-captive sources any metered electricity consumption exceeding the quantities (accounting for transmission and distribution losses) which are demonstrated to have been provided by grid-connected captive power sources in the monitoring period.
- c. Where project developers are unable to demonstrate full and uncontested ownership of the associated carbon attributes for a quantity of electricity supplied by captive sources, project developer shall consider this quantity as having been supplied to the project by a regional or national grid and quantify project emissions from consumption of electricity conservatively, using the greatest grid emissions intensity applicable to the project area.

Emissions intensity factor (EF_{GCPP_{j,y}}) for grid-connected captive and non-captive power sources – using TOOL 07:

The EF_{GCPP_{j,y}} also called as EF_{grid,CM,y} by the CDM TOOL 07, is Emission factor for the combined margin (CM), resulted of a weighted average of two emission factor pertaining to the electricity system: the operating margin (OM) and build margin (BM).

$$EF_{GCPP,j,y} = EF_{grid,CM,y}$$

In Brazil, the Designated National Authority (DNA), which is the Ministry of Science and Technology (MCTI), of Government of Brazil - provides this data.

The Brazilian DNA has published the delineation of SIN to be adopted for the purposes of CDM-projects. As per Resolution N° 8 of the Brazilian DNA, the electric grid considered in this project activity is considered as a single system consisted by the sub-markets of SIN as the definition of the electric system of the project. Off-grid plants will not be included in the calculation of $EF_{grid,CM,y}$.

$EF_{grid,CM,y}$ will be calculated using the latest version of the "Tool to calculate the emission factor for an electricity system". The following formula apply:

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times W_{OM} + EF_{grid,BM} \times W_{BM} \quad \text{Equation 21}$$

Where:

$EF_{grid,CM,y}$	=	Combined margin CO ₂ emission factor in year y (tCO ₂ /MWh)
$EF_{grid,BM,y}$	=	Build margin CO ₂ emission factor in year y (t CO ₂ /MWh)
$EF_{grid,OM,y}$	=	Operating margin CO ₂ emission factor in year y (t CO ₂ /MWh)
W_{OM}	=	Weighting of operating margin emissions factor (50%)
W_{BM}	=	Weighting of build margin emissions factor (50%)

The weighting factors for build and operating margin were selected according to guidance provided in the "Tool to calculate the emission factor for an electricity system".

Project emissions from grid-disconnected captive power sources in year y, PE_{p8y} , are determined as follows:

$$PE_{p8y} = \sum_i (PE_{p8i,y} \times AF_{Project_{i,y}}) \quad \text{Equation 22}$$

- a. Grid-disconnected captive power sources which do not consume fuel (fossil or otherwise) are deemed to have no emissions. In all other cases, project developers shall apply CDM TOOL 05 to determine project emissions from grid-disconnected captive power sources at site i in year y, $PE_{p8i,y}$.
 - i. In applying CDM TOOL 05, the project developer shall also

include biomass consumed by the grid-disconnected captive power sources applying the guidance provided for $Fuel_{j,Generation,i}$ and $EF_{Fuel,j,GHG}$ in monitoring section.

- ii. If grid-disconnected captive power sources combust fuel to generate electricity and/or heat and do not export or supply electricity and/or heat to consumption sources outside of the project boundary, there is no other reason to separately report on $PE_{p8,y}$, as fuel consumption is accounted for in $PE_{p9,y}$.

Project emissions from fuel consumption at site i in year y, $PE_{p9,y}$, are determined as follows:

$$PE_{p9,y} = \sum_i (PE_{p9,i,y} \times AF_{Project,i,y}) \quad \text{Equation 23}$$

And:

$$PE_{p9,i,y} = \sum_j \sum_{GHG} \left(\left(Fuel_{j,i,y} \times EF_{Fuel,j,GHG} \times GWP_{GHG} \right) + \left(Fuel_{j,Generation,i,y} \times Generation_{CCGS_{i,y}} \times EF_{Fuel,j,GHG} \times GWP_{GHG} \right) \right) \quad \text{Equation 24}$$

Where:

$EF_{Fuel,j,GHG}$ = Emissions factor for combustion of fuel of type j (t GHG per L, m³, kg or other)

- d. For transport sites, project developers shall apply [CDM TOOL 12](#) to determine project emissions from fuel consumption at transport site i in year y, $PE_{p9,i,y}$.
- e. For avoidance of doubt and consistency with [5.6.9 I](#), the project developer shall not consider in the determination of $PE_{p9,y}$ quantities of $Fuel_{j,Generation,i}$ that are considered in the determination of $PE_{p8,y}$.

Project emissions from emissions from venting at injection sites, $PE_{p16,y}$, are determined as follows:

$$PE_{P16y} = \sum_s (PE_{P16s,y} \times AF_{ProjectInjection_{s,y}})$$

Equation 25

And:

$$PE_{P16s,y} = \left(V_{gas\ vented_{s,y}} \times w_{CO_2inj_{s,y}} \times \rho_{CO_2} \right) \times 0.001$$

Equation 26

Where:

$V_{gas\ vented_{s,y}}$ = Volume of gas vented to atmosphere downstream of the injection meter at injection site s in year y (m^3)

0.001 = Conversion of kg to tonnes

5.1.2 | Project emissions from fugitive emissions at injection sites PE_{P17y} are determined as follows:

$$PE_{P17y} = \sum_s (PE_{P17s,y} \times AF_{ProjectInjection_{s,y}})$$

Equation 27

And:

$$PE_{P17s,y} = \sum_k \left(Source_{k,s,y} \times EF_{Source_k} \times Time_{s,y} \times w_{CO_2inj_{s,y}} \times \rho_{CO_2} \times 0.001 \right)$$

Equation 28

Where:

$Source_{k,s,y}$ = Number of fugitive gas sources of type k downstream of the injection meter at injection site s in year y

EF_{Source_k} = Emission rate of fugitive gas source type k (m^3 per hour)

$Time_{s,y}$ = Operating hours at injection site s in year y (hours)

0.001 = Conversion of kg to tonnes

5.1.3 | Project emissions from emissions from the subsurface to atmosphere, PE_{P19y} , are determined as follows:

$$PE_{P19y} = M_{CO_2\text{leaked}_y} \times \text{Cumulative Allocation}_{\text{Project}_y} \quad \text{Equation 29}$$

Where:

$M_{CO_2\text{leaked}_y}$ = Mass of CO_2 leaked from the subsurface to atmosphere in year y (t CO_2e)

$\text{Cumulative Allocation}_{\text{Project}_y}$ = Portion of CO_2 supplied to project injection sites since the project start (y_0) which is attributable to CO_2 captured by the project through to the end of year y (unitless)

$$\text{Cumulative Allocation}_{\text{Project}_y} = \frac{\sum_{y=y_0}^y BE_{B1y}}{\sum_{y=y_0}^y \sum_s (Q_{inj_{s,y}} \times w_{CO_2inj_{s,y}})} \quad \text{Equation 30}$$

Leakage Emissions (LE_y)

Total leakage emissions in year y , LE_y , are determined as follows:

$$LE_y = LE_{\text{Biomass}_y} \quad \text{Equation 31}$$

Where:

LE_y = Leakage emissions in year y (t CO_2e)

LE_{Biomass_y} = Leakage emissions from biomass in year y (t CO_2e)

Leakage may occur outside of the project boundary and may involve emissions due to shift of pre-project activities, diversion of biomass residues from other applications, and processing and transportation of biomass residues outside of the project boundary.

Leakage from biomass in year y , $LE_{Biomass_y}$ are determined as follows:

$$LE_{Biomass_y} = \sum_i (LE_{L1_{i,y}} + LE_{L2_{i,y}}) \quad \text{Equation 32}$$

Where:

$LE_{L1_{i,y}}$ = Leakage from biomass at biomass fermentation facility i in year y (t CO₂e)

$LE_{L2_{i,y}}$ = Leakage from biomass due to beneficial combustion at project site i in year y (t CO₂e)

a. The project may capture CO₂ from the fermentation of renewable biomass from new or existing biomass fermentation facilities. As such, various approaches are required to determine leakage from biomass at biomass fermentation facility i in year y , $LE_{L1_{i,y}}$:

- i. Where an existing facility has materially increased its consumption of biomass to the benefit of the project (i.e., condition 5.7.4 |a is met and condition 5.7.4 |b is met for at least one renewable energy product p participating in an eligible program – see APPENDIX 1|) and the biomass has been demonstrated to conform with the conditions of Option 2 of monitoring parameter Renewability of biomass _{i,n,k} , project developers shall estimate leakage emissions from biomass at biomass fermentation facility i in year y , $LE_{L1_{i,y}}$, using CDM TOOL 16 and based solely on the materially increased quantities and types of biomass consumed at the facility, Biomass_{increase i,b,y} , calculated using Equation 32 for each renewable energy product p that breached the materiality threshold.

$$\begin{aligned} \text{Biomass}_{\text{increase},i,b,y} &= \text{Biomass}_{\text{total},i,b,y} \\ &\times \max_p \left(\frac{\text{Output}_{\text{current},i,p} - \text{Output}_{\text{initial},i,p}}{\text{Output}_{\text{initial},i,p}} \right) \end{aligned} \quad \text{Equation 33}$$

$\text{Biomass}_{\text{total},i,b,y}$ = The total quantity of the relevant renewable biomass of type b consumed by biomass fermentation facility i in year y (tonnes or other, dry basis).

$\text{Output}_{\text{current},i,p}$ = The trailing three-year average quantity of renewable energy product p produced by the biomass fermentation facility i ending in the current period (kg, m³, GJ, or other).

$\text{Output}_{\text{initial},i,p}$ = The trailing three-year average quantity of renewable energy product p produced by the biomass fermentation facility i in the initial period (kg, m³, GJ, or other).

This calculation conservatively attributes leakage potential based on the highest observed disproportionate growth rate among all eligible products, applying it to the total biomass consumed. Project developers may allocate leakage emissions from biomass to the project using a suitable method per [ISO 14044](#) or similar product LCA standards; otherwise, the biomass emissions are conservatively attributed solely to the CO₂ captured by the project at the facility.

- ii. Where the biomass is consumed at an existing facility which has not materially increased its consumption of biomass to the benefit of the project, and where the biomass consumed by that facility has been demonstrated to conform with the conditions of Option 2 of monitoring parameter Renewability of biomass_{i,n,k}, the project does not contribute to positive leakage from biomass outside the project boundary and thus leakage from biomass at biomass fermentation facility i in year y, LE_{L1,i,y} is assumed to be zero.
- iii. Where the biomass consumed at the facility has been demonstrated to conform with the conditions described for Option

2⁵³ of monitoring parameter Renewability of biomass_{i,n,k}, project developers shall estimate leakage emissions from biomass at biomass fermentation facility i in year y, $LE_{L1,i,y}$ in accordance with CDM TOOL 16. Project developers may allocate leakage emissions from biomass to the project using a suitable method per ISO 14044 or similar product LCA standards; otherwise, the biomass emissions are conservatively attributed solely to the CO₂ captured by the project at the facility.

- b. Biomass may be combusted to the benefit of the project, such as to generate electricity or heat consumed by the project. Project developers shall estimate the leakage from biomass due to beneficial combustion at project site i in year y, $LE_{L2,i,y}$ in accordance with CDM TOOL 16, this estimation shall consider all quantities of biomass combusted to the benefit of the project, irrespective of the renewability of that biomass.

A biomass fermentation facility has materially increased its consumption of biomass to the benefit of the project if and only if both of the following conditions are met:

- a. The facility has undertaken capital expenditures intended to increase its production output capacity for a renewable energy product p participating in an eligible program (see APPENDIX 1|). This event must have occurred after the Project Start Date (or the date the facility was added to the project, whichever is later). Evidence of this expenditure and its intended purpose (e.g., engineering designs showing modifications, permits for expansion, purchase orders for larger/additional key equipment) must be provided.
- b. For at least one renewable energy product (p) manufactured at the facility and participating in an eligible program (see APPENDIX 1|), the relative growth in the facility's Actual Production Output (Output) for that product ($Output_p$) significantly outpaces the relative growth in Market Demand (Demand) for that specific product ($Demand_p$) within the relevant

⁵³ the Gold Standard Secretariat has officially confirmed that the reference to "Option 2" in Section 5.7.3(a)(iii) is a typographical/editorial error. Gold Standard clarified that Sections 5.7.3(i) and 5.7.3(ii), which address leakage assessment for existing facilities, correctly refer to "Option 2", whereas Section 5.7.3(a)(iii) should refer to "Option 1". The document was provided as evidence.

eligible program's market. Specifically, that the materiality ratio, $Ratio_{Materiality_p}$, calculated using Equation 1 below for any renewable energy product p is 1.05 or greater.

$$Ratio_{Materiality_p} = \frac{\left(\frac{Output_{current_{i,p}} - Output_{initial_{i,p}}}{Output_{initial_{i,p}}} \right)}{\left(\frac{Demand_{current_{i,p}} - Demand_{initial_{i,p}}}{Demand_{initial_{i,p}}} \right)} \quad \text{Equation 1}$$

Where:

$Demand_{current_{i,p}}$ = The trailing three-year average market demand for renewable energy product p produced by the biomass fermentation facility i in the current period (kg, m³, GJ, or other).

$Demand_{initial_{i,p}}$ = The trailing three-year average market demand for renewable energy product p produced by the biomass fermentation facility i in the initial period (kg, m³, GJ, or other).

- i. Where $Ratio_{Materiality_p} \geq 1.05$ for any renewable energy product p participating in an eligible program (see APPENDIX 1) , the increase in actual output for that product is considered to materially outpace its market demand growth, and condition 0b is met for the facility overall, triggering the leakage calculation, as .described in 5.7.3. Where $Output_{initial_p}$ or $Demand_{initial_p}$ are zero (indicating new production or new markets, respectively, at the facility for renewable energy product p) or the denominator $\frac{Demand_{current_p} - Demand_{initial_p}}{Demand_{initial_p}}$ is zero or negative (indicating flat or declining market demand for renewable energy product p) any increase in production output for renewable energy product p ($Output_p$) automatically satisfies condition 0a for that product.

Total emissions removals from the project activity in year y, ER_y are determined as follow:

$$ER_y = BE_y - PE_y - LE_y \quad \text{Equation 35}$$

Where:

ER_y	=	Emission removals in year y (t CO ₂ e)
BE_y	=	Baseline emissions in year y (t CO ₂ e)
PE_y	=	Project emissions in year y (t CO ₂ e)
LE_y	=	Leakage emissions in year y (t CO ₂ e)

SDG 02: Zero Hunger

For the calculation of the impact on SDG 02, the project developer will monitor the number of groups of farmers (corn producers) who have adopted sustainable practices promoted by the project.

According to the FS Socio-environmental Responsibility Policy in the Supply Chain and Sales⁵⁴, “Group” corresponds to the joint, family or corporate action, subordinate or coordinated, of individuals and/or legal entities, in common interests. The configuration of the Group gives rise to joint liability among the individuals and/or legal entities that comprise it.

SDG 04: Quality Education

Training activities will be implemented based on a structured training approach. An annual training plan will be developed and updated over time, considering project needs, operational requirements and identified capacity building priorities.

Trainings will be provided periodically in accordance with this planning and may include operational, technical and health and safety topics related to the project.

Records of training activities will be maintained, including attendance lists and supporting documentation.

SDG 07: Biofuel production with Carbon Capture and Storage

For the calculation of the impact on SDG 07, the project developer will monitor the amount of biofuel (ethanol) with Carbon Capture and Storage produced at Lucas do Rio Verde facility.

⁵⁴ Available at: <https://api.mziq.com/mzfilemanager/v2/d/34aeec8a-d08e-440f-ad7f-324e1e1e7745/4d69a148-e8e8-2b65-1b49-73ff1e805cfb?origin=1>

SDG 08: Decent work and economic growth

The project is expected to generate both direct and indirect employment. Direct jobs correspond to employees hired by FS for the operation and maintenance of the BECCS system. Indirect jobs correspond to personnel engaged by contracted companies providing services related to the project activity (e.g. monitoring, maintenance and operational support).

Due to the nature of indirect employment, the number of such jobs may vary over time and may not always be tracked at an individual level. Therefore, this parameter will be monitored based on the best available information, including contractor documentation and internal estimates, and reported as an annual average.

SDG 09: Proportion of small-scale industries in total industry value added.

For the calculation of the impact on SDG 09, the project developer will monitor the number of companies directly engaged in the project value chain during the monitoring period.

For ex-ante purposes, this has been estimated to be zero in the baseline scenario, since the BECCS project would not be implemented and, therefore, no project-related engagement of companies in the project value chain would occur.

For the project scenario, the annual average is estimated at 10 companies directly engaged in project-related activities. This estimate includes companies that may enter, remain in, or withdraw from the project value chain during each monitoring period, based on the best available project records.

SDG 15: Life on land

For the calculation of the impact on SDG 15, the project developer will monitor the area of trees planted ~~number of rural producers~~ that formally joined the **Forest Recuperation Program**⁵⁵ developed by the project developer.

The total area of Trees Planted refers to areas of land:

- on which trees were planted;

⁵⁵ Name of the Program to be confirmed by the project developer

- on which innovative regeneration techniques were applied, such as drones disperse seedpods;
- on which Assisted Natural Regeneration (ANR) technics are being developed.

The total area will be calculated based on satellite images of the areas subject to recuperation and restauration activities of the farmers that joined the program. Recovered areas will be monitored up to three years after the beginning of the restauration activities, at least.

B.6.2 Data and parameters fixed ex ante

SDG13

Data/parameter	T_{ref}
Unit	Kelvin
Description	Temperature at normal conditions (Parameter ID 01 from methodology).
Source of data	Default value as per the CDM methodological tool 08 "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 03.0), table 6
Value(s) applied	273.15
Choice of data or Measurement methods and procedures	Default value
Purpose of data	Calculation of baseline and project emissions. Safeguarding
Additional comment	Data from pressure and temperature compensated instruments shall be converted to the project's reference conditions. Conversion shall be done using the same pressure and/or temperature used for the specific meter calibration.

Data/parameter	P_{ref}
Unit	Pa

Description	Total pressure at normal conditions (Parameter ID 02 from methodology).
Source of data	Default value as per the CDM methodological tool 08 "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 03.0), table 5.
Value(s) applied	101,325
Choice of data or Measurement methods and procedures	Default value
Purpose of data	Calculation of baseline and project emissions. Safeguarding
Additional comment	Data from pressure and temperature compensated instruments shall be converted to the project's reference conditions. Conversion shall be done using the same pressure and/or temperature used for the specific meter calibration.

Data/parameter	$Q_{s,i}$
Unit	tCO ₂ per day (Parameter ID 03 from Tool 03)
Description	Mass flow rate of CO ₂ through leakage pathway i at storage site s in the event of a loss of storage site integrity
Source of data	Measured
Value(s) applied	For ex-ante estimative, it is 0. It will be measured, if applicable.
Choice of data or Measurement methods and procedures	Data shall be corrected to the activity's reference temperature and pressure. Per 12.1.5 and 12.2.4 g, the estimated mass flow rate of CO ₂ through each leakage pathway in the event of a loss of storage site integrity shall be specified in the storage site monitoring program document.
Purpose of data	Activity emissions
Additional comment	

Data/parameter	$f_{i,z,y}$
Unit	samples per day
Description	Sampling frequency of monitoring technique z for leakage pathway i during period y . (Parameter ID 04 from Tool 03)
Source of data	Storage site monitoring program specifications
Value(s) applied	For ex-ante estimative, it is 0. It will be detailed, if applicable.
Choice of data or Measurement methods and procedures	Per 7.1.5 and 7.2.4 g., the sampling frequency for each parameter used to monitor each leakage pathway shall be specified in the storage site monitoring program document.
Purpose of data	Used to determine the fraction of period y during which leakage pathway i is not monitored by monitoring technique z , $F_{unmonitored i,z,y}$. Used to determine the mass of CO ₂ which could have migrated through leakage pathway i , without detection by monitoring technique z in period y , $MCO_{2undetected i,z,y}$.
Additional comment	

Data/parameter	DT CO ₂ i,z
Unit	t CO ₂ , t CO ₂ per day, or ppmCO ₂
Description	Threshold for detection of CO ₂ migration through leakage pathway i using monitoring technique z . (Parameter ID 05 from Tool 03)
Source of data	Storage site monitoring program document
Value(s) applied	For ex-ante estimative, it is 0. It will be detailed, if after starting the project.
Choice of data or Measurement methods and procedures	Per 7.1.5 and 7.2.4 g., the detection thresholds for sampling each parameter used to monitor each leakage pathway shall be specified in the storage site monitoring program document. Data shall be corrected to the project's reference temperature and pressure.

Purpose of data	Used to determine the mass of CO ₂ which could have migrated through leakage pathway i, without detection by monitoring technique z in period y, $MC_{O2undetectedi,z,y}$.
Additional comment	

Data/parameter	MM CO ₂
Unit	kg/kmol
Description	Molar mass of component CO ₂ . (Parameter ID 03 from methodology).
Source of data	Default value as per the CDM methodological tool 08 "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 03.0), table 2.
Value(s) applied	44.01
Choice of data or Measurement methods and procedures	Default value
Purpose of data	Calculation of baseline emissions.
Additional comment	N/A

Data/parameter	MM N
Unit	kg/kmol
Description	Molar mass of component N. (Parameter ID 03 from methodology).
Source of data	Default value as per the CDM methodological tool 08 "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 03.0), table 3.
Value(s) applied	28.01
Choice of data or Measurement methods and procedures	Default value

Purpose of data	Calculation of baseline emissions.
Additional comment	N/A

Data/parameter	MM O ₂
Unit	kg/kmol
Description	Molar mass of component O ₂ . (Parameter ID 03 from methodology).
Source of data	Default value as per the CDM methodological tool 08 "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 03.0), table 2.
Value(s) applied	32.00
Choice of data or Measurement methods and procedures	Default value
Purpose of data	Calculation of baseline emissions.
Additional comment	N/A

Data/parameter	ρ_{GHG}
Unit	kg/m ³
Description	Density of GHG at the project developer's chosen references conditions, T_{ref} and P_{ref} . (Parameter ID 04 from methodology).
Source of data	measured
Value(s) applied	CO ₂ expected density: Well head: 745.9 kg/m ³ Bottom: 843.1 kg/m ³
Choice of data or Measurement methods and procedures	Continuous density measurement will be taken (minimum of one measurement every 15 minutes)

Purpose of data	Calculation of baseline and project emissions.
Additional comment	Data from pressure and temperature compensated instruments shall be converted to the project's reference conditions. Conversion shall be done using the same pressure and/or temperature used for the specific meter calibration.

Data/parameter	GWP_{GHG}
Unit	t CO ₂ e per t GHG
Description	100-year global warming potential of GHG. (Parameter ID 05 from methodology).
Source of data	IPCC Fifth Assessment Report, 2014 (AR5) - https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_Chapter08_FINAL.pdf
Value(s) applied	CH ₄ : 28 t CO ₂ e/t CH ₄ N ₂ O: 265 t CO ₂ e/t N ₂ O
Choice of data or Measurement methods and procedures	Default value from IPCC Fifth Assessment Report, 2014 (AR5)
Purpose of data	Calculation of baseline and project emissions.
Additional comment	N/A

Data/parameter	$EF_{MI_j, GHG}$
Unit	t CO ₂ e per tonnes
Description	GHG emission factor for triethylene glycol. GHG emission factor for lubricating oil. (Parameter ID 07 from methodology).
Source of data	Market for triethylene glycol triethylene glycol Cutoff, U – ROW – Ecoinvent 3.11

	Market for lubricating oil Lubricating oil Cutoff, U – ROW – Ecoinvent 3.11
Value(s) applied	TEG: 2.97 Lubricating oil: 1.72
Choice of data or Measurement methods and procedures	Market for triethylene glycol triethylene glycol Cutoff, U – ROW – Ecoinvent 3.11 Market for lubricating oil Lubricating oil Cutoff, U – ROW – Ecoinvent 3.11
Purpose of data	Calculation of project emissions.
Additional comment	N/A

Data/parameter	EF_{Source_s}
Unit	m ³ per hour
Description	Emission rate of fugitive gas source type i. (Parameter ID 10 from methodology).
Source of data	The following sources are permitted, in order of preference: 1. Manufacturers specifications for the equipment type. 2. Subpart W of the US EPA GHG Reporting Program, or equivalent national regulations and/or programs. 3. An equivalent life-cycle method.
Value(s) applied	For ex-ante estimative, it is 0. It will be included if any fugitive emissions at injection site occurs.
Choice of data or Measurement methods and procedures	Default value, using the sources permitted by the methodology.

Purpose of data	Used to determine project emissions from fugitive emissions at injection sites, PE_{p16y} .
Additional comment	To be monitored when the project is operating.

Data / Parameter	W_{BM}
Unit	%
Description	Weighting of build margin emissions factor
Source of data	Applicable default value as per the CDM methodological tool "Tool to calculate the emission factor for an electricity system" (TOOL 07, v7.0).
Value(s) applied	For ex-ante estimative, it is 0. 50% during the 5-year renewable crediting period of the project activity will be used, if applicable.
Choice of data or Measurement methods and procedures	Default value
Purpose of data	Used to determine project emissions from consumption of electricity from grid-connected non-captive power sources in year y , PE_{p7y} , if applicable in maintenance and/or emergency period.
Additional comment	N/A

Data / Parameter	W_{OM}
Unit	%
Description	Weighting of build margin emissions factor
Source of data	Applicable default value as per the CDM methodological tool "Tool to calculate the emission factor for an electricity system" (TOOL 07, v7.0).
Value(s) applied	For ex-ante estimative, it is 0. 50% during the 5-year renewable crediting period of the project activity will be used, if applicable.

Choice of data or Measurement methods and procedures	Default value
Purpose of data	Used to determine project emissions from consumption of electricity from grid-connected non-captive power sources in year y , PE_{p7y} , if applicable in maintenance and/or emergency period.
Additional comment	N/A

B.6.3 Ex ante estimation of SDG Impact

>>

SDG 13:

As mentioned above, the project activity uses the “Methodology for biomass fermentation with carbon capture and geologic storage”, version 2.0 and applicable tools. The methods for calculating baseline emissions, project emissions, leakage emissions and emission reductions are presented below:

Determination of ex-ante estimations for Baseline Emissions (BE_y):

According to the Methodology for biomass fermentation with carbon capture and geologic storage, version 2.0, the baseline emissions (BE_y) from the project in year y are determined as follows:

$$BE_y = \sum_i BE_{B1i,y}$$

Equation 1

Where:

BE_y	=	Baseline emissions in year y (t CO ₂ e)
$BE_{B1i,y}$	=	Baseline emissions from the injection of captured CO ₂ at injection site i that would have been emitted to the atmosphere in the absence of the project in year y (t CO ₂ e)

The project will monitor the mass or volume and density of project and non-project streams of captured, or transported, or injected fluids through direct measurement.

Baseline emissions from the injection of captured CO₂ at injection site i in year y

($BE_{B1,i,y}$) shall be determined as follows:

$$BE_{B1,i,y} = Q_{inj,i,y} \times w_{CO_2,i,y} \times Allocation_{Project,i,y} \quad \text{Equation 2}$$

Where:

$Q_{inj,i,y}$ = Mass of fluid injected at injection site i in year y (tonnes)

$w_{CO_2,i,y}$ = Mass fraction of CO₂ in fluid injected at injection site i in year y (% CO₂ by mass)

$Allocation_{Project,i,y}$ = Portion of CO₂ supplied to injection site i which is attributable to CO₂ captured by the project in year y (unitless)

Equations 3 and 4 below shall be applied to determine the quantity of stream injected or project or non -project, where the stream is an injected stream $Q_{Fluid} = Q_{inj,i,y}$, where the stream is a project capture stream $Q_{Fluid} = Q_{Project,i,y}$, $Q_{Non-project,i,y}$.

- c. Where volume and density of the fluid are monitored, the mass of the fluid, Q_{fluid} will be determined as follows:

$$Q_{Fluid} = V_{Fluid} \times \rho_{Fluid} \quad \text{Equation 3}$$

Where:

V_{Fluid} = Volume of fluid (m³) at project developer's chosen references conditions, T_{ref} and P_{ref}

ρ_{Fluid} = Density of fluid (kg/m³) at project developer's chosen references conditions, T_{ref} and P_{ref}

However, at the moment, the amounts of CO₂ captured and injected into the project are estimated according to the amount of ethanol produced in 2023. So, for ex-ante estimative $Q_{Fluid} = Q_{inj,i,y}$. The figure below shows the chemical formula for fermentation.

Fermentation

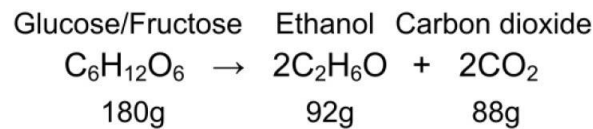


Figure 1113. Fermentation chemical formula.

From fermentation chemical formula, for every 180g of glucose/fructose, 92g of ethanol and 88g of CO₂ are generated. Therefore, the CO₂/ethanol ratio is 0.957.

Also, for ex-ante estimative the density of ethanol was used, 0.791 t ethanol/m³ ethanol. Considering the production license obtained by FS, the maximum annual ethanol production capacity of the Lucas do Rio Verde plant is 650,000 m³/year or 512,850-514,150 tons/year. Thus, considering a ratio of 0.957, the potential amount of CO₂ generated at the plant is 491,796 tons/year. Therefore, for the ex-ante estimates, the value of 491,796 tons of CO₂/year was adopted, considering that there are impurities.

It is important to emphasize that the project will monitor the amount of CO₂, the mass fraction or mole fraction of CO₂ in captured and injected quantities of fluid through direct measurement as established in the methodology.

- d. Where mole fraction of a fluid is monitored, the mass fraction of component z of the fluid, w_z , shall be determined as follows:

$$w_z = \frac{MM_z \times X_z}{\sum_{y=1}^N MM_y \times X_y} \quad \text{Equation 4}$$

Where:

MM_z	=	Molar Mass of component z (kg/kmol or other)
X_z	=	Mole fraction of component z (% CO ₂ by mol)
MM_y	=	Molar Mass of component y (kg/kmol or other)
X_y	=	Mole fraction of component y (% component y by mol)

For now, it was considered the mass fraction of CO₂ in fluid captured at project capturesite i is 98.07% CO₂, according to Table 7Table-7.

The portion of CO₂ supplied to injection site i which is attributable to CO₂ captured by the project in year y , $\text{Allocation}_{\text{Project},i,y}$, is determined as follows:

$$\text{Allocation}_{\text{Project},i,y} = \frac{\sum_{i \in S} (Q_{\text{Project},i,y} \times w_{\text{CO}_2 \text{ Project},i,y})}{\sum_{i \in S} ((Q_{\text{Project},i,y} \times w_{\text{CO}_2 \text{ Project},i,y}) + (Q_{\text{Non-project},i,y} \times w_{\text{CO}_2 \text{ Non-project},i,y}))} \quad \text{Equation 5}$$

Where S is the set of capture sites from which fluids injected at injection site i are sourced, and:

$Q_{\text{Project},i,y}$	=	Mass of fluid captured at project capture site i in year y (tonnes)
$w_{\text{CO}_2 \text{ Project},i,y}$	=	Mass fraction of CO ₂ in fluid captured at project capture site i in year y (% CO ₂ by mass)
$Q_{\text{Non-project},i,y}$	=	Mass of non-project fluid captured at site i in year y (tonnes)
$w_{\text{CO}_2 \text{ Non-project},i,y}$	=	Mass fraction of CO ₂ in non-project fluid captured at site i in year y (% CO ₂ by mass)

The allocation will be accounted for when the data begins to be monitored. For now, it is 1, considering all the fluid captured at project capture site allocated to this project.

Year	$Q_{\text{inj},i,y}$ (tonnes)	$w_{\text{CO}_2 i,y}$ (%CO ₂ by mass)	$\text{Allocation}_{\text{Project},i,y}$ (unitless)	$\text{BE}_{B1,j,y}$ ⁵⁶
Year 1 - 01/09/2026 to 31/12/2026	164,381	98.75%	1	162,325
Year 2 - 01/01/2027 to 31/12/2027	491,796	98.75%	1	485,644
Year 3 01/01/2028 to 31/12/2028	491,796	98.75%	1	485,644
Year 4 - 01/01/2029 to 31/12/2029	491,796	98.75%	1	485,644

⁵⁶ Gross value, before buffer amount deduction.

Year 5 - 01/01/2030 to 31/12/2030	491,796	98.75%	1	485,644
Year 6 - 01/01/2031 to 31/08/2031	327,415	98.75%	1	323,319

Determination of ex-ante estimations for Project Emission (PE_y)

Total emissions from the project in year y (PE_y) are determined as follows:

$$PE_y = PE_{P1y} + PE_{P3y} + PE_{P4y} + PE_{P5y} + PE_{P6y} + PE_{P7y} + PE_{P8y} + PE_{P9y} + PE_{P16y} + PE_{P17y} + PE_{P19y} \quad \text{Equation 6}$$

Where:

- PE_y = Project emissions in year y (t CO₂e)
- PE_{P1y} = Project emissions from biomass in year y (t CO₂e)
- PE_{P3y} = Project emissions from land clearing and soil carbon loss from installation of carbon capture, transportation, storage, and injection facilities in year y (t CO₂e)
- PE_{P4y} = Project emissions from construction of carbon capture, transportation, and storage facilities and well drill and service in year y (t CO₂e)
- PE_{P5y} = Project emissions from production and delivery of material inputs used carbon capture, transportation, and storage equipment in year y (t CO₂e)
- PE_{P6y} = Project emissions from fuel extraction, processing, and delivery in year y (t CO₂e)
- PE_{P7y} = Project emissions consumption of electricity from grid- connected captive and non-captive power sources in year y (t CO₂e)
- PE_{P8y} = Project emissions from grid-disconnected captive power sources in year y (t CO₂e)
- PE_{P9y} = Project emissions from fuel consumption in year y (t CO₂e)
- PE_{P16y} = Project emissions from venting at injection sites in year y (t CO₂e)
- PE_{P17y} = Project emissions from fugitive emissions at injection sites in year y (t CO₂e)

PE_{P19y} = Project emissions from the subsurface to atmosphere in year y (t CO₂e)

PE_{P1y} is not applicable in this project, since it is not a new installation and receives revenue from the sale of products (ethanol, BBGs, others). So $PE_{P1y} = 0$.

PE_{P3y} is not applicable in this project. It is important to note that the drilling activities will be carried out in an area that has already been affected by human activity and it will not be necessary to remove the zones. Furthermore, no new access roads will be opened for vehicles, so there will be no interference with native vegetation. (EIA, 2024)

PE_{P4y} is 0 at this moment. In the pre-crediting period, from the beginning of construction until the validation of this PDD, no kick or blowout events were recorded. Section 5.6.5.a of the methodology states that emissions from the pre-crediting period should be amortised over the project crediting period. As there were no emissions so far and no expected emissions to occur before start of CO₂ injection, there are no emissions to be amortised.

Despite PE_{P4y} 's description including CO₂ and CH₄ emissions from the use of fossil fuels and electricity from the operation of equipment, such as heavy equipment, smaller power tools, cranes, and generators, section 5.2.3.c.i of the methodology disregards these emissions in benefit of simplicity. In this sense, *"For simplicity, only emissions from the potential kick or blowout event that could release hydrocarbons or CO₂ during the drilling or servicing of injection and monitoring wells are included."* During CO₂ injection, any kick event will be monitored in real time and the gas accounted for via mudlogging-time gas sensors. A blowout event is not expected, as it means sensors and barriers failed. PE_{P4y} is expected to be zero.

PE_{P5y} :

Project emissions from production and delivery of material inputs (such as amine-based sorbents, glycols, or lubricants) consumed in year y . PE_{P5y} , are determined as follows:

$$PE_{P5y} = \sum_i (PE_{P5i,y} \times AF_{Project,i,y}) \quad \text{Equation 13}$$

And:

$$PE_{P5,y} = \sum_j \sum_{GHG} (MI_{i,j} \times EF_{MI,j,GHG} \times GWP_{GHG}) \quad \text{Equation 14}$$

Where:

$MI_{i,j}$ = Quantity of material inputs of type j consumed at site I in year y (kg, tonnes, L, m³ or other)

$EF_{MI,j,GHG}$ = GHG emission factor for material input of type j (t GHG per kg, tonnes, L, m³ or other)

Considering Triethylene glycol (TEG): daily consumption of 12kg of TEG = 4.26 tons/year.

Annual consumption of lubricating oil is expected to reach a maximum of 50 liters or 43.5kg, given a density equal to 0.87 kg/liter. The emission factor for lubricating oil consumption is 1.72 tCO₂e/t. The expected consumption for year 1 equals 14.5kg or 0.025 tCO₂e, for years 2-5 equals 43.5kg/year or 0.075 tCO₂e/year, and for year 6 equals 29kg or 0.017tCO₂e.

Year		MI _{i,TEG} (kg)	EF _{MITEG,GHG} (tCO ₂ e/t)	MI _{i,lub} (kg)	EF _{MIlub,GHG} (tCO ₂ e/t)	GWP _{CO2e}	PE _{P5y} (tCO ₂ e)
Year 1 - 01/09/2026 to 31/12/2026		1,424	2.97	14	1.72	1	4
Year 2 01/01/2027 to 31/12/2027	-	4,260	2.97	43	1.72	1	13
Year 3 01/01/2028 to 31/12/2028	-	4,260	2.97	43	1.72	1	13
Year 4 01/01/2029 to 31/12/2029	-	4,260	2.97	43	1.72	1	13
Year 5 01/01/2030 to 31/12/2030	-	4,260	2.97	43	1.72	1	13
Year 6 01/01/2031 to 31/08/2031	-	2,836	2.97	29	1.72	1	9

PE_{P6y} is not applicable in this project, since there is no use of fossil fuels nor energy (electrical and thermal) supplied to the project by grid-disconnected captive power source So PE_{P6y} = 0.

PE_{P7y}:

Project emissions from consumption of electricity from **grid-connected** captive and non-captive power sources in year y, PE_{P7y}, are determined as follows:

$$PE_{P7y} = \sum_i (PE_{P7i,y} \times AF_{Project,i,y}) \quad \text{Equation 18}$$

And:

$$PE_{P7i,y} = \sum_j (Electricity_{i,j} \times (1 + TDL_{i,y}) \times EF_{GCPP_{j,y}}) \quad \text{Equation 19}$$

Where:

Electricity _{i,j}	=	Quantity of electricity consumed at site i from the grid-connected power source j in year y (MWh _E)
EF _{GCPP_{j,y}}	=	Emissions factor associated generation of electricity at the grid-connected power source j in year y (t CO _{2e} per MWh _E)
TDL _{i,y}	=	Average transmission and distribution losses for provided electricity to site i in year y (unitless)

For now, it is assumed that the project will use 61,915 MWh, from grid-connected captive source (cogeneration process, using renewable biomass). Also, electricity from grid-connected non-captive source could be used in maintenance and/or emergency period.

According to the methodology, parameter ID 35 p. 78, biomass which is demonstrated to be renewable is deemed to have no emissions when consumed in grid-connected power generation facilities. In this project the biomass combusted is considered renewable following the instructions provided in parameter 48 from methodology.

The measure procedures indicated in parameter ID 48 to show the renewability of biomass beneficially combusted at project site i in year y is by "Operating records from the combustion equipment operator (e.g., purchasing invoices, sourcing agreements

with growers, registration records or supply agreements with the combustion equipment operator) which indicate the type and source of biomass consumed by the combustion equipment at the facility during the monitoring period, to demonstrate the renewability of the biomass.”

The necessary evidence indicating the type and source of biomass consumed by the combustion equipment at the facility during the monitoring period will be provided.

Emissions factor associated generation of electricity at the grid-connected power source shall be calculated using the CDM TOOL 07, version 07.0.

EF_{GCPP,j,y} using CDM TOOL 07, version 07.0:

The EF_{GCPP,j,y} also called as EF_{grid,CM,y} by CDM TOOL 07, version 07.0 is the emission factor for the combined margin (CM), resulted of a weighted average of two emission factors pertaining to the electricity system: the operating margin (OM) and build margin (BM).

$$EF_{GCPP,j,y} = EF_{grid,CM,y}$$

However, if the project uses electricity from grid-connected non-captive source could during maintenance and/or emergency period, the emission factor shall be calculated as follows:

EF_{grid,CM,y} will be calculated using the latest version of the Tool 07 “Tool to calculate the emission factor for an electricity system”. The following formula apply:

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times W_{OM} + EF_{grid,BM} \times W_{BM} \quad \text{Equation 20}$$

Where:

EF _{grid,CM,y}	=	Combined margin CO ₂ emission factor in year y (tCO ₂ /MWh)
EF _{grid,BM,y}	=	Build margin CO ₂ emission factor in year y (t CO ₂ /MWh)
EF _{grid,OM,y}	=	Operating margin CO ₂ emission factor in year y (t CO ₂ /MWh)
W _{OM}	=	Weighting of operating margin emissions factor (50%)
W _{BM}	=	Weighting of build margin emissions factor (50%)

In Brazil, the Designated National Authority (DNA), which is the Ministry of Science and Technology (MCTI), of Government of Brazil - provides this data.

The Brazilian DNA has published the delineation of SIN to be adopted for the purposes of CDM-projects. As per Resolution N^o 8 of the Brazilian DNA, the electric grid considered in this project activity is considered as a single system consisted by the sub-markets of SIN as the definition of the electric system of the project. Off-grid plants will not be included in the calculation of $EF_{grid,CM,y}$.

The weighting factors for build and operating margin were selected according to guidance provided in the CDM TOOL 07, version 07.0 as shown in the table below.

Table 1617. Emission factor for grid-connected non-captive electricity source.

Parameter	Value	Nomenclature	Source
			Calculated as follows: $EF_{grid,CM,y} = EF_{grid,OM,y} \times W_{OM} + EF_{grid,BM,y} \times W_{BM}$
$EF_{grid,CM,y}$	0.2498 tCO ₂ /MWh	Combined margin CO ₂ emission factor in year y	As per TOOL 07, version 07.0, paragraph 86: “The following default values should be used for w_{OM} and w_{BM} for all other projects: $w_{OM} = 0.5$ and $w_{BM} = 0.5$ for the first crediting period, unless otherwise specified in the approved methodology which refers to this tool.
$EF_{grid,OM,y}$	0.4473 tCO ₂ /MWh	Operating margin CO ₂ emission factor in year y	Calculated as the average hourly emission factor, weighted by the hourly net electricity generation, using the latest MCTI database.
$EF_{grid,BM,y}$	0.0523 tCO ₂ /MWh	Build margin CO ₂ emission factor in year y	Build margin emission factor of the National Interconnected System, as published by the Brazilian DNA, using the latest MCTI database.

PE_{p8y} is not applicable in this project, since there is no energy (electrical and thermal) supplied to the project by grid-disconnected captive power source. So $PE_{p8y} = 0$.

According to the methodology, Biomass which is demonstrated to be renewable is deemed to have no combustion emissions. So, considering the electricity from grid-connected captive source (cogeneration process, using 100% renewable biomass), $PE_{p9y} = 0$. For ex-ante estimative, PE_{p16y} , PE_{p17y} and PE_{p19y} were considered 0 since the project is not implemented yet and there is no gas vent, fugitive emissions or CO₂ leakage.

There are few registered BECCS projects to date. In the GS, this is the first. It was not possible to find benchmarks and articles that could support a conservative estimate of PE_{p16y} , PE_{p17y} and PE_{p19y} , given that these are items that will actually be monitored after the injection begins. FS is working on identifying the pathways and how to monitor them.

Year	PE_{p5y}	PE_{p7y}	PE_y
Year 1 - 01/09/2026 to 31/12/2026	4	0	0
Year 2 - 01/01/2027 to 31/12/2027	13	0	0
Year 3 - 01/01/2028 to 31/12/2028	13	0	0
Year 4 - 01/01/2029 to 31/12/2029	13	0	0
Year 5 - 01/01/2030 to 31/12/2030	13	0	0
Year 6 - 01/01/2031 to 31/08/2031	9	0	0

Leakage Emissions (LE_y)

Regarding $LE_{L1,y}$, according to section 5.2.4 of the methodology, leakage emissions which are considered relevant for assessment are:

- Leakage emissions from biomass due to shift of pre-project activities, diversion of biomass from other applications, processing and transportation of biomass and biomass residues outside of the project. Project developers shall apply the various approaches described in [5.7.3](#) in assessing and estimating leakage from biomass.

Also, item 5.7.3.iii. from methodology states that the biomass consumed at the facility has been demonstrated to conform with the conditions described for Option 1⁵⁷ of monitoring parameter Renewability of biomass_{i,n,k}, project developers shall estimate leakage emissions from biomass at biomass fermentation facility i in year y, $LE_{L1,i,y}$ in accordance with CDM TOOL 16. Project developers may allocate leakage emissions from biomass to the project using a suitable method per ISO 14044 or similar product LCA standards; otherwise, the biomass emissions are conservatively attributed solely to the CO₂ captured by the project at the facility.

Accessing tool 16, the leakage of biomass that is not residue may be due to shift of pre-project activities resulting from cultivation of biomass in a dedicated plantation in year y, section 6.1.

Chapter 45 from tool 16 states that "no leakage due to shift of pre-project activities occurs if one of the following two conditions applies:

- (a) The plantation area was or would have been abandoned land prior to the implementation of the project activity;
- (b) The plantation area was used prior to the implementation of the project area but the pre-project land use of the plantation area will be accommodated for, providing at least the same level of service during the project activity, within the land area included in the project boundary. The project area may be expanded to accommodate for this condition. This could be achieved, inter alia, in the following ways:
 - (i) At least the same number of cattle as prior to the implementation of the project activity will continue being grazed during the project activity within the land area included in project boundary;
 - (ii) Due to more efficient farming practice, the pre-project crops can be grown on a smaller area, which is included in the land area included in the project boundary, to achieve the same level of annual production of crops, freeing land for the dedicated plantation;
 - (iii) Settlements are not removed from the land area included in the project boundary.

⁵⁷ The Gold Standard Secretariat has officially confirmed that the reference to "Option 2" in Section 5.7.3(a)(iii) is a typographical/editorial error. Gold Standard clarified that Sections 5.7.3(i) and 5.7.3(ii), which address leakage assessment for existing facilities, correctly refer to "Option 2", whereas Section 5.7.3(a)(iii) should refer to "Option 1".

In this case, there are no leakage emissions since the plantation area was used prior to the implementation of the project area, but the pre-project land use of the plantation area will be accommodated for, providing at least the same level of service during the project activity. Regardless of the BECCS project, the corn will be planted and used to produce ethanol, in this case.

So, leakage emissions were considered 0 since the fermentation site **is not** a new installation and **there is no** shift of pre-project activities, diversion of biomass from other applications, and processing and transportation of biomass outside of the project boundary. It is not fair to attribute leakage emissions to CO₂ if the fermentation process is the main process and will continue to occur and consume corn. It is important to emphasize that CO₂ is a byproduct/residue of this process and not the main product. FS's business model is not to produce CO₂, but rather to produce Ethanol and some other products such as DDG and Corn Oil.

Regarding $LE_{L2i,y}$, section 5.7.3. b. states that biomass may be combusted to the benefit of the project, such as to generate electricity or heat consumed by the project. Project developers shall estimate the leakage from biomass due to beneficial combustion at project site i in year y, $LE_{L2i,y}$, in accordance with CDM TOOL 16, this estimation shall consider all quantities of biomass combusted to the benefit of the project, irrespective of the renewability of that biomass. Considering the combusted biomass, as explained for $LE_{L1i,y}$, there is no leakage emissions since the plantation area was used prior to the implementation of the project area, but the pre-project land use of the plantation area will be accommodated for, providing at least the same level of service during the project activity. Regardless of the BECCS project, the eucalyptus and bamboo will be planted and used to produce energy for the fermentation process at FS plant in any way.

The same applies to biomass residue. Regardless of the BECCS project, FS will continue to purchase and produce biomass residue to be used in generating the energy needed for the fermentation process. The amount of biomass needed to supply BECCS is negligible compared to the total amount of energy produced at the plant.

It is not fair to attribute leakage emissions to CO₂ if the fermentation process is the main process and will continue to occur and consume biomass. It is important to emphasize that CO₂ is a byproduct/residue of this process and not the main product.

Furthermore, according to Table 13, derived from the methodology, $LE_{L2i,y}$ is not part of the system boundary.

SDG 02: Ex-ante calculations related to the outcomes of SDG 02

For ex-ante purposes, the number of groups of farmers who have adopted sustainable cultivation practices promoted by the project will be estimated, as follow:

- The calculation will include only producers that directly supplied corn or biomass to the plant.
- The baseline estimate will include an average of the number of corn producers that included the acquisition of biofertilizers in the negotiations of corn sale with the project developer in the last three years.
- The project estimate will consider a 10% growth rate, when compared to the baseline estimate, by the end of year 5 of the project.

SDG 04: Ex-ante calculations related to the outcomes of SDG 04

The project contributes to SDG 04 (Quality Education) through the implementation of training, awareness, and knowledge-sharing activities related to the BECCS system and its broader environmental and social context.

These activities may include, but are not limited to, technical training, educational initiatives, workshops, or awareness sessions for relevant stakeholders such as employees, contractors, local communities, or other interested groups.

The activities are conducted in accordance with an internal planning framework, which defines their scope, target audience, and implementation approach. Trainings and educational initiatives are delivered on a periodic basis, including both initial and recurring activities, as applicable.

The implementation of these activities is monitored in accordance with the project's monitoring plan (Section 7), including tracking of the number of events conducted and participants involved.

SDG 07: Ex-ante calculations related to the outcomes of SDG 07

N/A. For the calculation of the impact on SDG 07, the project developer will monitor the amount of biofuel with Carbon Capture and Storage produced at Lucas do Rio Verde facility. For ex-ante purposes, this has been estimated to be zero in baseline scenario. For the project scenario, it will be around 650,000 m³ of biofuel with Carbon Capture and Storage.

SDG 08: Ex-ante calculations related to the outcomes of SDG 08

Regarding the baseline scenario for SDG 08, no jobs would be created since there would not have BECCS system. Thus, it is directly assumed that, in the baseline scenario, the parameter "Total number of jobs" is equal to 0.

It is estimated that around 10 jobs will be generated during the project's operation each year, including direct and indirect jobs.

These jobs correspond to positions required for the operation and maintenance of the project activity and are expected to be sustained over time rather than newly created each year.

The remuneration offered for both direct and contracted roles is in line with applicable labour regulations, following all the Labor Rights all the work requirements of the Consolidation of labor laws (CLT) modality, and exceeds the minimum wage established in Brazil.

The CLT is composed of eight chapters that cover and specify the rights of most Brazilian labor groups. In its 922 articles, information such as: professional identification, duration (day) of work, minimum wage, annual vacations, occupational safety and medicine, protection of the work of women and children, social security and regulations of working-class unions are found.

The Consolidation of Labor Laws (CLT) was established by Decree Law No. 5.452. of 01/05/1943.

The generation of employment and associated conditions are monitored in accordance with the project's monitoring plan (Section 7).

SDG 09: Ex-ante calculations related to the outcomes of SDG 09

For the calculation of the impact on SDG 09, the project developer will check the total number of companies supported by the project for their integration into value chains and markets. For ex-ante purposes, this has been estimated to be zero in baseline scenario. For the project scenario, it will be defined.

The reference to "value chains and markets" follows the SDG 09 target definition and does not imply that the project monitors FS's full value chain. The parameter is limited to companies directly engaged in project-related activities.

SDG 15: Ex-ante calculations related to the outcomes of SDG 15

For ex-ante purposes, this has been estimated to be 2,331 hectares in baseline scenario. Also, the total area of trees planted by the project will be estimated, as follow:

- The calculation will include both corn and biomass producers that supplied to the plant.
- The baseline estimate considers that the area recovered by the **Forest Recuperation Program** promoted by the project developer will continue to expand as the current situation.
- The project estimate will consider that the project developer will achieve a total area of 470 hectares restored, beyond the baseline scenario, with different technics and in different stages of recuperation, by the end of year 5 of the project.

The monitoring of the areas restored under the Forest Recuperation Program will be carried out through a combination of remote sensing tools and field verification, when applicable. The restored areas will be periodically assessed through the analysis of satellite imagery or other available remote sensing data sources in order to track the evolution of vegetation cover and confirm the implementation of restoration activities over time.

Whenever necessary, field inspections may be conducted to complement the information obtained through remote sensing and to validate the establishment of vegetation in restored areas. The areas under restoration will be recorded and maintained in a georeferenced spatial database, allowing the project developer to track the extent of restored areas throughout the monitoring period of the project.

This approach will allow the project developer to document the implementation of the Forest Recuperation Program and provide evidence of vegetation recovery over time using available geospatial data sources and field observations.

B.6.4 Summary of ex ante estimates of each SDG Impact

SDG 13: Ex-ante estimates related to the outcomes of SDG 13

Indicator: tCO₂

YEAR	BASELINE ESTIMATE	PROJECT ESTIMATE	NET BENEFIT ⁵⁸

⁵⁸ Before buffer amount deduction.

Year 1 - 01/09/2026 to 31/12/2026	162,325	4	162,320
Year 2 - 01/01/2027 to 31/12/2027	485,644	13	485,631
Year 3 - 01/01/2028 to 31/12/2028	485,644	13	485,631
Year 4 - 01/01/2029 to 31/12/2029	485,644	13	485,631
Year 5 - 01/01/2030 to 31/12/2030	485,644	13	485,631
Year 6 - 01/01/2031 to 31/08/2031	323,319	9	323,310
Total	2,428,218	64	2,428,153
Total number of crediting years	5		
Annual average over the crediting period	485,644	13	485,630

SDG 02: Ex-ante estimates related to the outcomes of SDG 02

Indicator: Number of groups of farmers adopted practices promoted by the project

YEAR	BASELINE ESTIMATE	PROJECT ESTIMATE	NET BENEFIT
Year 1	3	7	4
Year 2	3	7	4
Year 3	3	7	4
Year 4	3	7	4
Year 5	3	7	4

Total	15	35	20
Total number of crediting years	5		
Annual average over the crediting period	3	7	4

SDG 04: Ex-ante estimates related to the outcomes of SDG 04

Indicator: Number of people provided skill development training

YEAR	BASELINE ESTIMATE	PROJECT ESTIMATE	NET BENEFIT
Year 1	0	10	10
Year 2	0	10	10
Year 3	0	10	10
Year 4	0	10	10
Year 5	0	10	10
Total	0	50	50
Total number of crediting years	5		
Annual average over the crediting period	0	10	10

SDG 07: Ex-ante estimates related to the outcomes of SDG 07

Indicator: Amount of biofuel (ethanol) with Carbon Capture and Storage

YEAR	BASELINE ESTIMATE	PROJECT ESTIMATE	NET BENEFIT
Year 1	0	650,000	650,000
Year 2	0	650,000	650,000
Year ~~3~~ 2	0	650,000	650,000
Year 4	0	650,000	650,000
Year 5	0	650,000	650,000
Total	0	3,250,000	3,250,000
Total number of crediting years	5		
Annual average over the crediting period	0	650,000	650,000

SDG 08: Ex-ante estimates related to the outcomes of SDG 08

Indicator: Total number of jobs

YEAR	BASELINE ESTIMATE	PROJECT ESTIMATE	NET BENEFIT
Year 1	0	10	10
Year 2	0	10	10
Year ~~3~~ 2	0	10	10
Year 4	0	10	10
Year 5	0	10	10
Total	0	50	50
Total number of crediting years	5		

Annual average over the crediting period	0	10	10
--	---	----	----

SDG 09: Ex-ante estimates related to the outcomes of SDG 09

Indicator: Total number of companies supported for their integration into value chains and markets

YEAR	BASELINE ESTIMATE	PROJECT ESTIMATE	NET BENEFIT
Year 1	0	10	10
Year 2	0	10	10
Year 2	0	10	10
Year 4	0	10	10
Year 5	0	10	10
Total	0	50	~~10~~ 50
Total number of crediting years	5		
Annual average over the crediting period	0	10	10

SDG 15: Ex-ante estimates related to the outcomes of SDG 15

Indicator: Area of trees planted (hectares)

YEAR	BASELINE ESTIMATE	PROJECT ESTIMATE	NET BENEFIT
Year 1	2,331	2,351	20

Year 2	2,331	~~2,401~~ <u>2,381</u>	50
Year 3	2,331	~~2,551~~ <u>2,481</u>	150
Year 4	2,331	~~2,701~~ <u>2,481</u>	150
Year 5	2,331	~~2,801~~ <u>2,431</u>	100
Total	~~2,331~~ <u>11,655</u>	~~12,805~~ <u>12,125</u>	470
Total number of crediting years	5		
Annual average over the crediting period	2,331	~~2,561~~ <u>2,425</u>	94

B.7. Monitoring plan

B.7.1 Data and parameters to be monitored

SDG 13

Data / Parameter	$Q_{inj,s,y}$						
Unit	tonnes						
Description	Mass of fluid injected at injection site s in year y . (Parameter ID 11 from methodology).						
Source of data	Measurement						
Value(s) applied	Ex-ante values: <table> <tr> <th>Year</th><th>$Q_{inj,i,y}$</th></tr> <tr> <td>Year 1 - 01/09/2026 to 31/12/2026</td><td>164,381</td></tr> <tr> <td>Year 2 - 01/01/2027 to 31/12/2027</td><td>491,796</td></tr> </table>	Year	$Q_{inj,i,y}$	Year 1 - 01/09/2026 to 31/12/2026	164,381	Year 2 - 01/01/2027 to 31/12/2027	491,796
Year	$Q_{inj,i,y}$						
Year 1 - 01/09/2026 to 31/12/2026	164,381						
Year 2 - 01/01/2027 to 31/12/2027	491,796						

	Year 3 - 01/01/2028 to 31/12/2028	491,796
	Year 4 - 01/01/2029 to 31/12/2029	491,796
	Year 5 - 01/01/2030 to 31/12/2030	491,796
	Year 6 - 01/01/2031 to 31/08/2031	327,415
Measurement methods and procedures	Direct measurement of the mass flow of injection fluid. Calculation, per Equation 3, using direct metering of volumetric flow and density of injected fluid.	
	Type of meter	Coriolis Flowmeter Promass O 300, 8°3B80, DN80 3" ⁵⁹
	Location of meter	Wellhead
	Accuracy of meter	Mass flow (liquid): ±0.10 % (standard), 0.05 % (option) Volume flow (liquid): ±0.10 % Mass flow (gas): ±0.35 % Density (liquid): ±0.0005 g/cm ³
	Serial number of meter	information pending acquisition, receipt, internal catalog, and installation of equipment.
	Calibration frequency	12 months
	Date of Calibration/ validity	information pending acquisition, receipt, internal catalog, and installation of equipment.

⁵⁹ <https://www.endress.com/en/field-instruments-overview/flow-measurement-product-overview/coriolis-flowmeter-promass-o300-8o3b?t.tabId=product-overview>

	<table border="1"> <tr> <td>Reference No. of Calibration Certificates</td><td>N/A</td></tr> </table>	Reference No. of Calibration Certificates	N/A
Reference No. of Calibration Certificates	N/A		
Monitoring frequency	Continuous metering with monthly aggregation, with a minimum of one measurement every 15 minutes. Absolute frequency of metering shall be highest level possible.		
QA/QC procedures	Data from pressure and temperature compensated instruments shall be converted to the project's reference conditions. Conversion shall be done using the same pressure and/or temperature used for the specific meter calibration. Flow meters will be placed based on manufacturer recommendations, located downstream of tie-ins supplying commingled streams to the injection site, and placed as close as possible to the injection wellheads to ensure measurement accuracy. Meters will be checked and calibrated at regular intervals according to manufacturer's specifications.		
Purpose of data	Used to determine baseline emissions from the injection of captured CO₂ at injection sites that would have been emitted to the atmosphere in the absence of the Project in year y, $BE_{B1s,y}$. Used to determine the portion of injected CO₂ which is attributable to CO₂ captured by the project in year y, $Allocation_{Project_{s,y}}$. Used to determine the portion of CO₂ supplied to project injection sites since the project start (y_0) which is		

	attributable to CO₂ captured by the project through to the end of year y, $Cumulative Allocation_{Project,y}$. Used to determine the apportionment factor to quantify project emissions caused by activities related to project and non-project streams, $AF_{Project,i,y}$.
Additional comment	

Data / Parameter	X_z												
Unit	% CO ₂ by mol												
Description	Mole fraction of component z . (Parameter ID 12 from methodology).												
Source of data	Measurement												
Value(s) applied	98.07												
Measurement methods and procedures	Direct measurement, using gas chromatographs, of the molefraction of component in the captured or injected fluid. <table border="1"> <tr> <td>Type of meter</td><td>Envent Model 132S Process GC</td></tr> <tr> <td>Location of meter</td><td>Downstream of the PIG receiver</td></tr> <tr> <td>Accuracy of meter</td><td>1-2%, to be confirmed in curve calibrations</td></tr> <tr> <td>Serial number of meter</td><td>information pending acquisition, receipt, internal catalog, and installation of equipment.</td></tr> <tr> <td>Calibration frequency</td><td>12 months</td></tr> <tr> <td>Date of Calibration/ validity</td><td>information pending acquisition, receipt, internal catalog, and installation of equipment.</td></tr> </table>	Type of meter	Envent Model 132S Process GC	Location of meter	Downstream of the PIG receiver	Accuracy of meter	1-2%, to be confirmed in curve calibrations	Serial number of meter	information pending acquisition, receipt, internal catalog, and installation of equipment.	Calibration frequency	12 months	Date of Calibration/ validity	information pending acquisition, receipt, internal catalog, and installation of equipment.
Type of meter	Envent Model 132S Process GC												
Location of meter	Downstream of the PIG receiver												
Accuracy of meter	1-2%, to be confirmed in curve calibrations												
Serial number of meter	information pending acquisition, receipt, internal catalog, and installation of equipment.												
Calibration frequency	12 months												
Date of Calibration/ validity	information pending acquisition, receipt, internal catalog, and installation of equipment.												

	<table border="1"> <tr> <td>Reference No. of Calibration Certificates</td><td>N/A</td></tr> </table>	Reference No. of Calibration Certificates	N/A
Reference No. of Calibration Certificates	N/A		
Monitoring frequency	Continuous metering with monthly aggregation, with a minimum of one measurement every 15 minutes. Absolute frequency of metering shall be highest level possible.		
QA/QC procedures	Meters will be placed based on manufacturer recommendations and guidance provided in Table 4 from methodology. Meters will be maintained according to manufacturer's specifications.		
Purpose of data	Used to determine the mass fraction of component z of the fluid, w_z .		
Additional comment			

Data / Parameter	$w_{CO_2inj,s,y}$
Unit	% CO ₂ by mass
Description	Mass fraction of CO ₂ in fluid injected at injection site s in year y. (Parameter ID 13 from methodology).
Source of data	Measurement
Value(s) applied	For ex-ante calculation, 98.75% was assumed.
Measurement methods and procedures	Direct measurement, using gas chromatographs, of the mass fraction of CO ₂ in the injected fluid

	Calculation, per Equation 4, using direct metering of the mole fraction, using gas chromatographs, of CO ₂ in the injected fluid.	
	Type of meter	Envent Model 132S Process GC
	Location of meter	Downstream of the PIG receiver
	Accuracy of meter	1-2%, to be confirmed in curve calibrations
	Serial number of meter	information pending acquisition, receipt, internal catalog, and installation of equipment.
	Calibration frequency	12 months
	Date of Calibration/ validity	information pending acquisition, receipt, internal catalog, and installation of equipment.
	Reference No. of Calibration Certificates	N/A
Monitoring frequency	Continuous metering with monthly aggregation, with a minimum of one measurement every 15 minutes. Absolute frequency of metering shall be highest level possible.	
QA/QC procedures	Meters will be placed based on manufacturer recommendations and shall be located downstream of tie-ins supplying commingled streams to the injection site and shall be placed as close as possible to the injection wellheads to ensure measurement accuracy.	

	Meters shall be maintained according to manufacturer's specification.
Purpose of data	Used to determine baseline emissions from the injection of captured CO₂ at injection site s that would have been emitted to the atmosphere in the absence of the Project in year y, $BE_{B1s,y}$. Used to determine the portion of injected CO₂ which is attributable to CO₂ captured by the project in year y, $Allocation_{Project_{s,y}}$. Used to determine the portion of CO₂ supplied to project injection sites since the project start (y_0) which is attributable to CO₂ captured by the project through to the end of year y, $Cumulative Allocation_{Project_y}$. Used to determine project emissions from emissions from venting at injection sites, PE_{P16y}. Used to determine project emissions from fugitive emissions at injection sites, PE_{P17y}.
Additional comment	

Data / Parameter	$Q_{Project,i,y}$						
Unit	kg, tonnes, or other						
Description	Mass of project fluid captured at site i in year y . (Parameter ID 14 from methodology).						
Source of data	Measurement or estimation						
Value(s) applied	<table> <tr> <th>Year</th><th>$Q_{project\ i,y}$</th></tr> <tr> <td>Year 1 - 01/09/2026 to 31/12/2026</td><td>164,381</td></tr> <tr> <td>Year 2 - 01/01/2027 to 31/12/2027</td><td>491,796</td></tr> </table>	Year	$Q_{project\ i,y}$	Year 1 - 01/09/2026 to 31/12/2026	164,381	Year 2 - 01/01/2027 to 31/12/2027	491,796
Year	$Q_{project\ i,y}$						
Year 1 - 01/09/2026 to 31/12/2026	164,381						
Year 2 - 01/01/2027 to 31/12/2027	491,796						

	<table> <tr> <td>Year 3 01/01/2028 to 31/12/2028</td><td>491,796</td></tr> <tr> <td>Year 4 - 01/01/2029 to 31/12/2029</td><td>491,796</td></tr> <tr> <td>Year 5 - 01/01/2030 to 31/12/2030</td><td>491,796</td></tr> <tr> <td>Year 6 - 01/01/2031 to 31/08/2031</td><td>327,415</td></tr> </table>	Year 3 01/01/2028 to 31/12/2028	491,796	Year 4 - 01/01/2029 to 31/12/2029	491,796	Year 5 - 01/01/2030 to 31/12/2030	491,796	Year 6 - 01/01/2031 to 31/08/2031	327,415						
Year 3 01/01/2028 to 31/12/2028	491,796														
Year 4 - 01/01/2029 to 31/12/2029	491,796														
Year 5 - 01/01/2030 to 31/12/2030	491,796														
Year 6 - 01/01/2031 to 31/08/2031	327,415														
Measurement methods and procedures	Direct measurement of the mass of project streams transportation infrastructure are metered for both flow and composition; and Calculation, per Equation 3, using direct metering of volumetric flow and density of fluid captured at project capture site i in year. <table> <tr> <td>Type of meter</td><td>Coriolis Flowmeter Endress+Houser Proline Promass 80F, 83F</td></tr> <tr> <td>Location of meter</td><td>Injection Wellhead</td></tr> <tr> <td>Accuracy of meter</td><td>Mass flow (liquid): ± 0.10 % (standard), 0.05 % (option) Volume flow (liquid): ± 0.10 % Mass flow (gas): ± 0.35 % Density (liquid): ± 0.0005 g/cm³</td></tr> <tr> <td>Serial number of meter</td><td>N/A</td></tr> <tr> <td>Calibration frequency</td><td>To be defined</td></tr> <tr> <td>Date of Calibration/ validity</td><td>To be done</td></tr> <tr> <td>Reference No. of Calibration Certificates</td><td>N/A</td></tr> </table>	Type of meter	Coriolis Flowmeter Endress+Houser Proline Promass 80F, 83F	Location of meter	Injection Wellhead	Accuracy of meter	Mass flow (liquid): ± 0.10 % (standard), 0.05 % (option) Volume flow (liquid): ± 0.10 % Mass flow (gas): ± 0.35 % Density (liquid): ± 0.0005 g/cm ³	Serial number of meter	N/A	Calibration frequency	To be defined	Date of Calibration/ validity	To be done	Reference No. of Calibration Certificates	N/A
Type of meter	Coriolis Flowmeter Endress+Houser Proline Promass 80F, 83F														
Location of meter	Injection Wellhead														
Accuracy of meter	Mass flow (liquid): ± 0.10 % (standard), 0.05 % (option) Volume flow (liquid): ± 0.10 % Mass flow (gas): ± 0.35 % Density (liquid): ± 0.0005 g/cm ³														
Serial number of meter	N/A														
Calibration frequency	To be defined														
Date of Calibration/ validity	To be done														
Reference No. of Calibration Certificates	N/A														
Monitoring frequency	Continuous metering with monthly aggregation, with a minimum of one measurement every 15 minutes. Meter														

	details will be shared as soon as they are defined. Absolute frequency of metering should be highest level possible.
QA/QC procedures	Data from pressure and temperature compensated instruments shall be converted to the project's reference conditions. Conversion shall be done using the same pressure and/or temperature used for the specific meter calibration. To ensure that no emissions are omitted or double-counted, documentation of the combined quantity of CO₂ captured at the site which has been counted towards the host country's domestic climate mitigation policy and/or participated in other voluntary or compliance standards programs shall demonstrate that such quantities are suitable for application of mass-balance together with other monitored project and non-project capture data. To do so, the documentation shall a) clearly establish that such quantities correspond with quantities of CO₂ captured at the site, prior to tying into shared transportation infrastructure and are exclusive of deductions from any activity related emissions, via b) a detailed accounting of the applied quantification methods, which c) shall be either LCA methods or project, regional, subnational, or national GHG accounting methods, and d) include the relevant activity rates and data where LCA methods are applied. Flow meters will be placed based on manufacturer recommendations and with the guidance provided in Table 4 applied. Meters shall be checked/calibrated at regular intervals

	according to manufacturer's specifications. Where the source of the data is estimation, data from pressure and temperature compensated instruments used in the mass balance approach shall be converted to the project's reference conditions. Conversion shall be done using the same pressure and/or temperature used for the specific meter calibration.
Purpose of data	Used to determine the portion of injected CO₂ which is attributable to CO₂ captured by the project in year y, $Allocation_{Project_{s,y}}$. Used to determine the apportionment factor to quantify project emissions caused by activities related to project and non-project streams, $AF_{Project_{i,y}}$.
Additional comment	

Data / Parameter	$w_{CO_2 Project,i,y}$
Unit	% CO ₂ by mass
Description	Mass fraction of CO ₂ in project fluid captured at site i in year y. (Parameter ID 15 from methodology).
Source of data	Measurement or estimation
Value(s) applied	100
Measurement methods and procedures	Direct measurement of the mass fraction of CO₂ in those project fluids emitted during the fermentation of renewable biomass Calculation, per Equation 4, using direct metering of the molefraction, using gas chromatographs, of CO₂ in project fluid captured at site i in year y.

	Type of meter	Envent Model 132S Process GC
	Location of meter	Downstream of the PIG receiver
	Accuracy of meter	1-2%, to be confirmed in curve calibrations
	Serial number of meter	information pending acquisition, receipt, internal catalog, and installation of equipment.
	Calibration frequency	12 months
	Date of Calibration/ validity	information pending acquisition, receipt, internal catalog, and installation of equipment.
	Reference No. of Calibration Certificates	N/A
Monitoring frequency	Continuous metering with monthly aggregation, with a minimum of one measurement every 15 minutes. Absolute frequency of metering shall be highest level possible.	
QA/QC procedures	Fluid composition and density meters shall be placed based on manufacturer recommendations and with the guidance provided in Table 4 applied. Meters shall be maintained according to manufacturer's specifications. Where the source of the data is estimation, data from pressure and temperature compensated instruments used in the mass balance approach shall be converted to the project's reference conditions. Conversion shall be done	

	using the same pressure and/or temperature used for the specific meter calibration.
Purpose of data	Used to determine the portion of injected CO₂ which is attributable to CO₂ captured by the project in year y, $Allocation_{Project_{s,y}}$. Used to determine the apportionment factor to quantify project emissions caused by activities related to project and non-project streams, $AF_{Project_{i,y}}$.
Additional comment	

Data / Parameter	$Q_{Non-project,i,y}$
Unit	kg, tonnes, or other
Description	Mass of non-project fluid captured at site i in year y. (Parameter ID 16 from methodology).
Source of data	Measurement or estimation
Value(s) applied	For ex-ante estimative, it is 0. If applicable, it will be measured or estimated.
Measurement methods and procedures	Direct measurement of the mass of those non-project fluids emitted during the fermentation of renewable biomass and are counted towards the host country's domestic climate mitigation policy and/or participate in other voluntary or compliance standards programs and captured at site i in year y is not required only if: a) all capture streams connected to shared project transportation infrastructure are metered for both flow and composition and b) documentation (see QA/QC procedures below) is provided at verification to confirm the combined quantity of CO₂ captured at the site which has been counted towards the host country's domestic climate mitigation policy and/or participated in other voluntary or compliance standards programs in year y. Instead, where the above conditions are met, the mass

	of those non-project fluids emitted during the fermentation of renewable biomass and are counted towards the host country's domestic climate mitigation policy and/or participate in other voluntary or compliance standards programs and captured at site i in year y may be estimated based on the documented (as described above) combined quantity of CO₂ captured at the site which has been counted towards the host country's domestic climate mitigation policy and/or participated in other voluntary or compliance standards programs. Where emissions from the fermentation of both renewable and non-renewable biomass at a facility commingle prior to the point of capture applies, project developers shall apportion the quantities measured downstream of the point of capture to the project and non-project streams based the quantities of renewable and other biomass fermented at that facility during the monitoring period, respectively. If a developer is unable to substantiate the quantities of renewable biomass fermented at that facility, it is conservatively assumed that the total quantity captured at that stream is a nonproject stream. Otherwise, the quantities measured at or downstream of the point of capture shall be apportioned to the project stream based on the ratio of the quantity of renewable biomass to the total quantity (renewable and non-renewable) of biomass; the balance of the captured quantities less the project quantities shall be considered the non-project stream. In all other cases, only direct measurement of the mass of nonproject fluid captured at site i in year y is permitted. Calculation per Equation 3, using direct metering of volumetric flow and density of non-project fluid captured at site i in year y.
Monitoring frequency	Continuous metering with monthly aggregation, with a minimum of one measurement every 15 minutes.

	Absolute frequency of metering shall be highest level possible.
QA/QC procedures	Data from pressure and temperature compensated instruments shall be converted to the project's reference conditions. Conversion shall be done using the same pressure and/or temperature used for the specific meter calibration. To ensure that no emissions are omitted or double-counted, documentation of the combined quantity of CO₂ captured at the site which has been counted towards the host country's domestic climate mitigation policy and/or participated in other voluntary or compliance standards programs should demonstrate that such quantities are suitable for application of mass-balance together with other monitored project and non-project capture data. To do so, the documentation shall a) clearly establish that such quantities correspond with quantities of CO₂ captured at the site, prior to tying into shared transportation infrastructure and are exclusive of deductions from any activity related emissions, via b) a detailed accounting of the applied quantification methods, which c) shall be either LCA methods or project, regional, subnational, or national GHG accounting methods, and d) include the relevant activity rates and data where LCA methods are applied. Flow meters shall be placed based on manufacturer recommendations, and with the guidance provided in Table 4 applied. Meters shall be checked/calibrated at regular intervals according to manufacturer's specifications. Where the source of the data is estimation, data from pressure and temperature compensated instruments used in the mass balance approach shall be converted to the project's reference conditions. Conversion shall be done using the same pressure and/or temperature used for the specific meter calibration. A non-project stream is any quantity of CO₂

	and/or fluids which are: a) emitted from sources other than the fermentation of renewable biomass and subsequently captured; or, b) captured at project sites and are considered in the selected baseline, or, c) emitted during the fermentation of renewable biomass and subsequently captured and are also counted towards the host country's domestic climate mitigation policy, or, d) emitted during the fermentation of renewable biomass and subsequently captured and are also accounted in other voluntary or compliance standards or programs.
Purpose of data	Used to determine the portion of injected CO₂ which is attributable to CO₂ captured by the project in year y, $Allocation_{Project_{s,y}}$. Used to determine the apportionment factor to quantify project emissions caused by activities related to project and non-project streams, $AF_{Project_{i,y}}$.
Additional comment	There is no mass of non-project fluid captured in this project. If applicable in the future, it will be measured.

Data / Parameter	$W_{CO_2 Non-project,i,y}$
Unit	% CO ₂ by mass
Description	Mass fraction of CO ₂ in non-project fluid captured at site i in year y. (Parameter ID 17 from methodology).
Source of data	Measured
Value(s) applied	For ex-ante estimative, it is 0. If applicable, it will be measured.
Measurement methods and procedures	Direct measurement of the mass fraction of CO ₂ in those non project fluids emitted during the fermentation of

	renewable biomass and are counted towards the host country's domestic climate mitigation policy and/or participate in other voluntary or compliance standards programs and captured at site i in year y is not required only if: a) all capture streams connected to shared project transportation infrastructure are metered for both flow and composition, and b) documentation (see QA/QC procedures, below) is provided at verification to confirm the combined quantity of CO₂ captured at the site which has been counted towards the host country's domestic climate mitigation policy and/or participated in other voluntary or compliance standards programs in year y. Instead, where the above conditions are met, the mass fraction of CO₂ in those fluids described in emitted during the fermentation of renewable biomass and are counted towards the host country's domestic climate mitigation policy and/or participate in other voluntary or compliance standards programs and captured at site i in year y may be assumed to be equal to 100% CO₂, based on the documented (as described above) combined quantity of CO₂ captured at the site which has been counted towards the host country's domestic climate mitigation policy and/or participated in other voluntary or compliance standards programs. In all other cases, only direct measurement, using gas chromatographs, of the mass fraction of CO₂ in non-project fluid captured at site i in year y is permitted. Calculation, per Equation 4, using direct metering of the mole fraction, using gas chromatographs, of CO₂ in non-project fluid captured at site i in year y.
Monitoring frequency	Continuous metering with monthly aggregation, with a minimum of one measurement every 15 minutes. Absolute frequency of metering shall be highest level possible.

QA/QC procedures	Fluid composition and density meters shall be placed based on manufacturer recommendations, and with the guidance provided in Table 4 applied. Meters shall be maintained according to manufacturer's specifications. Where the source of the data is estimation, data from pressure and temperature compensated instruments used in the mass balance approach shall be converted to the project reference conditions. Conversion shall be done using the same pressure and/or temperature used for the specific meter calibration.
Purpose of data	Used to determine the portion of injected CO ₂ which is attributable to CO ₂ captured by the project in year y, $Allocation_{Project_{s,y}}$. Used to determine the apportionment factor to quantify project emissions caused by activities related to project and non-project streams, $AF_{Project_{i,y}}$.
Additional comment	There is no mass of non-project fluid captured in this project. If applicable in the future, it will be measured.

Data / Parameter	$Export_{k,y}$
Unit	tonnes
Description	Mass of fluid exported outside of the project boundary from transport sites k in year y. (Parameter ID 18 from methodology).
Source of data	Measured
Value(s) applied	For ex-ante estimative, it is 0. If applicable, it will be measured.
Measurement methods and procedures	Direct measurement of the mass of fluid exported outside of the project boundary from export site k in year y; alternatively, calculation per Equation 3, using direct metering of volumetric flow and density of fluid exported outside of the project boundary from export site k in year y

Monitoring frequency	Continuous metering with monthly aggregation, with a minimum of one measurement every 15 minutes. Absolute frequency of metering shall be highest level possible.
QA/QC procedures	Data from pressure and temperature compensated instruments shall be converted to the project's reference conditions. Conversion shall be done using the same pressure and/or temperature used for the specific meter calibration. Flow meters shall be placed based on manufacturer recommendations, and with the guidance provided in Table 4 applied. Meters shall be checked and calibrated at regular intervals according to manufacturer's specifications.
Purpose of data	Used to determine the portion of injected CO₂ which is attributable to CO₂ captured by the project in year y, $Allocation_{Project_{s,y}}$. Used to determine the apportionment factor to quantify project emissions caused by activities related to project and non-project streams, $AF_{Project_{i,y}}$.
Additional comment	There is no mass of fluid exported outside of the project boundary If applicable in the future, it will be measure.

Data / Parameter	$Q_{ProjectTransport_{i,j,y}}$				
Unit	tonnes				
Description	Mass of project fluid transported from capture site i through transport site j in year y. (Parameter ID 19 from methodology).				
Source of data	Measurement and/or estimation				
Value(s) applied	<table> <tr> <th>Year</th><th>$Q_{ProjectTransport_{i,j,y}}$</th></tr> <tr> <td>Year 1 - 01/09/2026 to 31/12/2026</td><td>164,381</td></tr> </table>	Year	$Q_{ProjectTransport_{i,j,y}}$	Year 1 - 01/09/2026 to 31/12/2026	164,381
Year	$Q_{ProjectTransport_{i,j,y}}$				
Year 1 - 01/09/2026 to 31/12/2026	164,381				

	Year 2 - 01/01/2027 to 31/12/2027 491,796 Year 3 - 01/01/2028 to 31/12/2028 491,796 Year 4 - 01/01/2029 to 31/12/2029 491,796 Year 5 - 01/01/2030 to 31/12/2030 491,796 Year 6 - 01/01/2031 to 31/08/2031 327,415
Measurement methods and procedures	Direct measurement of the mass of project fluid transported from capture site i through transport site j in year y; alternatively, calculation per Equation 3 using direct metering of volumetric flow and density of project fluid transported from capture site i through transport site j in year y. Estimation, via application of mass balance on all sites and/or intermediate nodes, beginning at capture site i, and ending at transport site j. An intermediate node is any location where two or more flowpaths commingle or diverge.
Monitoring frequency	Continuous metering with monthly aggregation, with a minimum of one measurement every 15 minutes. Absolute frequency of metering shall be highest level possible.
QA/QC procedures	Data from pressure and temperature compensated instruments shall be converted to the project's reference conditions. Conversion shall be done using the same pressure and/or temperature used for the specific meter calibration. Flow meters shall be placed based on manufacturer recommendations, and with the guidance provided in Table 4 applied.

	Meters shall be checked and calibrated at regular intervals according to manufacturer's specifications.
Purpose of data	Used to determine the apportionment factor to quantify project emissions caused by activities related to project and non-project streams, $AF_{Project_{i,y}}$.
Additional comment	

Data / Parameter	$Q_{Non-project_{Transport_{i,j,y}}}$
Unit	tonnes
Description	Mass of non-project fluid transported from capture site i through transport site j in year y. (Parameter ID 20 from methodology).
Source of data	Measurement and/or estimation
Value(s) applied	For ex-ante estimative, it is 0. If applicable, it will be measured or estimated.
Measurement methods and procedures	Direct measurement of the mass of project fluid transported from capture site i through transport site j in year y; alternatively, calculation per Equation 3 using direct metering of volumetric flow and density of project fluid transported from capture site i through transport site j in year y. Estimation, via application of mass balance on all sites and/or intermediate nodes, beginning at capture site i, and ending at transport site j. An intermediate node is any location where two or more flowpaths commingle or diverge.
Monitoring frequency	Continuous metering with monthly aggregation, with a minimum of one measurement every 15 minutes. Absolute frequency of metering shall be highest level possible.

QA/QC procedures	Data from pressure and temperature compensated instruments shall be converted to the project's reference conditions. Conversion shall be done using the same pressure and/or temperature used for the specific meter calibration. Flow meters shall be placed based on manufacturer recommendations, and with the guidance provided in Table 4 applied. Meters shall be checked and calibrated at regular intervals according to manufacturer's specifications.
Purpose of data	Used to determine the apportionment factor to quantify project emissions caused by activities related to project and non-project streams, $AF_{Project_{i,y}}$.
Additional comment	

Data / Parameter	$Area_{dLUC_i}$
Unit	m ² , ha, acre, or other
Description	Area affected by direct land use changes from construction of project infrastructure at site i in year y. (Parameter ID 21 from methodology).
Source of data	Estimated
Value(s) applied	For ex-ante estimative, it is 0. If applicable, it will be measured or estimated.
Measurement methods and procedures	Based on EIA, 2024.
Monitoring frequency	Once at project validation, and/or at verification immediately following installation of additional project infrastructure
QA/QC procedures	N/A

Purpose of data	Used to determine project emissions from land clearing and soil carbon loss from installation of carbon capture, transportation, storage, and injection facilities in year y , PE_{p3y} .
Additional comment	N/A

Data / Parameter	$Q_{DS,i,y}$
Unit	tonnes
Description	Mass of vent gas emitted during well drill and service at site i in year y . (Parameter ID 22 from methodology).
Source of data	Estimation
Value(s) applied	For ex-ante estimative, it is 0. If applicable, it will be estimated.
Measurement methods and procedures	If the drilling or well service activity results in release from subsurface to atmosphere, the quantity of gas released shall be estimated according to the relevant rules in the injection site jurisdiction. In the absence of relevant rules in the injection site jurisdictions, engineering estimates based on site-specific parameters are required.
Monitoring frequency	Once per event
QA/QC procedures	Where possible, these estimates shall be obtained from drilling or well servicing reports to the relevant regulators.
Purpose of data	Used to determine project emissions from construction of carbon capture, transportation, and storage facilities and well drill and service in year y , PE_{p4y} .
Additional comment	PE_{p4y} at this moment, is 0 since the stratigraphic was drilled before the crediting period start date and,

	according to the methodology, section 5.2.3, c. i., this type of emissions are amortised over the project crediting period (i.e., 40 years). If emission happens during monitoring wells drilling and if this drilling happens after the crediting period start date, this will be include in PE_{p4y} .
--	--

Data / Parameter	w_{GHG}
Unit	% GHG by mass
Description	Mass fraction of GHG in vent gas. (Parameter ID 23 from methodology).
Source of data	Measurement or estimation
Value(s) applied	For ex-ante estimative, it is 0. If applicable, it will be measured or estimated.
Measurement methods and procedures	Two options are permitted: 1. A measured gas analysis. 2. Conservatively estimation of the entire release to be methane(i.e., $w_{CH_4} = 100\%$).
Monitoring frequency	Once per event
QA/QC procedures	Where needed, project developers shall apply the methods described in 5.5.5 Ia to determine the relevant mass fractions.
Purpose of data	Used to determine project emissions from construction of carboncapture, transportation, and storage facilities and well drill and service in year y , PE_{p4y} .
Additional comment	PE_{p4y} at this moment, is 0 since the stratigraphic was drilled before the crediting period start date and, according to the methodology, section 5.2.3, c. i., this

	type of emissions are amortised over the project crediting period (i.e., 40 years). If emission happens during monitoring wells drilling and if this drilling happens after the crediting period start date, this will be included in PE_{p4y} .
--	--

Data / Parameter	MI _{i,j}																					
Unit	kg																					
Description	Quantity of material inputs of type j consumed at site i in year y. In this case, Triethylene glycol (TEG) and lubricating oil. (Parameter ID 24 from methodology).																					
Source of data	Measurement																					
Value(s) applied	Triethylene glycol (TEG) and lubricating oil <table><tr><th>Year</th><th>MI_{i,TEG}</th><th>MI_{i,lubricating oil}</th></tr><tr><td>Year 1 - 01/09/2026 to 31/12/2026</td><td>1,424</td><td>14</td></tr><tr><td>Year 2 - 01/01/2027 to 31/12/2027</td><td>4,260</td><td>43</td></tr><tr><td>Year 3 - 01/01/2028 to 31/12/2028</td><td>4,260</td><td>43</td></tr><tr><td>Year 4 - 01/01/2029 to 31/12/2029</td><td>4,260</td><td>43</td></tr><tr><td>Year 5 - 01/01/2030 to 31/12/2030</td><td>4,260</td><td>43</td></tr><tr><td>Year 6 - 01/01/2031 to 31/08/2031</td><td>2,836</td><td>29</td></tr></table>	Year	MI _{i,TEG}	MI _{i,lubricating oil}	Year 1 - 01/09/2026 to 31/12/2026	1,424	14	Year 2 - 01/01/2027 to 31/12/2027	4,260	43	Year 3 - 01/01/2028 to 31/12/2028	4,260	43	Year 4 - 01/01/2029 to 31/12/2029	4,260	43	Year 5 - 01/01/2030 to 31/12/2030	4,260	43	Year 6 - 01/01/2031 to 31/08/2031	2,836	29
Year	MI _{i,TEG}	MI _{i,lubricating oil}																				
Year 1 - 01/09/2026 to 31/12/2026	1,424	14																				
Year 2 - 01/01/2027 to 31/12/2027	4,260	43																				
Year 3 - 01/01/2028 to 31/12/2028	4,260	43																				
Year 4 - 01/01/2029 to 31/12/2029	4,260	43																				
Year 5 - 01/01/2030 to 31/12/2030	4,260	43																				
Year 6 - 01/01/2031 to 31/08/2031	2,836	29																				
Measurement methods and procedures	Measurement of the quantity of material inputs consumed by carbon capture, transportation, and storage equipment based onoperating records.																					
Monitoring frequency	Continuous, with monthly aggregation																					
QA/QC procedures	None																					

Purpose of data	Used to determine project emissions from production and delivery of material inputs consumed by carbon capture, transportation, and storage equipment in year y , PE_{p5y} .
Additional comment	N/A

Data / Parameter	$Fuel_{j,i,y}$
Unit	L, m ³ , kg, or other
Description	Quantity of fuel of type j consumed at site i by the project for purposes other than generation of electricity and/or co-generation of heat in year y . (Parameter ID 25 from methodology).
Source of data	Measurement
Value(s) applied	For ex-ante estimative, it is 0. It will be measured, if applicable.
Measurement methods and procedures	For gaseous fuels: direct measurement of the quantity of fuel of type j consumed at site i by the project for purposes other than generation of electricity and/or co-generation of heat in year y. For liquid or solid fuels: monthly reconciliation or allocation of the quantity of fuel of type j consumed at site i by the project for purposes other than generation of electricity and/or co-generation of heat in monitoring period.
Monitoring frequency	For gaseous fuels: continuous metering with monthly aggregation, with at least one measurement every 15 minutes; absolute frequency of metering shall be highest level possible.

	For liquid or solid fuels: reconciliation of purchasing records monthly with inventory adjustments as needed.
QA/QC procedures	For gaseous fuels only: Data from pressure and temperature compensated instruments shall be converted to the project's reference conditions. Conversion shall be done using the same pressure and/or temperature used for the specific meter calibration. Flow meters shall be placed based on manufacturer recommendations and checked and calibrated at regular intervals according to manufacturer's specifications. For liquid or solid fuels: reconciliation of purchasing records with inventory adjustments as needed.
Purpose of data	Used to determine project emissions from fuel extraction, processing, and delivery in year y, PE_{P6y}. Used to determine project emissions from fuel consumption in year y, PE_{P9y}.
Additional comment	There is no use of fuels in this project. If applicable in the future, it will be measure.

Data / Parameter	$Fuel_{jGeneration,I,y}$
Unit	L, m ³ , kg, or other
Description	Quantity of fuel of type j consumed at site i by grid-disconnected captive sources to generate electricity and/or co-generate heat in year y (Parameter ID 26 from methodology).
Source of data	Measured

Value(s) applied	For ex-ante estimative, it is 0. It will be measured, if applicable.
Measurement methods and procedures	For gaseous fuels: direct measurement of the quantity of fuel of type j consumed at site i by grid-disconnected captive sources to generate electricity and/or co-generate heat in year y For liquid or solid fuels: monthly reconciliation or allocation of the quantity of fuel of type j consumed at site i by grid-disconnected captive sources to generate electricity and/or co-generate heat in year y
Monitoring frequency	For gaseous fuels: continuous metering with monthly aggregation, with at least one measurement every 15 minutes; absolute frequency of metering shall be highest level possible For liquid or solid fuels: reconciliation of purchasing records monthly with inventory adjustments as needed
QA/QC procedures	For gaseous fuels only: Data from pressure and temperature compensated instruments shall be converted to the project's reference conditions. Conversion shall be done using the same pressure and/or temperature used for the specific meter calibration. Flow meters shall be placed based on manufacturer recommendations and checked and calibrated at regular intervals according to manufacturer's specifications. For liquid or solid fuels: reconciliation of purchasing records with inventory adjustments as needed.

Purpose of data	Used to determine project emissions from fuel extraction, processing, and delivery in year y , PE_{p6y} .
Additional comment	There is no use of grid-disconnected captive sources in this project. If applicable in the future, it will be measure.

Data / Parameter	Generation _{CCGS_{i,j,y}}
Unit	Unitless
Description	Portion of the generation of energy (electrical and thermal) supplied to the project at site i by grid-disconnected captive power source j in year y (Parameter ID 27 from methodology).
Source of data	Calculation
Value(s) applied	For ex-ante estimative, it is 0. It will be measured, if applicable.
Measurement methods and procedures	Calculated according to Equation 18
Monitoring frequency	Continuously, with monthly aggregation
QA/QC procedures	None
Purpose of data	Used to determine project emissions from fuel extraction, processing, and delivery in year y , PE_{p6y} Used to determine project emissions from fuel consumption in year y , PE_{p9y}
Additional comment	There is no use of grid-disconnected captive sources in this project.

Data / Parameter	Electricity _{CCGS_{i,j,y}}
------------------	---

Unit	MWhE, GJ, or other
Description	Quantity of electricity supplied to the project at site i by grid- disconnected captive power source j in year y (Parameter ID 28 from methodology).
Source of data	Measurement or estimation
Value(s) applied	For ex-ante estimative, it is 0. It will be measured or estimated, if applicable.
Measurement methods and procedures	Direct measurement of electricity that is generated on-site and consumed in project equipment at each facility involved in the capture, processing, compression, transport, injection, and storage of CO₂. In certain cases, non-project loads may be tied into the same electricity meter. Where this occurs, estimates with justification are required to deduct consumption from non-project loads from the continuously metered data. In these cases, the maximum power rating of each piece of equipment is used in conjunction with operating hours of the equipment to estimate the electricity consumption. Operating hours may be derived from recorded operating hours of the equipment or conservatively estimated to be equal to the recorded operating hours of the plant. Projects require an individual meter for exported electricity.
Monitoring frequency	Continuous metering, with monthly aggregation, of electricity which is generated at grid-disconnected captive power sources and consumed in project equipment, or reconciliation of maximum power rating for each type of equipment and operating hours, or a combination of the two.

	Absolute frequency of metering shall be highest level possible.
QA/QC procedures	In cases where electricity meters are regulated (e.g. the electricity is supplied to the electric grid), the electricity meter shall be subject to regular maintenance and testing in accordance with the stipulation of the meter supplier and/or per the requirements set by the grid operators or national requirements. The calibration of meters, including the frequency of calibration, shall be done in accordance with national standards or requirements set by the meter supplier or requirements set by the grid operators. The accuracy class of the meters should be in accordance with the stipulation of the meter supplier and/or as the requirements set by the grid operators or national requirements. In cases where electricity meters are not regulated (e.g. the electricity is supplied to captive users), the electricity meter shall be subject to regular maintenance and testing in accordance with the stipulation of the meter supplier or national requirements. The calibration of meters, including the frequency of calibration, shall be done in accordance with national standards or requirements set by the meter supplier. The accuracy class of the meters shall be in accordance with the stipulation of the meter supplier or national requirements. If these standards are not available, calibrate the meters every three years and use the meters with at least 0.5 accuracy class (e.g. meter with 0.2 accuracy class is more accurate and thus it is accepted). The electricity generation (gross or net) shall be cross-checked with records of electricity sale (e.g. sales receipt).
Purpose of data	Used to determine project emissions from fuel extraction,

	processing, and delivery in year y, PE_{p6y}. Used to determine project emissions from fuel consumption in year y, PE_{p9y}.
Additional comment	There is no use of grid-disconnected captive sources in this project.

Data / Parameter	$Heat_{CCGS_{i,j,y}}$
Unit	MWh _T , GJ, or other
Description	Quantity of heat supplied to the project at site i and co-generated by captive power source j in year y . (Parameter ID 29 from methodology).
Source of data	Measurement or estimation
Value(s) applied	For ex-ante estimative, it is 0. It will be measured or estimated, if applicable.
Measurement methods and procedures	Heat generation is determined as the difference of the enthalpy of the steam or hot water generated minus the enthalpy of the feedwater and any condensate return. The respective enthalpies shall be determined based on the mass (or volume) flows, the temperatures and, in case of superheated steam, the pressure. Steam tables or appropriate thermodynamic equations may be used to calculate the enthalpy as a function of temperature and pressure. In certain cases, non-project equipment may be tied into the heat supply. Where this occurs, estimates with justification are required to deduct consumption from non-project equipment from the continuously metered data.

	In these cases, the maximum heat duty of each piece of equipment is used in conjunction with operating hours of the equipment to estimate heat consumption. Operating hours may be derived from recorded operating hours of the equipment or conservatively estimated to be equal to the recorded operating hours of the plant.
Monitoring frequency	Continuous measurement, with monthly aggregation, of the heat that is co-generated by captive power sources and consumed in project equipment, or reconciliation of maximum heat duty for each type of equipment and operating hours, or a combination of the two.
QA/QC procedures	Cross check measurement results with records for sold heat and the other energy measurements where relevant.
Purpose of data	Used to determine project emissions from fuel extraction, processing, and delivery in year y , PE_{p6y} . Used to determine project emissions from fuel consumption in year y , PE_{p9y} .
Additional comment	There is no use of heat in this project.

Data / Parameter	$\eta_{\text{Electricity}}$
Unit	Unitless
Description	Efficiency of electricity production of captive power source j in year y . (Parameter ID 30 from methodology).
Source of data	The following sources are permitted, in order of preference: 1. Manufacturer specifications

	2. Measurement of the efficiency of electricity production of the captive power source. Assume a default value of 35%, inf applicable.
Value(s) applied	For ex-ante estimative, it is 0. It will be indicated, if applicable.
Measurement methods and procedures	1. Manufacturer specification would provide the appropriate value for efficiency of electricity production. 2. Use national or international standards applicable to the captive power source to determine the efficiency of electricity production.
Monitoring frequency	1. Once, at project validation 2. Once, at project validation
QA/QC procedures	In cases where electricity meters are regulated (e.g. the electricity is supplied to the electric grid), the electricity meter shall be subject to regular maintenance and testing in accordance with the stipulation of the meter supplier and/or as per the requirements set by the grid operators or national requirements. The calibration of meters, including the frequency of calibration, shall be done in accordance with national standards or requirements set by the meter supplier or requirements set by the grid operators. The accuracy class of the meters shall be in accordance with the stipulation of the meter supplier and/or per the requirements set by the grid operators or national requirements. In cases where electricity meters are not regulated (e.g. the electricity is supplied to captive users), the electricity meter shall be subject to regular maintenance and testing in accordance with the stipulation of the meter supplier or national requirements. The calibration of meters, including the frequency of

	calibration, shall be done in accordance with national standards or requirements set by the meter supplier. The accuracy class of the meters shall be in accordance with the stipulation of the meter supplier or national requirements. If these standards are not available, calibrate the meters every three years and use the meters with at least 0.5 accuracy class (e.g. meter with 0.2 accuracy class is more accurate and thus it is accepted). The electricity generation (gross or net) shall be cross-checked with records of electricity sale (e.g. sales receipt).
Purpose of data	Used to determine project emissions from fuel extraction, processing, and delivery in year y , PE_{p6y} . Used in the determination of project emissions from fuel consumption in year y , PE_{p9y} .
Additional comment	There is no use of grid-disconnected captive sources in this project. If applicable in the future, it will be indicated.

Data / Parameter	η_{Heat}
Unit	Unitless
Description	Efficiency of heat production of captive power source j in year y . (Parameter ID 31 from methodology).
Source of data	The following sources are permitted, in order of preference: 1. Manufacturer specifications 2. Measurement of the efficiency of heat production of the captive power source. Assume a default value of 80%

Value(s) applied	For ex-ante estimative, it is 0. It will be indicated, if applicable.
Measurement methods and procedures	1. Manufacturer's specification would provide the appropriate value for efficiency of heat production 2. Use national or international standards applicable to the captive power source to determine the efficiency of heat production
Monitoring frequency	1. Once, at project validation 2. Once, at project validation
QA/QC procedures	Heat consumption shall be from continuously metered data wherever possible; however, in certain cases other non-project equipment may be tied into the heat supply. Where this occurs, estimates with justification are required. In these cases, the maximum heat duty of each piece of equipment is used in conjunction with operating hours of the equipment to estimate heat consumption. Operating hours may be derived from recorded operating hours of the equipment, or conservatively estimated to be equal to the recorded operating hours of the plant.
Purpose of data	Used to determine project emissions from fuel extraction, processing, and delivery in year y, PE_{p6y}. Used to determine project emissions from fuel consumption in year y, PE_{p9y}.
Additional comment	There is no use of heat in this project. If applicable in the future, it will be indicated.

Data / Parameter	Electricity _{Total,j,y}
Unit	MWh _E , GJ, or other

Description	Total quantity of electricity generated by grid-disconnected captive power source j in year y. (Parameter ID 32 from methodology).
Source of data	Measured
Value(s) applied	For ex-ante estimative, it is 0. It will be measured, if applicable.
Measurement methods and procedures	Direct measurement of electricity that is generated by grid-disconnected captive power sources. Projects require a separate meter for exported electricity
Monitoring frequency	Continuous metering, with monthly aggregation, of electricity that is generated at grid-disconnected captive power sources. Absolute frequency of metering shall be highest level possible.
QA/QC procedures	In cases where electricity meters are regulated (e.g. the electricity is supplied to the electric grid), the electricity meter shall be subject to regular maintenance and testing in accordance with the stipulation of the meter supplier and/or as per the requirements set by the grid operators or national requirements. The calibration of meters, including the frequency of calibration, shall be done in accordance with national standards or requirements set by the meter supplier or requirements set by the grid operators. The accuracy class of the meters shall be in accordance with the stipulation of the meter supplier and/or as per the requirements set by the grid operators or national requirements. In cases where electricity meters are not regulated (e.g. the electricity is supplied to captive users), the electricity meter shall be subject to regular maintenance and testing in accordance with the stipulation of the meter supplier or national requirements.

	The calibration of meters, including the frequency of calibration, should be done in accordance with national standards or requirements set by the meter supplier. The accuracy class of the meters shall be in accordance with the stipulation of the meter supplier or national requirements. If these standards are not available, calibrate the meters every three years and use the meters with at least 0.5 accuracy class (e.g. meter with 0.2 accuracy class is more accurate and thus it is accepted). The electricity generation (gross or net) shall be cross-checked with records of electricity sale (e.g. sales receipt).
Purpose of data	Used to determine project emissions from fuel extraction, processing, and delivery in year y, PE_{p6y}. Used to determine project emissions from fuel consumption in year y, PE_{p9y}.
Additional comment	There is no use of grid-disconnected captive sources in this project. If applicable in the future, it will be measured.

Data / Parameter	$Heat_{Total,j,y}$
Unit	MWh _T , GJ, or other
Description	Total quantity of heat co-generated by captive power source j in year y . (Parameter ID 33 from methodology).
Source of data	Measured or estimated
Value(s) applied	For ex-ante estimative, it is 0. It will be measured or estimated, if there is any electricity consumed at site i from the grid-connected power source.
Measurement methods and procedures	Heat generation is determined as the difference of the enthalpy of the steam or hot water generated minus the

	enthalpy of the feedwater and any condensate return. The respective enthalpies shall be determined based on the mass (or volume) flows, the temperatures and, in case of superheated steam, the pressure. Steam tables or appropriate thermodynamic equations may be used to calculate the enthalpy as a function of temperature and pressure.
Monitoring frequency	Continuous measurement, with monthly aggregation, of the heat that is co-generated by captive power sources.
QA/QC procedures	Cross check measurement results with records for sold heat and the other energy measurements where relevant.
Purpose of data	Used to determine project emissions from fuel extraction, processing, and delivery in year y , PE_{P6y} . Used to determine project emissions from fuel consumption in year y , PE_{P9y} .
Additional comment	There is no use of heat in this project. If applicable in the future, it will be measure.

Data / Parameter	Electricity _{i,j}
Unit	MWh _E
Description	Quantity of electricity consumed at site i from the grid-connected power source j in year y (MWh _E). (Parameter ID 34 from methodology). In this case combusted biomass.
Source of data	Measurement
Value(s) applied	For ex-ante estimative, it is 61,915. It will be measured when to start consuming
Measurement methods and procedures	Direct measurement of electricity consumed at site i from

	the grid-connected power source j in year y In certain cases, non-project loads may be tied into the same electricity meter. Where this occurs, estimates with justification are required to deduct consumption from non-project loads from the continuously metered data. In these cases, the maximum power rating of each piece of equipment is used in conjunction with operating hours of the equipment to estimate the electricity consumption. Operating hours may be derived from recorded operating hours of the equipment, or conservatively estimated to be equal to the recorded operating hours of the plant. Projects require a separate meter for exported electricity.
Monitoring frequency	Continuous metering with monthly aggregation, with a minimum of one measurement every 15 minutes Continuous metering with monthly aggregation, or reconciliation of maximum power rating for each type of equipment and operating hours, or a combination of the two. Absolute frequency of metering shall be highest level possible.
QA/QC procedures	Internal records. Where project consumption of electricity from grid-connected captive and non-captive power sources is measured using a single meter, the project developer shall assign to the grid-connected non-captive sources any metered electricity exceeding the quantities (accounting for transmission and distribution losses) that are demonstrated to have been provided by captive power sources in the monitoring period. In cases where electricity meters are regulated (e.g. the

	electricity is supplied to the electric grid), the electricity meter shall be subject to regular maintenance and testing in accordance with the stipulation of the meter supplier and/or as per the requirements set by the grid operators or national requirements. The calibration of meters, including the frequency of calibration, shall be done in accordance with national standards or requirements set by the meter supplier or requirements set by the grid operators. The accuracy class of the meters shall be in accordance with the stipulation of the meter supplier and/or as per the requirements set by the grid operators or national requirements. In cases where electricity meters are not regulated (e.g. the electricity is supplied to captive users), the electricity meter shall be subject to regular maintenance and testing in accordance with the stipulation of the meter supplier or national requirements. The calibration of meters, including the frequency of calibration, shall be done in accordance with national standards or requirements set by the meter supplier. The accuracy class of the meters shall be in accordance with the stipulation of the meter supplier or national requirements. If these standards are not available, calibrate the meters every three years and use the meters with at least 0.5 accuracy class (e.g. meter with 0.2 accuracy class is more accurate and thus it is accepted). The electricity generation (gross or net) shall be cross-checked with records of electricity sale (e.g. sales receipt).
Purpose of data	Used to determine project emissions from electricity consumption in year y , PE_{p7y} .
Additional comment	N/A

Data / Parameter	$EF_{GCPP_{j,y}}$
Unit	t CO ₂ e per MWh
Description	Emissions intensity factor associated generation of electricity at the grid-connected power source j in year y. (Parameter ID 35 from methodology).
Source of data	For captive power sources the factor is determined through the application of CDM TOOL 05. Biomass which is demonstrated to be renewable is deemed to have no emissions when consumed in grid-connected power generation facilities. In this project the biomass combusted is considered renewable following the instructions provided in parameter 48 from methodology. In applicable, for non-captive power sources, the factor is determined through the application of CDM TOOL07, using values published by Brazilian authorities (MCTI).
Value(s) applied	For ex-ante estimative, it is 0, using renewable biomass If applicable: For captive power sources: 0 for renewable biomass (see parameter 48). For non-captive power sources: 0.2498 tCO₂e/MWh
Measurement methods and procedures	For renewable biomass, it is not applicable. For grid-connected non-captive power source, using CDM TOOL 07, considering data provided by DNA - MCTI
Monitoring frequency	Once per monitoring period
QA/QC procedures	N/A

Purpose of data	Used to determine project emissions from consumption of electricity from grid-connected captive and non-captive powersources in year y , PE_{p7y} , if applicable.
Additional comment	The combined margin emissions factor is calculated with data provided and monitored by Designated National Authority (DNA) – MCTI, Government of Brazil.

Data / Parameter	$EF_{grid,BM,y}$
Unit	t CO ₂ e per MWh
Description	Building margin CO ₂ emission factor for the project electricity system in year y
Source of data	Designated National Authority (DNA) - MCTI
Value(s) applied	For ex-ante estimative, it is 0. If applicable, 0.0523 will be used.
Measurement methods and procedures	Provided by DNA - MCTI
Monitoring frequency	Once per monitoring period
QA/QC procedures	Official source of data.
Purpose of data	Used to determine project emissions from consumption of electricity from grid-connected non-captive power sources in year y , PE_{p7y} , if applicable.
Additional comment	This data is available on the MCTI website: https://www.gov.br/mcti/pt-br/acompanhe-o-mcti/sirene/dados-e-ferramentas/fatores-de-emissao

Data / Parameter	$EF_{grid,OM,y}$
Unit	t CO ₂ e per MWh

Description	Operation margin CO ₂ emission factor for the project electricity system in year y
Source of data	Designated National Authority (DNA) - MCTI
Value(s) applied	For ex-ante estimative, it is 0. If applicable, 0.4473 will be used.
Measurement methods and procedures	Provided by DNA - MCTI
Monitoring frequency	Once per monitoring period
QA/QC procedures	Official source of data.
Purpose of data	Used to determine project emissions from consumption of electricity from grid-connected non-captive powersources in year y, PE_{p7y} , if applicable.
Additional comment	This data is available on the MCTI website: https://www.gov.br/mcti/pt-br/acompanhe-o-mcti/sirene/dados-e-ferramentas/fatores-de-emissao

Data / Parameter	$TDL_{i,y}$
Unit	%
Description	Average technical transmission and distribution losses for provided electricity to site i in year y. (Parameter ID 36 from methodology).
Source of data	Values published by jurisdictional and national host country authorities, Energisa MT from ANEEL Portal Reports Abertos .
Value(s) applied	For ex-ante estimative, it is 0. If applicable, 8.79 will be used.
Measurement methods and procedures	None

Monitoring frequency	Once per monitoring period
QA/QC procedures	None
Purpose of data	Used to determine project emissions from consumption of electricity from grid-connected non-captive power sources in year y , PE_{p7y} , if applicable.
Additional comment	N/A

Data / Parameter	$V_{\text{gas vented}_{s,y}}$
Unit	m^3
Description	Volume of gas vented to atmosphere downstream of the injection meter at injection site s in year y . (Parameter ID 37 from methodology).
Source of data	Estimation
Value(s) applied	For ex-ante estimative, it is 0. It will be estimated, if any venting situation.
Measurement methods and procedures	Estimate volume based on the pressure, length and diameter of the pipe being serviced.
Monitoring frequency	Once per event. See monitoring plan for more details.
QA/QC procedures	None
Purpose of data	Used to determine project emissions from emissions from venting at injection sites, PE_{p16y} , if applicable.
Additional comment	To be monitored when the project is operating.

Data / Parameter	$\text{Source}_{k,s,y}$
Unit	Unitless

Description	Number of fugitive gas sources of type k downstream of the injection meter at injection site s in year y. (Parameter ID 38 from methodology).
Source of data	Measured
Value(s) applied	For ex-ante estimative, it is 0. It will be estimated, if any venting situation.
Measurement methods and procedures	Based on the number of sources of each type at the injection site, after the injection meter and above the surface, per facility engineering drawings and/or operating records
Monitoring frequency	Continuously, with monthly aggregation
QA/QC procedures	None
Purpose of data	Used to determine project emissions from fugitive emissions at injection sites, PE_{p17y} .
Additional comment	After installation, the number of sources of each type will be identified at the injection site, after the injection meter and above the surface. To be monitored when the project is operating. See monitoring plan for more details.

Data / Parameter	$Time_{s,y}$
Unit	Hours
Description	Operating hours at injection site s in year y. (Parameter ID 39 from methodology).
Source of data	Measured
Value(s) applied	For ex-ante estimative, it is 8,760. It will be measured after project operation start.

Measurement methods and procedures	Based on operating hours of injection site, per site operating records.
Monitoring frequency	Continuously, with monthly aggregation.
QA/QC procedures	Where operating hours are unknown, apply prorated hours for year y at an assumed rate of 8,760 hours per calendar year.
Purpose of data	Used to determine project emissions from fugitive emissions at injection sites, PE_{P17y} .
Additional comment	To be measured when the project is operating.

Data / Parameter	$M_{CO_2 leaked,y}$
Unit	t CO ₂ e
Description	Mass of CO ₂ estimated to have leaked from the subsurface to atmosphere in loss event j in year y. (Parameter ID 40 from methodology).
Source of data	Estimation
Value(s) applied	For ex-ante estimative, it is 0. It will be estimated, if any leaked situation.
Measurement methods and procedures	Estimated via calibrated reservoir modelling
Monitoring frequency	Once per loss event
QA/QC procedures	GS4GG Tool 03 - Project emissions calculation and monitoring requirements for geological storage complex for requirements
Purpose of data	Used to determine project emissions from the subsurface to atmosphere, PE_{P19y}
Additional comment	To be estimated when the project is operating.

Data / Parameter	Cumulative Allocation _{Project,y}
Unit	Unitless
Description	Portion of CO ₂ supplied to project infrastructure since the creditingperiod start date which is attributable to CO ₂ captured by the project through to the end of year y. (Parameter ID 41 from methodology).
Source of data	Calculation
Value(s) applied	For ex-ante estimative, it is 1. If applicable, it will be measured or estimated.
Measurement methods and procedures	Calculated
Monitoring frequency	Continuously, with monthly aggregation
QA/QC procedures	None
Purpose of data	Used to determine leakage emissions from emissions from the subsurface to atmosphere, PE _{P19y} .
Additional comment	N/A

Data / Parameter	Renewability of biomass _{i,n,k}
Unit	None
Description	Renewability of biomass of type n fermented at biomass fermentation facility i in year y. (Parameter ID 42 from methodology).
Source of data	Biomass fermentation facility records
Value(s) applied	1

Measurement methods and procedures	Operating records from the biomass fermentation facility (e.g., purchasing invoices, sourcing agreements with growers, registration records or supply agreements with the fermentation facility or fermentation products) which indicate the type and source of biomass used at the facility during the monitoring period. For any existing biomass fermentation facility, the renewability of biomass feedstock consumed at the facility shall be ascertained using one of the following options: Option 1: During validation and at each verification, provision of suitable evidence to VVBs that biomass used at the biomass fermentation facility(ies) during the monitoring period complies with both the criteria for the definition of renewable biomass provided in <u>CDM EB 23 Report Annex 18</u> and any applicable laws and regulations; or,; or, Option 2: At validation and each verification, provision of suitable evidence confirming the registration or certification of the biomass fermentation facility(ies) or fermentation product(s) under any eligible jurisdictional or host country standard, regulation, or program identified in APPENDIX 1 .
Monitoring frequency	During validation and at each verification following option 1. See appendix 6.
QA/QC procedures	None
Purpose of data	Guarantee the sustainability of the biomass used in the project
Additional comment	N/A
Data / Parameter	Biomass _{totali,b,}

Unit	tonnes, or other (dry basis)
Description	The total quantity of the relevant renewable biomass of type b consumed by biomass fermentation facility i in year y. (Parameter ID 43 from methodology).
Source of data	Biomass fermentation facility operating records
Value(s) applied	For ex-ante estimative, it is 0. If occurs materially increase in consumption of biomass to the benefit of the project, it will be measured or estimated.
Measurement methods and procedures	Operating records from the biomass fermentation facility (e.g., Facility operating records, weighbridge data, purchase invoices, inventory management system) which indicate the type and quantity of biomass consumed at the facility during the monitoring period.
Monitoring frequency	Continuous monitoring with annual aggregation, if applicable.
QA/QC procedures	Cross-check with purchase records, inventory adjustments. Ensure moisture content adjustments are documented and applied correctly.
Purpose of data	Used to determine leakage emissions at biomass fermentation facility i in year y, $LE_{Li,y}$, if occurs materially increase in consumption of biomass to the benefit of the project
Additional comment	According to section 5.2.4 of the methodology, leakage emissions which are considered relevant for assessment are: a. Leakage emissions from biomass due to shift of pre-project activities, diversion of biomass from other applications, processing and transportation of biomass and biomass residues outside of the project. Project developers shall apply the various

	approaches described in 5.7.3 in assessing and estimating leakage from biomass. The leakage emissions were considered 0 since the fermentation site is not a new installation and there is no shift of pre-project activities, diversion of biomass residues from other applications, and processing and transportation of biomass residues outside of the project boundary.
--	--

Data / Parameter	Output _{currenti,p}
Unit	kg, m ³ , GJ, or other
Description	The trailing three-year average quantity of renewable energy product p produced by the biomass fermentation facility i ending in the current period. (Parameter ID 44 from methodology).
Source of data	Biomass fermentation facility operating records
Value(s) applied	For ex-ante estimative, it is 0. If applicable, it will be measured or estimated.
Measurement methods and procedures	Operating records from the biomass fermentation facility (e.g., sales invoices, inventory management system) which indicate the type and quantity of renewable energy product manufactured and sold or verifiably utilized at the facility during the monitoring period based on the most recent three year. Estimate the average quantity of renewable energy product p participating in an eligible program (see APPENDIX 1) produced by the biomass fermentation facility i using the most recent three years data. If the facility has been operating for less than three years, use

	the average over the operational portion of the threeyear period.
Monitoring frequency	Continuous monitoring with annual aggregation, if applicable.
QA/QC procedures	Cross-check with sales records, inventory adjustments.
Purpose of data	Used to determine leakage emissions at biomass fermentation facility i in year y , $LE_{Li,y}$, if occurs materially increase in consumption of biomass to the benefit of the project
Additional comment	According to section 5.2.4 of the methodology, leakage emissions which are considered relevant for assessment are: b. Leakage emissions from biomass due to shift of pre-project activities, diversion of biomass from other applications, processing and transportation of biomass and biomass residues outside of the project. Project developers shall apply the various approaches described in 5.7.3 in assessing and estimating leakage from biomass. The leakage emissions were considered 0 since the fermentation site is not a new installation and there is no shift of pre-project activities, diversion of biomass residues from other applications, and processing and transportation of biomass residues outside of the project boundary.
Data / Parameter	Output _{initiali,p}
Unit	kg, m ³ , GJ, or other

Description	The trailing three-year average quantity of renewable energy product p produced by the biomass fermentation facility i ending in the initial period. (Parameter ID 45 from methodology).
Source of data	Biomass fermentation facility operating records
Value(s) applied	For ex-ante estimative, it is 0. If applicable, it will be measured or estimated.
Measurement methods and procedures	Operating records from the biomass fermentation facility (e.g., audited production logs, sales receipts/invoices, inventory reconciliation reports.) which indicate the type and quantity of renewable energy product manufactured and sold or verifiably utilized at the facility during the monitoring period. Estimate the average quantity of renewable energy product p participating in an eligible program (see APPENDIX 1) produced by the biomass fermentation facility i using data from the period spanning three-years prior to date on which the biomass fermentation facility began supplying CO₂ to project transportation and/or storage infrastructure. If the facility was in operation for less than three years by that date, use the average over the operational portion during the three-year period.
Monitoring frequency	Once at validation or first verification, if applicable.
QA/QC procedures	Cross-check with sales records, inventory adjustments. Monitor per renewable energy product type
Purpose of data	Used to determine leakage emissions at biomass fermentation facility i in year y, $LE_{Li,y}$, if occurs materially increase in consumption of biomass to the benefit of the project

Additional comment	According to section 5.2.4 of the methodology, leakage emissions which are considered relevant for assessment are: c. Leakage emissions from biomass due to shift of pre-project activities, diversion of biomass from other applications, processing and transportation of biomass and biomass residues outside of the project. Project developers shall apply the various approaches described in 5.7.3 in assessing and estimating leakage from biomass. The leakage emissions were considered 0 since the fermentation site is not a new installation and there is no shift of pre-project activities, diversion of biomass residues from other applications, and processing and transportation of biomass residues outside of the project boundary.
--------------------	--

Data / Parameter	Demand _{currenti,p}
Unit	kg, m ³ , GJ, or other
Description	The trailing three-year average market demand for renewable energy product p produced by the biomass fermentation facility i ending in the current period. (Parameter ID 46 from methodology).
Source of data	The following sources are permitted, in order of preference: – Reports from authorities overseeing respective eligible programs (see APPENDIX 1) – Official statistics published by jurisdictional and/or national host country authorities

	– Independent renewable energy product market analysis/research reports.
Value(s) applied	For ex-ante estimative, it is 0. If applicable, it will be measured or estimated.
Measurement methods and procedures	Estimate the average demand for renewable energy product p within the market(s) associated with the eligible program(s) (see APPENDIX 1) using the most recent three years data. If the facility has been operating for less than three years, use the average over the operational portion of the three-year period.
Monitoring frequency	Once per monitoring period aggregated annually, if applicable (i.e., if a capital expenditures satisfies condition 5.7.4 a).
QA/QC procedures	Cross-check relevance of the assessed market demand to renewable energy product p and/or the associated eligible program.
Purpose of data	Used to determine leakage emissions at biomass fermentation facility i in year y, $LE_{L1i,y}$, if occurs materially increase in consumption of biomass to the benefit of the project
Additional comment	According to section 5.2.4 of the methodology, leakage emissions which are considered relevant for assessment are: d. Leakage emissions from biomass due to shift of pre-project activities, diversion of biomass from other applications, processing and transportation of biomass and biomass residues outside of the project. Project developers shall apply the various approaches described in 5.7.3 in assessing and estimating leakage from biomass.

	The leakage emissions were considered 0 since the fermentation site is not a new installation and there is no shift of pre-project activities, diversion of biomass residues from other applications, and processing and transportation of biomass residues outside of the project boundary.
--	--

Data / Parameter	Demand _{initiali,p}
Unit	kg, m ³ , GJ, or other
Description	The trailing three-year average market demand for renewable energy product p produced by the biomass fermentation facility i ending in the initial period. (Parameter ID 47 from methodology).
Source of data	The following sources are permitted, in order of preference: – Reports from authorities overseeing respective eligible programs (see APPENDIX 1) – Official statistics published by jurisdictional and/or national host country authorities – Independent renewable energy product market analysis/research reports.
Value(s) applied	For ex-ante estimative, it is 0. If applicable, it will be measured or estimated.
Measurement methods and procedures	Estimate the average demand for renewable energy product p within the market(s) associated with the eligible program(s) (see APPENDIX 1) using data from the more recent of either:

	– The period beginning on the facility's initial commissioning date and ending three years hence, or on the project start date (whichever is earlier); or, – The period beginning on the latest recommissioning date associated with capital expenditures occurring prior to the project start date, and ending three years hence or on the project start date (whichever is earlier); or, – The period beginning on the earliest date on which the facility participated in an eligible renewable energy program (see APPENDIX 1), and ending three years hence or on the project start date (whichever is earlier);
Monitoring frequency	Once at validation or first verification, if applicable (i.e., if a capital expenditures satisfies condition 5.7.4 a).
QA/QC procedures	Cross-check relevance of the assessed market demand to renewable energy product p and/or the associated eligible program.
Purpose of data	Used to determine leakage emissions at biomass fermentation facility i in year y, $LE_{Li,y}$.
Additional comment	According to section 5.2.4 of the methodology, leakage emissions which are considered relevant for assessment are: e. Leakage emissions from biomass due to shift of pre-project activities, diversion of biomass from other applications, processing and transportation of biomass and biomass residues outside of the project. Project developers shall apply the various approaches described in 5.7.3 in assessing and estimating leakage from biomass. The leakage emissions were considered 0 since the fermentation site is not a new installation and there is no shift of pre-project activities, diversion of biomass

	residues from other applications, and processing and transportation of biomass residues outside of the project boundary.
--	--

Data / Parameter	Renewability of combusted biomass $_{i,n,k}$
Unit	None
Description	Renewability of biomass beneficially combusted at project site i in year y. (Parameter ID 48 from methodology).
Source of data	Operating records
Value(s) applied	1
Measurement methods and procedures	Operating records from the combustion equipment operator (e.g., purchasing invoices, sourcing agreements with growers, registration records or supply agreements with the combustion equipment operator) which indicate the type and source of biomass consumed by the combustion equipment at the facility during the monitoring period, to demonstrate the renewability of the biomass.
Monitoring frequency	At verification, following reconciliation of types and sources of biomass used during the monitoring period
QA/QC procedures	None
Purpose of data	Monitoring applicability of biomass fermented at biomass fermentation facilities.
Additional comment	N/A

Parameters from TOOL 03:

Data / Parameter	$M_{CO_2 detected\ s,j,y}$
Unit	t CO ₂
Description	Mass of CO ₂ which has migrated beyond the storage complex site s to the atmosphere detected in event j and period y. (Parameter ID 06 from Tool 03)
Source of data	Measurement or estimation
Value(s) applied	For ex-ante estimative, it is 0. It will be estimated, if any migration situation.
Measurement methods and procedures	See monitoring plan for more details.
Monitoring frequency	Continuous
QA/QC procedures	Monitored quantities shall be corrected to the project's reference temperature and pressure.
Purpose of data	Used to determine project emissions from storage sites include emissions from the migration of CO ₂ beyond the storage complex to the atmosphere in period y $PE_{storage,y}$.
Additional comment	N/A

Data / Parameter	$M_{CO_2 unmitigated\ y}$
Unit	t CO ₂
Description	Mass of CO ₂ which could have migrated through physical leakage pathways without detection or mitigation in period y. (Parameter ID 07 from Tool 03)
Source of data	Calculation

Value(s) applied	For ex-ante estimative, it is 0. It will be calculated, if any CO ₂ migration situation.
Measurement methods and procedures	Calculated, using Eq 2. See monitoring plan for more details.
Monitoring frequency	Calculated once per period y
QA/QC procedures	None
Purpose of data	Used to determine project emissions from storage sites include emissions from the migration of CO ₂ beyond the storage complex to the atmosphere in period y $PE_{storage,y}$.
Additional comment	N/A

Data / Parameter	$M_{CO_2\ undetected\ y}$
Unit	t CO ₂
Description	Mass of CO ₂ which could have migrated through leakage pathways without detection in period y. (Parameter ID 08 from Tool 03)
Source of data	Calculation
Value(s) applied	For ex-ante estimative, it is 0. It will be calculated, if any CO ₂ migration situation. See monitoring plan, for details.
Measurement methods and procedures	Calculated, using Eq 3.
Monitoring frequency	Calculated once per period y
QA/QC procedures	None
Purpose of data	Used to determine the mass of CO ₂ which could have migrated through physical leakage pathways without detection or mitigation in period y, $M_{CO_2\ unmitigated}^y$

Additional comment	N/A
--------------------	-----

Data / Parameter	Buffer Transfer _y																										
Unit	t CO ₂																										
Description	Quantity of GSVERs contributed to the buffer account in period y. (Parameter ID 09 from Tool 03)																										
Source of data	Measured																										
Value(s) applied	<table><tr><th>Year</th><th>Removals without buffer deduction (tCO₂e)</th><th>Buffer (tCO₂e)</th></tr><tr><td>Year 1 - 01/09/2026 to 31/12/2026</td><td>162,320</td><td>6,493</td></tr><tr><td>Year 2 - 01/01/2027 to 31/12/2027</td><td>485,631</td><td>19,425</td></tr><tr><td>Year 3 - 01/01/2028 to 31/12/2028</td><td>485,631</td><td>19,425</td></tr><tr><td>Year 4 - 01/01/2029 to 31/12/2029</td><td>485,631</td><td>19,425</td></tr><tr><td>Year 5 - 01/01/2030 to 31/12/2030</td><td>485,631</td><td>19,425</td></tr><tr><td>Year 6 - 01/01/2031 to 31/08/2031</td><td>323,310</td><td>12,932</td></tr><tr><td>Total</td><td>2,428,153</td><td>97,126</td></tr></table>			Year	Removals without buffer deduction (tCO ₂ e)	Buffer (tCO ₂ e)	Year 1 - 01/09/2026 to 31/12/2026	162,320	6,493	Year 2 - 01/01/2027 to 31/12/2027	485,631	19,425	Year 3 - 01/01/2028 to 31/12/2028	485,631	19,425	Year 4 - 01/01/2029 to 31/12/2029	485,631	19,425	Year 5 - 01/01/2030 to 31/12/2030	485,631	19,425	Year 6 - 01/01/2031 to 31/08/2031	323,310	12,932	Total	2,428,153	97,126
Year	Removals without buffer deduction (tCO ₂ e)	Buffer (tCO ₂ e)																									
Year 1 - 01/09/2026 to 31/12/2026	162,320	6,493																									
Year 2 - 01/01/2027 to 31/12/2027	485,631	19,425																									
Year 3 - 01/01/2028 to 31/12/2028	485,631	19,425																									
Year 4 - 01/01/2029 to 31/12/2029	485,631	19,425																									
Year 5 - 01/01/2030 to 31/12/2030	485,631	19,425																									
Year 6 - 01/01/2031 to 31/08/2031	323,310	12,932																									
Total	2,428,153	97,126																									
Measurement methods and procedures	GS4GG Tool 04 Reversal Risk Calculations for Geological Storage V1.0																										
Monitoring frequency	Once per period y																										
QA/QC procedures	None																										
Purpose of data	Used to determine the mass of CO ₂ which could have migrated through physical leakage pathways without detection or mitigation in period y, <i>M</i> CO ₂ <i>unmitigated, y</i>																										
Additional comment	N/A																										

Data / Parameter	$M_{CO_2 \text{ undetected } s,i,z,y}$
Unit	t CO ₂
Description	Mass of CO ₂ which could have migrated through leakage pathway <i>i</i> at storage site <i>s</i> without detection by monitoring technique <i>z</i> in period <i>y</i> . (Parameter ID 10 from Tool 03)
Source of data	Calculation
Value(s) applied	For ex-ante estimative, it is 0. If applicable, it will be measured or estimated.
Measurement methods and procedures	Where the threshold for detection of CO₂ migration through leakage pathway <i>i</i> at storage site <i>s</i> using monitoring technique <i>z</i>, $DT_{CO_2 s,i,z}$, specified in the storage site monitoring program document as unidimensional (i.e., has units of tCO₂), the mass of CO₂ which could have migrated through leakage pathway <i>i</i> at storage site <i>s</i> without detection by monitoring technique <i>z</i> in period <i>y</i>, $M_{CO_2 \text{ undetected } s,i,z,y}$, shall be calculated using Equation 4. Where the threshold for detection of CO₂ migration through leakage pathway <i>i</i> at storage site <i>s</i> using monitoring technique <i>z</i>, $DT_{CO_2 s,i,z}$, specified in the storage site monitoring program document as a rate (i.e., has units of tCO₂ per day), $M_{CO_2 \text{ undetected } s,i,z,y}$ shall be calculated using Equation 6. Where the threshold for detection of CO₂ migration through leakage pathway <i>i</i> at storage site <i>s</i> using monitoring technique <i>z</i>, $DT_{CO_2 s,i,z}$, is specified in the storage site monitoring program document as a proportion (e.g., a concentration in ppmCO₂),

	$M_{CO2undetected\ s,i,z,y}$ shall be calculated using Equation 7.
Monitoring frequency	By event.
QA/QC procedures	Calculated once per period y
Purpose of data	None
Additional comment	Used to determine the mass of CO ₂ which could have migrated through leakage pathways without detection in period y, $M_{CO2undetected\ y}$

Data / Parameter	$F_{unmonitored\ s,i,z,y}$
Unit	Fractional
Description	Fraction of period y during which leakage pathway i is not monitored by monitoring technique z. (Parameter ID 11 from Tool 03)
Source of data	Calculated
Value(s) applied	For ex-ante estimative, it is 0. If applicable, it will be measured or estimated.
Measurement methods and procedures	Where $N_{sampled\ s,i,z,y}/f_{s,i,z,y} \geq D_y$, project developers shall apply a value of zero. In all other cases, project developers shall calculate the fraction of period y during which leakage pathway i at storage site s is not monitored by monitoring technique z using Eq 5.
Monitoring frequency	Calculated once per period y
QA/QC procedures	None
Purpose of data	Used to determine the mass of CO ₂ which could have migrated through leakage pathway i at storage site s without detection by monitoring technique z in period y,

	$M_{CO_2 \text{ undetected } s,i,z,y}$
Additional comment	N/A

Data / Parameter	$N_{sampled_{s,i,z,y}}$
Unit	count
Description	Number of samples collected by monitoring technique z for leakage pathway i at storage site s during period y. (Parameter ID 12 from Tool 03)
Source of data	Measurement
Value(s) applied	For ex-ante estimative, it is 0. If applicable, it will be measured or estimated.
Measurement methods and procedures	Count the total number of distinct samples collected by monitoring technique z for leakage pathway i during period y
Monitoring frequency	Once per period y
QA/QC procedures	None
Purpose of data	Used to determine the fraction of period y during which leakage pathway i at storage site s is not monitored by monitoring technique z, $F_{unmonitored_{s,i,z,y}}$. Used to determine the mass of CO ₂ which could have migrated through leakage pathway i without detection by monitoring technique z in period y, $M_{CO_2 \text{ undetected}, s,i,z,y}$

Additional comment	
Data / Parameter	$D_{s,i,z,y}$
Unit	days
Description	Duration of period of monitoring leakage pathway i at storage site s in period y (Parameter ID 13 from Tool 03)
Source of data	Estimated
Value(s) applied	For ex-ante estimative, it is 0. If applicable, it will be measured or estimated.
Measurement methods and procedures	Estimated based on the dates delineating period y
Monitoring frequency	Once per period y
QA/QC procedures	None
Purpose of data	Used to determine the fraction of period y during which leakage pathway i at storage site s is not monitored by monitoring technique z, $F_{unmonitored_{s,i,z,y}}$. Used to determine the mass of CO₂ which could have migrated through leakage pathway i at storage site s without detection by monitoring technique z in period y, $M_{CO_2 \text{ undetected } s,i,z,y}$
Additional comment	N/A

SDG 02

Data / Parameter	Number of groups of farmers adopted practices promoted by the project
Unit	Number

Description	Referring to the number of groups of farmers who have adopted sustainable cultivation practices promoted by the project in the monitoring period. According to the FS Socio-environmental Responsibility Policy in the Supply Chain and Sales⁶⁰, "Group" corresponds to the joint, family or corporate action, subordinate or coordinated, of individuals and/or legal entities, in common interests. The configuration of the Group gives rise to joint liability among the individuals and/or legal entities that comprise it.
Source of data	Internal records.
Value(s) applied	7
Measurement methods and procedures	Internal records.
Monitoring frequency	Annually
QA/QC procedures	N/A
Purpose of data	This parameter monitors impacts related to SDG 02.
Additional comment	The implementation of activities associated with this SDG is dependent on the operational phase of the project, which is supported by revenues from carbon credit commercialization covering the project's operational expenditures (OPEX). Therefore, this parameter will be monitored and reported only during periods in which the project is operational and such activities are effectively implemented. If, during a given monitoring period, the project is not operational or the associated activities are not carried out, no values will be reported for this parameter.

⁶⁰ Available at: <https://api.mziq.com/mzfilemanager/v2/d/34aeec8a-d08e-440f-ad7f-324e1e1e7745/4d69a148-e8e8-2b65-1b49-73ff1e805cfb?origin=1>

SDG 04

Data / Parameter	Number of people provided skill development training
Unit	Number
Description	Number of individuals who participated in training activities related to the project during the monitoring period. Training activities are implemented following a structured approach and are planned in accordance with project needs.
Source of data	Attendance lists for training and capacity building programs provided.
Value(s) applied	10
Measurement methods and procedures	The project developer will maintain records of all training activities carried out under the project, including attendance lists and supporting documentation. Training activities will be implemented based on an annual training plan, which will be developed and updated over time according to project needs and operational requirements. Trainings will be provided periodically in accordance with this planning. The number of individuals trained will be determined based on attendance records.
Monitoring frequency	Annually
QA/QC procedures	Training records, attendance lists, training materials and internal documentation related to training activities.
Purpose of data	This parameter monitors impacts related to SDG 04.
Additional comment	The implementation of activities associated with this SDG is dependent on the operational phase of the

project, which is supported by revenues from carbon credit commercialization covering the project's operational expenditures (OPEX).

Therefore, this parameter will be monitored and reported only during periods in which the project is operational and such activities are effectively implemented.

If, during a given monitoring period, the project is not operational or the associated activities are not carried out, no values will be reported for this parameter.

SDG 07

Data / Parameter	Amount of biofuel with Carbon Capture and Storage
Unit	m ³
Description	The project developer will monitor the amount of biofuel with Carbon Capture and Storage produced at Lucas do Rio Verde facility.
Source of data	Internal records.
Value(s) applied	650,000
Measurement methods and procedures	Internal records.
Monitoring frequency	Annually
QA/QC procedures	n/a
Purpose of data	This parameter monitors impacts related to SDG 07.
Additional comment	If any amount of ethanol is not intended for fuel use, that amount will be disregarded from the SDG.

SDG 08

Data / Parameter	Number of jobs
------------------	----------------

Unit	Number
Description	Creation of direct and indirect jobs for the operation of the project activity. The project yields permanent work opportunities in a safe and secure working environment, following all the Labor Rights all the work requirements of the Consolidation of labor laws (CLT) modality.
Source of data	Internal payroll records (for direct employees) and contractor records and supporting documentation (for indirect workers), where available.
Value(s) applied	10
Measurement methods and procedures	The number of jobs will be monitored annually based on: (i) internal employment records for direct employees; and (ii) contractor information, employment records and service agreements for indirect workers. Due to the nature of contracted services, indirect employment may fluctuate over time and may not always be tracked at individual level. Therefore, the parameter will be reported as an annual average based on the best available information.
Monitoring frequency	Annually
QA/QC procedures	The information provided will be cross-checked with information on labor and social security reported on public systems, when applicable.
Purpose of data	This parameter monitors impacts related to SDG 08.
Additional comment	The CLT is composed of eight chapters that cover and specify the rights of most Brazilian labor groups. In its 922 articles, information such as: professional identification, duration (day) of work, minimum wage, annual vacations, occupational safety and medicine,

protection of the work of women and children, social security and regulations of working-class unions are found.

The Consolidation of Labor Laws (CLT) was established by Decree Law No. 5.452. of 01/05/1943.

SDG 09

Data / Parameter	Number of companies directly engaged in the project value chain
Unit	Number
Description	Number of unique companies directly engaged in project-related activities during the monitoring period. This includes companies newly engaged, continuing, and withdrawn during the period, provided that their participation is evidenced by formal project records.
Source of data	Internal records, including contracts, purchase orders, service agreements, work orders, supplier registration records, payment records, and technical assistance records, as applicable.
Value(s) applied	10
Measurement methods and procedures	The project developer shall maintain a registry of all companies directly engaged in the project value chain. Each company will be recorded with at least the following information: company name, role in the project, type of engagement, start date, and, where applicable, end date. For each monitoring period, the project developer will identify: (i) companies active at the beginning of the monitoring period;

	(ii) companies entering during the monitoring period; (iii) companies withdrawing during the monitoring period; and (iv) the total number of unique companies engaged during the monitoring period. Entries and withdrawals will be determined based on documentary evidence such as executed contracts, purchase orders, service agreements, work orders, payment records, or equivalent records demonstrating the beginning or end of direct engagement in project-related activities.
Monitoring frequency	Annually
QA/QC procedures	The information will be cross-checked against contract records, procurement records, service records, and payment records, where applicable.
Purpose of data	This parameter monitors impacts related to SDG 09.
Additional comment	This parameter refers only to companies directly engaged in the project value chain and does not cover FS's broader corporate supply chain.

SDG 15

Data / Parameter	Total area of Trees Planted
Unit	Hectares

Description	Sum of the total area of rural producers that are subscribed to the Forest Recuperation Program ⁶¹ developed by the project developer
Source of data	Program registration form
Value(s) applied	Year 1 – 20 ha Year 2 – 580 ha Year 3 – 150 ha Year 4 – 150 ha Year 5 – 100 ha
Measurement methods and procedures	Internal records.
Monitoring frequency	Annually
QA/QC procedures	The information provided will be cross-checked with samplings of satellite images of the areas subject to recuperation and restauration activities of the farmers that joined the program.
Purpose of data	This parameter monitors impacts related to SDG 15.
Additional comment	N/A

Monitoring of Safeguards

Data / Parameter	Number of recordable accidents
Unit	Number

⁶¹ Name of the Program to be confirmed by the project developer

Description	Recordable accidents include accidents resulting in time off work as established by law and accidents without time off work that required medical treatment and functional restriction. Within the boundaries of the BECCS Project.
Source of data	Internal records monitored by the Occupational Health and Safety team. Relevant Workplace Accident Reports (CAT).
Value(s) applied	For ex-ante estimative, it is 0. It will be measured after starting the project.
Measurement methods and procedures	See monitoring plan for more details.
Monitoring frequency	Compiled monthly, aggregated annually. See monitoring plan for more details.
QA/QC procedures	Cross check of information with CATs or equivalent documents.
Purpose of data	Safeguard. To monitor potential risks related to requirement P.3.1 Community Health and Safety.
Additional comment	N/A

Data / Parameter	Compliance with water quality parameters
Unit	%
Description	Water analysis reports for the five water wells in the context of the FS BECCS Project that were submitted to SEMA-MT and are in compliance.
Source of data	Water Analysis Reports. Monitored by the Environmental team.

Value(s) applied	For ex-ante estimative, it is 0. This parameter will be reported after the beginning of the CO ₂ injection.
Measurement methods and procedures	Provided in monitoring plan
Monitoring frequency	Compiled monthly, aggregated annually. See monitoring plan for more details.
QA/QC procedures	For project validation and at each verification, the Environmental team will share a compilation of Water Analysis Reports from the monitoring wells for that period, indicating those in which there is/are parameter(s) outside the limits acceptable by Brazilian legislation.
Purpose of data	Safeguard. To monitor potential risks related to requirement P.8.1 Impact on Natural Water Patterns/Flows.
Additional comment	N/A

Data / Parameter	Quantity of hazardous waste disposed
Unit	kg
Description	Quantity, by weight, of hazardous waste generated in the context of the FS BECCS Project.
Source of data	Internal records monitored by the Environmental team.
Value(s) applied	For ex-ante estimative, it is 0. This parameter will be reported after the beginning of the CO ₂ injection.
Measurement methods and procedures	Weighing. See monitoring plan for more details.
Monitoring frequency	Compiled monthly, aggregated annually. See monitoring plan for more details.

QA/QC procedures	Cross check of information with Waste Transportation Manifests (MTR) or equivalent documents.
Purpose of data	Safeguard. To monitor potential risks related to requirement P.9.5 Hazardous and non-hazardous waste.
Additional comment	N/A

Data / Parameter	CO ₂ flux at the soil-atmosphere interface
Unit	CO ₂ flow rate
Description	Chambers installed at five points around the injection well will be monitored to aid detection of potential CO ₂ leaks to soil, considering the baseline emissions.
Source of data	Surface chamber
Value(s) applied	Baseline soil CO ₂ flux will be measured to be used as default in intervals described in monitoring plan.
Measurement methods and procedures	Provided in monitoring plan.
Monitoring frequency	Baseline soil CO ₂ flux will be measured in determined months, with frequency defined in monitoring plan. During CO ₂ injection, frequency is planned to be continuous..
QA/QC procedures	For baseline, specific procedures will be followed by the contractor for collecting samples. Third-party will use calibrated equipment (e.g. chromatographs) for analysis. During CO ₂ injection, flux chambers will be calibrated as required by manufacturer's specifications.
Purpose of data	Safeguard. To monitor potential risks related to requirement P.8.1 Impact on Natural Water Patterns/Flows.
Additional comment	N/A

B.7.2 Sampling plan

>>

Not applicable.

B.7.3 Other elements of monitoring plan

>>

Due to the sensitive nature of the data, the monitoring plan will be presented as a separate document. The complete document will be provided as evidence.

SECTION C. DURATION AND CREDITING PERIOD

C.1. Duration of project

C.1.1 Start date of project

>> According to GS4GG Principle 4, the start date is “the earliest date on which the Project Developer has committed to expenditures related to the implementation of the Project”.

The Project Start Date is defined as 04/10/2024, corresponding to the effective procurement of the main CO₂ capture and compression equipment required for the implementation of the BECCS system.

On this date, the project developer formalized the acquisition of the core process units, including large-scale CO₂ compressors, process intercoolers and aftercoolers, and a CO₂ dehydration unit. These components are essential for the compression, conditioning, and preparation of captured CO₂ prior to transport and permanent storage.

The procurement of these key equipment items represents the transition from project planning and engineering activities to the effective implementation phase, as it constitutes a substantial capital commitment directly linked to the physical realization of the BECCS facility. The invoice was provided as evidence.

The project is a retroactive project.

C.1.2 Expected operational lifetime of project

>> The project will generate credits for 45 years and 0 months.

C.2. Crediting period of project

C.2.1 Start date of crediting period

>> Expected start date of crediting period: 01/09/2026.

In accordance with the Methodology for Biomass Fermentation with Carbon Capture and Geologic Storage V2.0, the crediting period start date corresponds to the date on which CO₂ is first injected into the geological storage complex or a maximum of two years prior to the date of project design certification, whichever occurs later.

Based on the current project implementation schedule and the expected timeline for obtaining the operational license, the anticipated start date of CO₂ injection is 01/09/2026.

The expected start date indicated above is based on the current project implementation schedule. However, the actual crediting period start date will correspond to the date of the first CO₂ injection. If this occurs on a different date, the confirmed crediting period start date will be reported and documented in the first monitoring report.

C.2.2 Total length of crediting period

>> According to the Activity Engineered Carbon Dioxide Removal and the methodology Methodology for Biomass Fermentation with Carbon Capture and Geologic Storage V2.0, the crediting period could be forty five years (maximum). Also, projects should follow five year renewal cycle according to the latest version of GS4GG requirements for renewal of crediting period.

So, this project will be a 45 years and 0 months crediting period.

SECTION D. SUMMARY OF SAFEGUARDING PRINCIPLES AND GENDER SENSITIVE ASSESSMENT

D.1 Safeguarding Principles that will be monitored

The complete Safeguarding Principles Assessment is in [Appendix 1](#), ongoing monitoring is summarised below. This assessment is based on the conclusions of the Environmental Impact Assessment (EIA).

PRINCIPLES	MITIGATION MEASURES ADDED TO THE MONITORING PLAN
Principle 1 – Human Rights	Not required
Principle 2 – Gender Equality and Women’s Empowerment	Not required

Principle 3 – Community Health and Safety -Health and safety regulations are complied with. As a mitigation measure, the project will monitor if actions of health and safety are effective through indicator “Number of recordable accidents”.

-The project may incur risks related to soil contamination and air quality. These risks are addressed in the Environmental Impact Assessment and will have specific mitigation programs⁶².

Principle 4 – Cultural Heritage, Indigenous Peoples, Displacement and Resettlement

Not required

Principle 5 – Corruption

Not required

Principle 6 – Economic Impacts

Not required

Principle 7 – Climate and Energy

Not required

Principle 8 – Water - The project may incur risks related to water contamination due to non-expected release of CO₂. These risks are addressed in the Environmental Impact Study and have specific mitigation programs planned⁶³.

Principle 9 – Environment, ecology and land use - Hazardous waste regulations are fully adhered to. Although only a small quantity of hazardous waste may be generated during project operations, the project owner will actively monitor and track the "Quantity of hazardous waste disposed (kg)" to ensure proper management and compliance.

⁶² Further information and monitoring indicators to be confirmed by the project developer

⁶³ Further information and monitoring indicators to be confirmed by the project developer

D.2. Assessment that project complies with GS4GG Gender Sensitive requirements

Question 1 - Explain how the project reflects the key issues and requirements of Gender Sensitive design and implementation as outlined in the Gender Policy?

The FS BECCS Project has been designed and will be implemented in a manner consistent with the Gold Standard Gender Policy and Gender Equality Guidelines. The project does not create differentiated impacts on women, men, or gender-diverse individuals, nor does it restrict access to project benefits based on gender.

Stakeholder engagement activities were conducted using an inclusive approach, providing equal opportunities for participation by women and men. Invitations to the Local Stakeholder Consultation were extended to a broad range of stakeholders, including educational institutions, local organizations, public authorities, and community representatives. Participation was open and non-discriminatory. The project owner maintains corporate policies related to equal employment opportunities, non-discrimination, workplace safety, prevention of harassment, and grievance mechanisms available to all workers and stakeholders. These measures help ensure that women and other potentially vulnerable groups are able to participate in and benefit from project activities on an equal basis.

The project is expected to generate employment, training opportunities, and local economic benefits without gender-based restrictions. Monitoring of labour and stakeholder-related safeguards will continue throughout the project lifecycle.

Brazil is a signatory to the identified commitment, which can be verified at the following electronic address:

https://treaties.un.org/Pages/ViewDetails.aspx?src=IND&mtdsg_no=IV-8&chapter=4&clang=en.

Additionally, the project aligns with Brazilian legislation and public policies related to gender equality, labour rights, and non-discrimination, including the principles established in the Federal Constitution of Brazil and labour legislation.

Article 5 of the Brazilian Constitution⁶⁴ declares women equal to men in all legal respects, explicitly stating that “men and women have equal rights and duties under the terms of this Constitution.”

Question 2 - Explain how the project aligns with existing country policies, strategies and best practices

Moreover, the Consolidation of Labour Laws (CLT), established by Decree Law No. 5.452. of 01/05/1943.⁶⁵, which regulates labour relations in Brazil, prohibits gender-based wage discrimination (Article 461, §1º) and ensures equal rights for men and women in the workplace.

The project also follows FS's internal corporate policies⁶⁶ governing equal opportunity employment, professional development, workplace health and safety, prevention of discrimination and harassment, and access to grievance mechanisms.

Through its inclusive stakeholder engagement process and equal-access employment practices, the project is consistent with national best practices for gender-sensitive project implementation and supports broader efforts to promote diversity and inclusion in the workplace.

Question 3 - Is an Expert
required for the Gender
Safeguarding Principles &
Requirements?

No. The Gender Safeguarding Principles Assessment identified no material gender-related risks, adverse impacts, resettlement activities, livelihood impacts, or circumstances requiring specialized gender analysis. The project consists of the installation and operation of carbon capture, compression, transport, and geological storage infrastructure within an existing industrial facility and does not involve activities that disproportionately affect women or other gender groups.

Therefore, based on the risk profile of the project and the outcomes of the safeguarding assessment, engagement of an external gender expert is not considered necessary.

⁶⁴ https://www.planalto.gov.br/ccivil_03/constituicao/constituicao.htm

⁶⁵ https://www.planalto.gov.br/ccivil_03/decreto-lei/del5452.htm

⁶⁶ <https://www.fs.agr.br/investidores/governanca-corporativa/codigos-e-politicas/>

Question 4 - Is an Expert required to assist with Gender issues at the Stakeholder Consultation?

No. The stakeholder consultation process did not identify specific gender-related concerns, barriers to participation, or vulnerable groups requiring specialized facilitation. The consultation was designed, following the Principle 2 – Gender Equality and Women's Empowerment requirements of Safeguarding Principles & Requirements, to provide equal opportunities for participation by all stakeholders regardless of gender, and no gender-specific grievances or issues were raised during the consultation process. Consequently, the involvement of a dedicated gender expert during stakeholder consultations was not considered necessary. Should gender-related issues emerge during project implementation, the project developer will assess the need for additional specialist support and implement appropriate measures.

SECTION E. SUMMARY OF LOCAL STAKEHOLDER CONSULTATION

The local stakeholder consultation was held physically, in Lucas do Rio Verde city (State of Mato Grosso/Brazil) in 02/04/2025.

The stakeholder feedback round was open between 10/04/2025 and 11/05/2025.

E.1 Summary of stakeholder mitigation measures

>> There are no concerns that were raised by stakeholders during the stakeholder consultations (including the stakeholder comments/feedbacks due to the project design change, if applicable) for which mitigation measures were proposed.

E.2 Final continuous input / grievance mechanism

METHOD	INCLUDE ALL DETAILS OF CHOSEN METHOD (S) SO THAT THEY MAY BE UNDERSTOOD AND, WHERE RELEVANT, USED BY READERS.
Continuous Input / Grievance Expression Process Book (mandatory)	Website - https://www.fs.agr.br/audiencias. Main method used from the beginning. It will remain since it is a formal method and some stakeholders prefer that. Confidential Channel, 24h per day, 7 days a week: Website - https://www.canalconfidencial.com.br/fs/ Phone (Brazil) - 0800 792 1013
GS Contact (mandatory)	help@goldstandard.org
Other	Email - audienciapublicafs@fs.agr.br. Main method used from the beginning. It will remain since it is a formal method and some stakeholders prefer that. After the consultation, Evaluation forms were provided (as suggested by Gold Standard in section C.3.1.) and in the responses, the preference for using WhatsApp was informed, in addition to email.

APPENDIX 1 - SAFEGUARDING PRINCIPLES ASSESSMENT

Complete the Assessment below and copy all Mitigation Measures for each Principle into SECTION D above. Please refer to the instructions in the Guide to Completing this Form.

About FS:

FS operates mainly in the bioenergy sector, producing ethanol (anhydrous and hydrated) and low-emission animal feed from corn. Through an integrated food and energy production system, we take advantage of 100% of the processed corn, producing different types of products for animal nutrition.

Purpose

Energy that supplies the good.

Mission

Grow and expand the supply of energy and food to new frontiers in a scalable and sustainable way, executing with excellence and agility

Goal

To be the largest producer of carbon-negative fuel in the world.

Values

- Ethics cannot be negotiated
- Competent and engaged people
- Driven by challenges
- Excellence in execution

FS has achieved the highest level of sustainability in the value chain of the corn ethanol production system, using 100% of the raw material and completely closing its life cycle. We do not generate waste in the ethanol production process and create a variety of co-products, such as DDG, highly nutritious food for cattle, pigs, poultry, fish and domestic

animals, with high protein and fiber content. Our process also enables the production of corn oil, which is used in animal feed, in the cosmetics industry and the manufacture of biofuels.

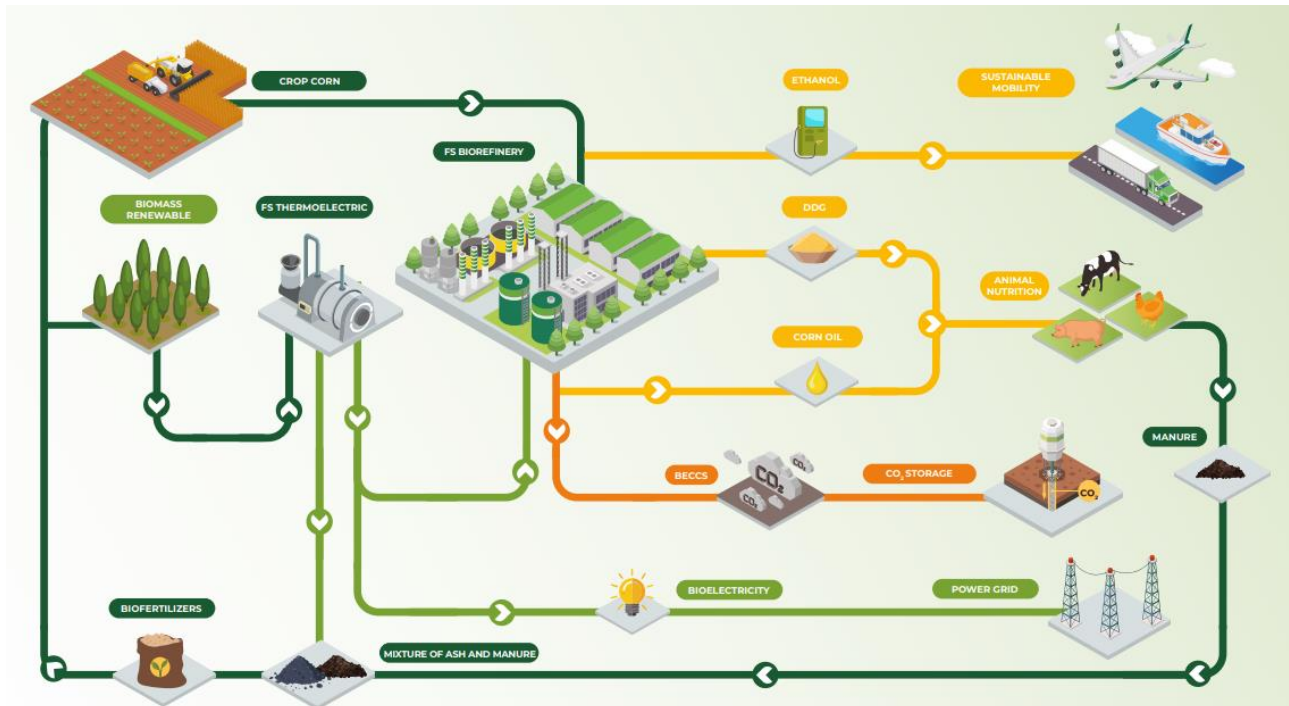


Figure 1214. Fermentation process.

- The corn received is classified according to quality standards and sent to bulk warehouses.
- The grains go through a pre-cleaning system and are ground in roller mills (they become a kind of flour). With the addition of hot water and enzymes, corn starch is converted into fermentable sugars (must) in the cooking tanks.
- The wort then goes through the FST™ (Fiber System Separation) corn fiber separation process before fermentation, which increases the yield for ethanol production.
- The remaining solids in the distillery are used to manufacture animal nutrition products (DDG) and corn oil, which is also used for animal nutrition by the cosmetics industry and in the production of biofuels.
- FS is self-sufficient in the generation of electricity and steam through the burning of renewable biomass. The surplus energy will be used for BECCS operation and the steam is designed for the supply of industrial clients.

- The remaining ashes from burning biomass for energy generation are transformed into biological fertilizers.

FS is committed to sustainability, transparency, equity, provision accounts and corporate responsibility, strengthening ethical relationships with shareholders and other stakeholders. To ensure this principle and reaffirm that all activities follow laws and regulations, FS has guidelines and policies such as, but not limited to, FS Social and Environmental Responsibility Policy in the Supply Chain and Sales⁶⁷, verifying the socio-environmental criteria established in 100% of the negotiations for the purchase of corn and biomass and its Code of Ethics – created to guide the standards of behavior of all collaborators. The company's governance structure is formed by shareholders, Board of Directors, Supervisory Board and two non statutory committees: the Audit Committee and the Ethics Committee, whose role is to advise the board and councils in taking decisions, and are therefore not deliberative bodies.

FS Codes and Policies:

- Conflict of Interest Policy
- Quality Policy
- Socio-environmental Responsibility Policy in the Supply Chain and Sales
- Policy for Transactions with Related Parties
- Water Management Policy
- Integrity Policy
- HSE Policy
- Attraction and Selection Policy
- Performance and Career Management Policy
- Confidential Channel Policy and Ethics Committee
- Gifts and Kindness Policy
- Institutional Relations Policy
- Anti-Corruption Policy, Prevention of Money Laundering and Terrorist Financing
- Code of Ethics 2023
- Policy of Respect for the Rights of Indigenous Peoples and Traditional Communities
- Remote Work Policy

⁶⁷ Available at: <https://api.mziq.com/mzfilemanager/v2/d/34aeec8a-d08e-440f-ad7f-324e1e1e7745/4d69a148-e8e8-2b65-1b49-73ff1e805cfb?origin=1>

Socio-environmental Responsibility Policy in the Supply Chain and Sales

The Socio-Environmental Responsibility Policy in the Supply and Sales Chain establishes the essential guidelines so that FS can manage its operations acting in a socially and environmentally responsible manner, aiming to promote the company's main purpose, which is to produce the "Energy that supplies the well", in addition to describing the criteria and applicability for commercial transactions carried out within the scope of corn and biomass origination, as well as sales of animal nutrition products throughout the national territory.

Therefore, the objectives of this Policy are:

- I. Integrate and monitor socio-environmental commitments in the daily life of the FS business, in the context of corn and biomass origination, in addition to the marketing of animal nutrition products;
- II. Demonstrate to investors, shareholders and stakeholders the compliance of the FS business with the global sustainable development agenda;
- III. Develop a more sustainable supply chain, contributing to conservation, protection and effective restoration of forests in the territories where it operates;
- IV. Structure and apply mechanisms to defend and enhance the image and reputation of FS, aiming to minimize negative impacts;
- V. Promote respect for Human Rights through continuous improvement of socio-environmental performance.

Certifications:

ISCC CORSIA + Low LUC Risk

International certification for production and supply of ethanol for Sustainable Aviation Fuel (SAF) with additional Low Land Use Change (LUC) Risk. FS was the first ethanol producer in the world to obtain the ISCC CORSIA Certification with Low LUC Risk for the supply of ethanol for the production of SAF.

Climate Bonds Initiative (CBI)

Certification confirming that FS is able to issue Green Bonds with CBI seal on a recurring basis.

Global Manufacturing Practices Plus (GMP+)

Largest international certificate for animal nutrition, required by more than 50 countries, which guarantees the food safety of the products, based on HACCP (Hazard Analysis and Critical Control Points).

International Renewable Energy Certificate (I-REC)

I-REC Standard is a global system for tracking Energy Attribute Certificate (EAC). I-REC(E) is an exchangeable EAC that conveys information about the production of a unit of renewable electricity (1 MWh). FS has certified FS Lucas do Rio Verde unit to guarantee that electricity generated at this unit is from renewable sources.

Halal

Certification that ensures that our products have been produced in accordance with Islamic requirements.

ISO 9001, 14001 and 45001

All FS industries have undergone the implementation and certification process of ISO 9001 (Quality Management System), ISO 14001 (Environmental Management System) and ISO 45001 (Occupational Health and Safety Management System).

Zero Waste

All three of FS' units have been awarded the Zero Waste certification, which guarantees that at least 90% of the solid waste produced is sent for reuse, recycling or composting, thus avoiding sanitary landfills and incineration.

RenovaBio

RenovaBio is the Brazilian National Biofuels Policy, aimed at expanding biofuels in the Brazilian energy matrix, contribute to the fulfillment of the commitments made by Brazil under the Paris Agreement, and reduce GHG emissions. FS works to increase the eligibility for certification of corn grains produced by suppliers, improving the carbon footprint of ethanol and expanding the offer of decarbonization credits (CBIOS). The four FS units are certified under RenovaBio and contribute to the generation of CBIOS.

Kosher

This certificate guarantees that FS products meet the standards of good manufacturing practices and precepts of the Jewish dietary law.

Brazilian GHG Protocol Program

FS has reported the corporate greenhouse gas emissions inventory for its units according to the guidelines of the program since 2021. These annual GHG inventories were verified by an independent third-party, achieving the highest level of qualification and receiving the Gold Seal, and are available through the Public Emissions Registry. Colombian Resolution 1962/2017

Greenhouse gas emissions calculations from the production of anhydrous ethanol at the FS Lucas do Rio Verde unit and its export to Colombia comply with ISO 14064-1 and the requirements of the Colombian Ministry of Environment and Sustainable Development.

ESG Planning and Integration:

FS Strategic Planning is structured into six fundamental pillars, known as PROAS2⁶⁸, that guide business actions and define tangible goals to drive development in the short, medium and long term. A central element of the strategy, the integration of Environmental, Social and Governance (ESG) principles in all operations extends to the corn ethanol value chain. In 2023, we worked on restructuring advocacy actions that consolidate FS's business model as a promoter of a low-carbon economy and essential for the energy transition.

The second crop Brazilian corn ethanol is an integrated low-emission food and energy production system that does not compete for land for food production, since it is planted in a rotation system.

Energy transition:

According to the International Energy Agency (IEA), the energy sector is primarily responsible for global greenhouse gas (GHG) emissions, accounting for 73% of total emissions in 2020. Thus, the implementation of effective decarbonization actions in this sector is urgent.

The energy matrix—that is, the set of energy sources used to move cars, light the stove and generate electricity—in Brazil is different from the global one, with the energy sector accounting for one-third of GHG emissions. This is because our renewables – including hydropower, biomass, biofuels, wind, solar and others – represent 47.4% of

⁶⁸ Productivity, Profitability, Optionality, Agility, Sustainability, Security.

the total, well above the global index, which is 14.7%, according to data from the Energy Research Company (EPE).

In this scenario, Brazil has a unique and advantageous position in the biofuels sector due to the diversity of raw materials: soybeans for biodiesel production, sugarcane and second-crop corn for ethanol production, which play a fundamental and complementary role in the country's energy matrix. The seasonality of the production of both raw materials allows a complementarity that strengthens the stability and continuity of biofuel production throughout the year. The coexistence of these raw material sources is vital for a sustainable and viable energy transition in Brazil.

Thus, the development of public policies aimed at encouraging the use of biofuels is not only essential, but strategic. Policies that promote the research and development of cleaner technologies, as well as the expansion of infrastructure for the production and distribution of biofuels, are fundamental to accelerating the energy transition in Brazil and in the world. The adoption of such policies can strengthen Brazil's role as a global leader in sustainable energy production, contributing significantly to reducing GHG emissions and building a cleaner and more resilient energy future.

Advantages of Second Crop Corn Ethanol

- Corn used for the manufacture of ethanol in the second crop Brazil produced after the main soybean crop, without additional pressure to open new areas and without the need for irrigation.
- The production of raw materials does not compete with agricultural areas for food production.
- Substantially lower lifecycle CO₂ release compared to fossil fuels
- Reducing dependence on oil prices and fossil fuel shortages
- Promoting the circular economy, reducing waste and optimizing natural resources
- Stimulating innovation in energy production, conversion and storage technologies
- Boost to economic growth, generating direct and indirect jobs
- Direct use in internal combustion engines, taking advantage of existing distribution infrastructure
- Use of 100% of the corn processed in an Integrated Food and Energy Production System, generating several products for animal nutrition
- The production process uses advanced technologies, such as fiber separation before fermentation, which increases ethanol yield and allows the production of high-quality products for animal nutrition

- Use of renewable biomass, such as eucalyptus chips and agro-industrial waste, to generate energy and steam in boilers

Corn Demand grows:

Despite the increase in corn demand for ethanol production, there was no drop in supply for food. According to U.S. Department of Agriculture's (USDA) 2022 data, Brazil's annual corn exports have more than doubled in the past decade, with an average of 37.5 million tons in the last five years. Between 2016/17 and 2022/23, the demand for corn in Brazil increased to:

- Food, seeds and industrial use: about 2 million tons
- Ethanol: 9.6 million tons
- Animal feed: 17.5 million tons

Governance, ethics and integrity:

Through an integrated governance structure and active participation of the Executive Board and shareholders, FS adopts the best management practices, which generate security for the interests of stakeholders and transparency for operations. In this model, the Advisory Board acts as a guiding body and the Advisory Committees provide technical support and trend analysis. To ensure the highest standards of integrity, legality and transparency in relationships, we instituted, in 2024, the Integrity Policy, made available to all stakeholders. In addition, we have built a matrix that maps activities and functions, which allows us to identify and act on the greatest risks to which the company is subject. In the 23/24 crop year, there were no significant records of non-compliance with laws and regulations. Cases related to corruption in FS were also not confirmed, nor were public lawsuits filed against the company or employees under this allegation.

96% of all employees, including FS directors, participated in training on Brazilian anticorruption legislation and also on the main North American regulation on the subject, the Foreign Corrupt Practices Act (FCPA).

Confidential Channel

FS provides a safe and reliable communication channel for registering complaints or reports of misconduct or actions that go against the ethical principles and values, as well as the laws. Operating 24 hours a day, 7 days a week, the Confidential Channel

can be accessed in Brazilian Portuguese and English and assures the whistleblower of anonymity and secrecy in the investigations.⁶⁹

Engagement and accountability in the value chain

In 100% of the negotiations for the purchase of corn and biomass and the sale of products for animal nutrition, the socio-environmental criteria established in the FS Social and Environmental Responsibility Policy are verified. These criteria are analyzed from the prospecting of the business to its closure when the volume of a given contract is finalized. This process takes place on Agrottools' TerraMatrix platform, where all suppliers and clients and their territories are registered and analyzed, through the Rural Environmental Registry (CAR), when applicable, according to its modality. To improve deforestation monitoring in the supply chain, in May 2023, we consolidated the Alert Center. This platform monitors supplier territories **daily** by consulting deforestation alerts issued by four public sources (Mapbiomas, DETER-B, SAD, GLAD).

SOCIAL SAFEGUARDING PRINCIPLES ⁷⁰		
Reference requirement	Question	Response
P.1 Human Rights		
P.1.1.1 	Does the project developer, its representatives and the Project disrespect internationally proclaimed human rights?	☐ YES ☒ NO
P.1.1.1 	Is the project involved or complicit in violence or human rights abuses of any kind as defined in the Universal Declaration of Human Rights?	☐ YES ☒ NO
P.1.1.2 	Have local communities or individuals raised human rights concerns regarding the project (e.g., during the stakeholder engagement process, grievance processes, public statements)?	☐ YES ☒ NO
P.1.1.3 	Is there a risk that rights-holders (e.g., Project-affected stakeholders) do not have the capacity to claim their rights?	☐ YES ☒ NO
P.1.1.3 	Does this project undermine national or regional measures for the realisation of the right to development?	☐ YES ☒ NO
If the answer to any of the questions above is "yes," please explain the reason and how the project will ensure compliance with applicable requirements.		
-		
Would the project potentially involve or lead to:		

⁶⁹ <https://www.canalconfidencial.com.br/fs/>

⁷⁰ A previous assessment is under development based on the conclusions of the Environmental Impact Study. Further analysis will be made during the project development

P.1.1.1 	adverse impacts on enjoyment of the human rights (civil, political, economic, social or cultural) of the affected population and particularly of marginalised groups?	☐ YES ☐ POTENTIALLY ☒ NO
P.1.1.2 	inequitable or discriminatory impacts on affected populations, particularly people living in poverty or marginalised or excluded individuals or groups, including persons with disabilities?	☐ YES ☐ POTENTIALLY ☒ NO
P.1.1.3 	restrictions in availability, quality of and/or access to resources or basic services, in particular to marginalised individuals or groups, including persons with disabilities?	☐ YES ☐ POTENTIALLY ☒ NO
P.1.1.3 	exacerbation of conflicts among and/or the risk of violence to project-affected communities and individuals?	☐ YES ☐ POTENTIALLY ☒ NO

Briefly describe below how the project incorporates a human rights-based approach.

- To ensure this principle and reaffirm that all activities follow laws and regulations related to Human Rights, FS has guidelines and policies such as, but not limited to, FS Social and Environmental Responsibility Policy, verifying the socio-environmental criteria established in 100% of the negotiations for the purchase of corn and biomass and its Code of Ethics – created to guide the standards of behavior of all collaborators.
- The company is also signatory to the Global Compact, an initiative promoted by the UN to guide the strategic incorporation of ten universal principles on human rights, decent work, the environment and the fight against corruption⁷¹.
- In the 23/24 harvest year, the company began implementing due diligence on human and social rights in activities of the FS, including an analysis of impacts and risks on human rights in three axes: Territories (internal FS), Chain of suppliers and ecosystem services⁷².

Please add text here....

P.2 | GENDER EQUALITY AND WOMEN'S EMPOWERMENT

P.2.1.1 	Have women's groups/leaders raised gender equality concerns regarding the project, (e.g., during the stakeholder engagement process, grievance processes, public statements)?	☐ YES ☒ NO
P.2.1.2 	Does the project undermine the principles of non-discrimination, equal treatment, and equal pay for equal work?	☐ YES ☒ NO
P.2.1.2 	Does the project prevent men and women from having equal opportunities to participate in identified tasks and activities, whether through paid work, volunteer work, or community contributions, as appropriate?	☐ YES ☒ NO

⁷¹ For more information: <https://www.fs.agr.br/sustentabilidade/programas-e-iniciativas/>

⁷² More information available in the Company's Annual Report: <https://www.fs.agr.br/sustentabilidade/relatorios-de-sustentabilidade/>

P.2.1.2 	Does the project limit the participation of women or men based on pregnancy, maternity/paternity leave, or marital status?	☐ YES ☒ NO
P.2.1.2 	Is information about project objectives being communicated in a way that is inappropriate for the local context and not tailored to the methods of understanding of both women and men, which could hinder their participation?	☐ YES ☒ NO
P.2.1.3 	Has the project assessed gender risks without referencing the country's gender strategy or equivalent national commitment?	☐ YES ☒ NO
P.2.1.4 	Has expert stakeholder(s) been involved, and has their input been requested for the project design on gender equality and women's empowerment?	☐ YES ☒ NO

If the answer to any of the questions above is "yes," please explain the reason and how the project will ensure compliance with applicable requirements.

-

Would the project potentially involve or lead to:

P.2.1.1 	adverse impacts on gender equality and/or the situation of women and girls?	☐ YES ☐ POTENTIALLY ☒ NO
P.2.1.1 	exacerbation of risks of gender-based violence? For example, through the influx of workers to a community, changes in community and household power dynamics, increased exposure to unsafe public places and/or transport, etc.	☐ YES ☐ POTENTIALLY ☒ NO
P.2.1.2 	reproducing discriminations against women based on gender, especially regarding participation in design and implementation or access to opportunities and benefits?	☐ YES ☐ POTENTIALLY ☒ NO
P.2.1.2 	limitations on women's ability to use, develop and protect natural resources, taking into account different roles and positions of women and men in accessing environmental goods and services? For example, activities that could lead to natural resources degradation or depletion in communities who depend on these resources for their livelihoods and well-being.	☐ YES ☐ POTENTIALLY ☒ NO

Briefly describe below how the project is addressing any identified risk to gender equality and women's empowerment.

-

[P.3 | COMMUNITY HEALTH AND SAFETY](#)

P.3.1.1 	Does the project involve potential risks to the health and safety of affected communities during its life cycle?	☐ YES ☒ NO
P.3.1.2 	Does the project involve any potential risks to the workers' safety and health?	☒ YES ☐ NO

If the answer to any of the questions above is "yes," please explain the reason and how the project will ensure compliance with applicable requirements.

- Potential causes of physical hazards at project sites can include human error, technical malfunction, and emergency situations. According to the EIA, it is an uncertain and reversible probability, considering that, once the necessary measures, the impact of risk exposure to accidents will tend to reduce. The PO establishes health and safety policies and procedures, including periodic training, provision of personal protective equipment (PPE), monitoring and reporting of accidents.

For tracking effectiveness of mitigation actions, the PO will monitor the indicator "Number of fatal and non-fatal occupational accidents". Health and safety regulations are complied with.

Would the project potentially involve or lead to:

P.3.1.1 	construction and/or infrastructure development (e.g., roads, buildings, dams)?	☐ YES ☒ NO
P.3.1.2 	air pollution, noise, vibration, traffic, injuries, physical hazards, poor surface water quality due to runoff, erosion, sanitation?	☐ YES ☒ POTENTIALLY ☐ NO
P.3.1.2 	harm or losses due to failure of structural elements of the project (e.g., collapse of buildings or infrastructure)?	☐ YES ☐ POTENTIALLY ☒ NO
P.3.1.2 	risks of water-borne or other vector-borne diseases (e.g., temporary breeding habitats), communicable and noncommunicable diseases, nutritional disorders, mental health?	☐ YES ☐ POTENTIALLY ☒ NO
P.3.1.2 	transport, storage, and use and/or disposal of hazardous or dangerous materials (e.g., explosives, fuel and other chemicals during construction and operation)?	☐ YES ☒ POTENTIALLY ☐ NO
P.3.1.2 	adverse impacts on ecosystems and ecosystem services relevant to communities' health (e.g., food, surface water purification, natural buffers from flooding)?	☐ YES ☐ POTENTIALLY ☒ NO

Briefly describe below how the project is addressing any identified risk related to community health and safety.

- *-During operation the project may incur in risks related to soil contamination and water resources. These risks are addressed in the Environmental Impact Study and have planned mitigation programs. For hazardous waste, please refer to section P.9.5*

P.4 | CULTURAL HERITAGE, INDIGENOUS PEOPLE, DISPLACEMENT AND RESETTLEMENT

P.4.1 | Sites of Cultural and Historical Heritage

P.4.1.1 	Does the project involve altering, damaging, or removing sites, objects, or structures of significant cultural heritage?	☐ YES ☒ NO
---------------------------	--	--

If the answer to question above is "yes," please explain the reason and how the project will ensure compliance with applicable requirements.

According to the Environmental Impact Study, **NO** historical, cultural or archaeological heritage was identified, no damage will occur. The same applies to traditional communities, which were not identified in the project area.

Would the project potentially involve or lead to:

P.4.1.1 	activities adjacent to or within a cultural heritage site?	☐ YES ☐ POTENTIALLY
---------------------------	--	--

		☒ NO
P.4.1.1 	significant excavations, demolitions, movement of earth, flooding or other environmental changes?	☐ YES ☐ POTENTIALLY ☒ NO
P.4.1.1 	alterations to landscapes and natural features with cultural significance?	☐ YES ☐ POTENTIALLY ☒ NO
P.4.1.1 	adverse impacts to sites, structures, or objects with historical, cultural, artistic, traditional or religious values or intangible forms of culture (e.g., knowledge, innovations, practices)? (Note: projects intended to protect and conserve Cultural Heritage may also have inadvertent adverse impacts)	☐ YES ☐ POTENTIALLY ☒ NO
P.4.1.2 	utilisation of tangible and/or intangible forms (e.g., practices, traditional knowledge) of Cultural Heritage for commercial or other purposes?	☐ YES ☐ POTENTIALLY ☒ NO
P.4.1.2 	If answer to question above is "YES" or "POTENTIALLY" - are the communities made aware of their right under the law, scope and nature of proposed development and its potential consequences?	☐ YES ☐ NO ☒ NA
P.4.1.3 	If answer to question above is "YES" - does the project provide equitable sharing of benefits from commercialisation of such knowledge, innovation, or practice, consistent with their customs and traditions?	☐ YES ☐ NO ☒ NA
P.4.1.4 	If answer to question above is "YES" - are opinions and recommendations of an Expert Stakeholder(s) not sought and demonstrated as being included in the project design?	☐ YES ☐ NO ☒ NA
P.4.1.4 	If answer to question above is "YES", has project design been changed, modified, updated considering opinions and recommendations of an Expert Stakeholder?	☐ YES ☐ NO ☒ NA

If the answer is "yes" or "potentially" to any of the above questions, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.

According to the Environmental Impact Study, NO historical, cultural or archaeological heritage was identified, no damage will occur. The same applies to traditional communities, which were not identified in the project area.

[P.4.2 |Forced Eviction and Displacement](#)

P.4.2.1 	Does the project involve any risks related to involuntary relocation of people?	☐ YES ☒ NO
---------------------------	---	--

If the answer to question above is "yes," please explain the reason and how the project will ensure compliance with applicable requirements.

Please add text here....

Would the project potentially involve or lead to:

P.4.2.1 	risk of forced evictions or involuntary relocation of people?	☐ YES
---------------------------	---	------------------------------

		☐ POTENTIALLY ☒ NO
P.4.2.2 	temporary or permanent and full or partial physical displacement (including people without legally recognisable claims to land)?	☐ YES ☐ POTENTIALLY ☒ NO
P.4.2.2 	economic displacement (e.g., loss of assets or access to resources due to land acquisition or access restrictions – even in the absence of physical relocation)?	☐ YES ☐ POTENTIALLY ☒ NO
P.4.2.2 	If answer to question above is “YES” or “POTENTIALLY”, - has the project developed Resettlement Action Plan or Livelihood Action Plan in consultation and agreement with affected individual, group or community? - has the project integrated Resettlement Action Plan or Livelihood Action Plan into the Project design?	☐ YES ☐ NO ☒ NA
P.4.2.3 	If answer to question above is “YES” - are opinions and recommendations of an Expert Stakeholder(s) not sought and demonstrated as being included in the project design?	☐ YES ☐ NO ☒ NA
P.4.2.3 	If answer to question above is “YES”, have project design been changed, modified, updated considering opinions and recommendations of an Expert Stakeholder?	☐ YES ☐ NO ☒ NA

If the answer is "yes" or "potentially" to any of the above questions, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.

Please add text here....

[P.4.3 | LAND TENURE AND OTHER RIGHTS](#)

P.4.3.1 	Does the project involve any risks related to identifying and managing legitimate tenure rights that may be affected by the project?	☐ YES ☒ NO
---------------------------	--	--

If the answer to question above is "yes," please explain the reason and how the project will ensure compliance with applicable requirements.

Please add text here....

Would the project potentially involve or lead to:

P.4.3.1 	impacts on or changes to land tenure arrangements and/or community-based property rights/customary rights to land, territories and/or resources?	☐ YES ☐ POTENTIALLY ☒ NO
P.4.3.1 	uncertainties with regards to land tenure, access rights, usage rights or land ownership? Examples include, but are not limited to water access rights, community-based property rights and customary rights.	☐ YES ☐ POTENTIALLY ☒ NO
P.4.3.2 	Changes in legal arrangements, if yes, are the changes done in line with relevant laws and regulations?	☐ YES ☐ NO ☒ NA

P.4.3.2 	Changes in legal arrangements, if yes, are these changes agree with free, prior and informed consent of the involved stakeholders?	☐ YES ☐ NO ☒ NA
P.4.3.3 	Does some other entity (other than the project developer) hold uncontested land title for the entire Project Boundary?	☐ YES ☒ NO ☐ NA
P.4.3.4 	Are opinions and recommendations of an Expert Stakeholder(s) not sought and demonstrated as being included in the project design?	☐ YES ☒ NO ☐ NA
P.4.3.4 	If answer to question above is "YES", have project design been changed, modified, updated considering opinions and recommendations of an Expert Stakeholder?	☐ YES ☐ NO ☒ NA
P.4.3.5 	Have project developer in consultation with stakeholders established a functioning mechanism to receive, process, resolve, communicate and record grievances?	☒ YES ☐ NO ☐ NA

If the answer is "yes" or "potentially" to any of the above questions, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.

FS provides a safe and reliable communication channel for registering complaints or reports of misconduct or actions that go against the ethical principles and values, as well as the laws. Operating 24 hours a day, 7 days a week, the Confidential Channel can be accessed in Brazilian Portuguese and English and assures the whistleblower of anonymity and secrecy in the investigations.

Link: <https://www.canalconfidencial.com.br/fs/>;

Phone (Brazil): 0800 792 1013.

[P.4.4 | INDIGENOUS PEOPLES](#)

P.4.4.1 	Does the project involve Indigenous People within the Project area of influence who may be affected directly or indirectly by the Project?	☐ YES ☒ NO
---------------------------	--	--

If the answer to question above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements.

According to the Environmental Impact Study, NO historical, cultural or archaeological heritage was identified, no damage will occur. The same applies to traditional and indigenous communities, which were not identified in the project area.

Would the project potentially involve or lead to:

P.4.4.1 	affect areas where indigenous peoples are present (including project area of influence)	☐ YES ☐ POTENTIALLY ☒ NO
P.4.4.1 	affect areas, land and territory claimed by indigenous peoples?	☐ YES ☐ POTENTIALLY ☒ NO
P.4.4.1 	impacts (positive or negative) to the human rights, lands, natural resources, territories, and traditional livelihoods of indigenous peoples?	☐ YES ☐ POTENTIALLY ☒ NO
P.4.4.7 	If answer to above questions is "YES" or "POTENTIALLY",	☐ YES

	- Is it determined that the proposed project may affect the rights, lands, resources, or territories of indigenous people? - Has an "Indigenous People Plan" (IPP) or "Indigenous People Plan Framework" been elaborated and included in the project documentation? - Was the plan developed in accordance with the effective and meaningful participation of indigenous peoples and in accordance with UNDP Guidelines?	☐ NO ☒ NA
P.4.4.3 	risk of forcibly removing indigenous people from their lands and territories?	☐ YES ☐ POTENTIALLY ☒ NO
P.4.4.4 	utilisation and/or commercial development of natural resources on lands and territories claimed by indigenous peoples? Consider, and where appropriate ensure, consistency with the answers under Principle 4.1 above	☐ YES ☐ POTENTIALLY ☒ NO
P.4.4.5 P.4.4.6 	If answer to question above is "YES" or "POTENTIALLY" - Did the project obtain free, prior and informed consent from indigenous people before taking their cultural, intellectual, religious, and/or spiritual property? - Does the project ensure that the indigenous people receive an equitable sharing of benefits resulting from the use of their traditional knowledge and practices? ? - Does the project ensure that the sharing of benefits resulting from the use of indigenous peoples' traditional knowledge and practices is culturally appropriate and inclusive? - Does the project ensure that the provision of equitable sharing of benefits does not impede land rights or equal access to basic services including health services, clean water, energy, education, safe and decent working conditions, and housing?	☐ YES ☐ NO ☒ NA
P.4.4.8 	Does the project lack appropriate feedback and grievance channels for Indigenous Peoples and their representatives?	☐ YES ☐ NO ☒ NA
P.4.4.8 	Has a grievance mechanism not been established at the beginning of programme or project implementation with due consideration given to customary dispute settlement mechanisms among the Indigenous Peoples concerned and will it remain operational throughout the project cycle?	☐ YES ☐ NO ☒ NA
P.4.4.9 	Are opinions and recommendations of an Expert Stakeholder(s) not sought and demonstrated as being included in the project design?	☐ YES ☐ NO ☒ NA

P.4.4.9 	If answer to question above is "YES", have project design been changed, modified, updated considering opinions and recommendations of an Expert Stakeholder?	☐ YES ☐ NO ☒ NA
---------------------------	--	---

If the answer is "yes" or "potentially" to any of the above questions, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.

According to the Environmental Impact Study, NO historical, cultural or archaeological heritage was identified, no damage will occur. The same applies to traditional and indigenous communities, which were not identified in the project area.

P.5 | CORRUPTION

P.5.1.1 	Does the project involve, or is it complicit in, contributing to or reinforcing corruption or corrupt projects?	☐ YES ☒ NO
P.5.1.1 	Does the project have a risk of encouraging bribery, kickbacks, or other unethical behavior?	☐ YES ☒ NO

If the answer to any of the questions above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements.

-

ECONOMIC SAFEGUARDING PRINCIPLES

P.6 | ECONOMIC IMPACTS

P.6.1 | LABOUR RIGHTS AND WORKING CONDITIONS

P.6.1.1 	Does the project involve, facilitate, or condone forced labor, or pose a potential risk of forced labor?	☐ YES ☒ NO
P.6.1.1 	Does the project violate any labor or health and safety laws, international obligations, or ILO conventions?	☐ YES ☒ NO
P.6.1.2 	Does the project violate the principles of equal opportunity and fair treatment in its employment decisions?	☐ YES ☒ NO
P.6.1.3 	Does the project violate national laws, if available regarding non-discrimination in employment?	☐ YES ☒ NO
P.6.1.4 P.6.1.5 	Does the project allow child labor?	☐ YES ☒ NO
P.6.1.7 P.6.1.8 	Does the project have insufficient processes and measures in place to ensure the safety and health of project workers?	☐ YES ☒ NO
P.6.1.9 	Does the project have insufficient measures to safeguard and support vulnerable project workers, such as women, people with disabilities, migrant workers, and young workers, and to prevent any kind of harassment, abuse, bullying, or exploitation, including gender-based violence (GBV)?	☐ YES ☒ NO
P.6.1.10 	Does the project have no grievance mechanism available for workers to voice workplace concerns? Is information about this mechanism not provided to workers at the time of recruitment, or is it not easily accessible?	☐ YES ☒ NO

If the answer to any of the questions above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements.

Would the project potentially involve or lead to:

(NOTE: APPLIES TO BOTH PROJECT AND CONTRACTOR WORKERS)

P.6.1.1 	use of forced labour?	☐ YES ☐ POTENTIALLY ☒ NO
P.6.1.1 	working conditions that do not meet national labour laws and international commitments?	☐ YES ☐ POTENTIALLY ☒ NO
P.6.1.1 	working conditions that may deny freedom of association and collective bargaining?	☐ YES ☐ POTENTIALLY ☒ NO
P.6.1.1 	absence of documented working agreements with all individual workers <i>if such agreements do not exist, or do not address working conditions and terms of employment, the project developer shall provide reasonable working conditions and terms of employment.</i>	☐ YES ☐ POTENTIALLY ☒ NO
P.6.1.1 	use of migrant workers? <i>if engaged, the developer shall ensure that they are engaged substantially equivalent terms and conditions to non-migrant workers carrying out similar work.</i>	☐ YES ☐ POTENTIALLY ☒ NO
P.6.1.1 	having no arrangements for basic services ⁷³ for workers? <i>the project developer shall put in place and implement policies on the quality and management of the accommodation and provision of basic services in a manner consistent with the principles of non-discrimination and equal opportunity. Workers' accommodation arrangements should not restrict workers' freedom of movement or of association</i>	☐ YES ☐ POTENTIALLY ☒ NO
P.6.1.2 	any form of discrimination or harassment based on factors unrelated to job requirements, such as gender, race, nationality, ethnicity, social or indigenous origin, religion or belief, disability, age, or sexual orientation?	☐ YES ☐ POTENTIALLY ☒ NO
P.6.1.2 	any form of discrimination in any aspect of employment, such as recruitment, compensation, working conditions, training, job assignment, promotion, termination, or discipline?	☐ YES ☐ POTENTIALLY ☒ NO

⁷³ Basic services requirements refer to minimum space, supply of water, adequate sewage and garbage disposal system, appropriate protection against heat, cold, damp, noise, fire, and disease-carrying animals, adequate sanitary and washing facilities, ventilation, cooking and storage facilities and natural and artificial lighting, and in some cases basic medical services.

P.6.1.2 	harassment, intimidation, and/or exploitation, especially in regard to women?	☐ YES ☐ POTENTIALLY ☒ NO
P.6.1.3 	discriminatory working conditions and/or lack of equal opportunity where national law provides provision to address non-discrimination in employment?	☐ YES ☐ POTENTIALLY ☒ NO
P.6.1.4 	use of child labour? (including third-party engaged workers)	☐ YES ☐ POTENTIALLY ☒ NO
P.6.1.4 	inadequate and verifiable mechanisms for age verification?	☐ YES ☒ NO
P.6.1.7 	no processes and measures in place for the safety and health of project workers?	☐ YES ☒ NO
P.6.1.7 	No provision of safety and health training provisions, including on the proper use and maintenance of personal protective equipment conducted by competent persons and the maintenance of training records?	☐ YES ☒ NO
P.6.1.7 	No provision to record and document accidents, diseases, incidents, and any resulting injuries, illnesses, or deaths?	☐ YES ☒ NO
P.6.1.8 	occupational health and safety risks due to physical, chemical, biological and psychosocial hazards (including violence and harassment) throughout the project life-cycle?	☐ YES ☒ NO
P.6.1.9 	No measures to protect vulnerable project workers from harassment, exploitation, and gender-based violence (GBV)? This includes women, people with disabilities, migrant workers, and young workers.	☐ YES ☒ NO
P.6.1.10 	No grievance mechanism available for workers to voice workplace concerns.	☐ YES ☒ NO
P.6.1.11 	No measures for due diligence and the establishment of policies and procedures to manage and monitor the performance of third-party employees in the project?	☐ YES ☒ NO

If the answer is "yes" or "potentially" to any of the above questions, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.

-

[P.6.2 | NEGATIVE ECONOMIC CONSEQUENCES](#)

P.6.2.1 	Is there a risk of project failure during implementation or after project certification due to a lack of financial resources?	☐ YES ☒ NO
P.6.2.2 	Does the project have potential negative impacts or pose a risk to the local economy?	☐ YES ☒ NO
P.6.2.2 	Are there any potential risks or negative impacts this project may have on vulnerable or marginalised social groups, despite the benefits it may bring?	☐ YES ☒ NO

If the answer to any of the questions above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements.

-

Would the project involve or lead to:

-

P.6.2.2 	economic impacts (negative/detrimental) to the local economy?	☐ YES ☐ POTENTIALLY ☒ NO
P.6.2.2 	negative economic consequences during and after project implementation, e.g., for vulnerable and marginalised social groups in targeted communities?	☐ YES ☐ POTENTIALLY ☒ NO

If the answer is "yes" or "potentially" to any of the above questions, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.

-

[P.7 | CLIMATE AND ENERGY](#)

[P.7.1 | GHG EMISSIONS](#)

P.7.1.1 	Does the project have a risk of increasing greenhouse gas emissions over the Baseline Scenario?	☐ YES ☒ NO
---------------------------	---	--

If the answer to question above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements.

-

Would the project involve or lead to:

P.7.1.1 	increase greenhouse gas emissions over the Baseline Scenario?	☐ YES ☐ POTENTIALLY ☒ NO
---------------------------	---	--

If the answer is "yes" or "potentially" to the above question, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.

-

[P.7.2 | ENERGY SUPPLY](#)

P.7.2.1 	Does the project pose a risk to the availability and reliability of energy supply to other users?	☐ YES ☒ NO
---------------------------	---	--

If the answer to question above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements.

-

Would the project involve or lead to:

P.7.2.1 	negative impact on the availability and reliability of energy supply to other users?	☐ YES ☐ POTENTIALLY ☒ NO
---------------------------	--	--

If the answer is "yes" or "potentially" to the above question, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.

-

-

P.8 | WATER

P.8.1 | IMPACT ON NATURAL WATER PATTERNS/FLOWS

P.8.1.1	Does the project increase water usage to a level that will not allow for the maintenance of environmental flows?	☐ YES ☒ NO
P.8.1.1	Does the project result in the discharge of wastewater that does not meet the required standard for beneficial reuse and could therefore negatively impact the environmental flow?	☐ YES ☒ NO
P.8.1.1	Does the project have the potential risk to exceed the rate of recharge for the groundwater source?	☐ YES ☒ NO
P.8.1.1	Does the project involve any processes or activities that could contaminate the groundwater and render it unsuitable for use?	☒ YES ☐ NO

If the answer to any of the questions above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements.

The project may incur risks related to water contamination due to non-expected release of CO₂. This risks is addressed in the Environmental Impact Study and have specific mitigation and monitoring programs planned.

Would the project involve or lead to:

P.8.1.1	affect the natural or pre-existing pattern of watercourses, groundwater and/or the watershed(s) such as high seasonal flow variability, flooding potential, lack of aquatic connectivity or water scarcity?	☐ YES ☐ POTENTIALLY ☒ NO
P.8.1.1	Wastewater discharge of quality that does not meet the required standard for beneficial reuse?	☐ YES ☐ POTENTIALLY ☒ NO
P.8.1.1	significant extraction, diversion of ground water? For example, construction of dams, reservoirs, river basin developments, groundwater extraction	☐ YES ☐ POTENTIALLY ☒ NO
P.8.1.2	Are opinions and recommendations of an Expert Stakeholder(s) not sought and demonstrated as being included in the project design?	☐ YES ☐ NO ☒ NA

If the answer is "yes" or "potentially" to any of the above questions, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.

-

P.8.2 | EROSION AND/OR WATER BODY INSTABILITY

P.8.2.1	Does the project have a risk of negatively impacting the catchment and has it been assessed and addressed?	☐ YES ☒ NO
---------	--	--

If the answer to question above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements.

-

Would the project involve or lead to:

P.8.2.2 -	negatively impact on the catchment area?	
P.8.2.5 	<i>If yes, Erosion prevention measures, including soil and slope protection measures, must be implemented before project commencement. These measures should involve natural terracing, infiltration strips, permanent ground cover, hedge and tree rows, and effective slope length assessment. Regular reassessment of these measures is necessary.</i>	☐ YES ☐ POTENTIALLY ☒ NO
P.8.2.6 	Are opinions and recommendations of an Expert Stakeholder(s) not sought and demonstrated as being included in the project design?	☐ YES ☐ NO ☒ NA

If the answer is "yes" or "potentially" to any of the above questions, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.

-

P.9 | ENVIRONMENT, ECOLOGY AND LAND USE

P.9.1 | LANDSCAPE MODIFICATION AND SOIL

P.9.1.1 -	Is there any risk of soil resource degradation or loss of ecosystem services provided by soils in the project?	
P.9.1.3 	<i>If yes, the project shall maintain healthy soils by minimising negative impacts on soil health, productivity, structure, and water retention. Steps to minimise soil degradation include crop rotation, composting, using N-fixing plants, and reducing tillage and ecologically harmful substances.</i>	☐ YES ☒ NO

If the answer to question above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements.

Please add text here....

Would the project involve or lead to:

P.9.1.4 	production, harvesting, and/or management of living natural resources by small-scale landholders and/or local communities?	☐ YES ☐ POTENTIALLY ☒ NO
P.9.1.4 	if answer to above question "yes" or "potentially", does project adopt appropriate and culturally sensitive sustainable resource management practices?	☐ YES ☐ NO ☒ NA

If the answer is "yes" or "potentially" to any of the above questions, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.

-

P.9.2 | VULNERABILITY TO NATURAL DISASTER

P.9.2.1 	Does the project have any risks associated with natural or man-made hazards that could result from land use changes due to the project?	☐ YES ☒ NO
---------------------------	---	--

If the answer to question above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements.

-

Would the project involve or lead to:

P.9.2.2 	any potential risks that require emergency preparedness and response planning?	☐ YES ☐ POTENTIALLY ☒ NO
---------------------------	--	--

P.9.2.2 	if answer to above question "yes" or "potentially", did the project developer disclose appropriate information about emergency preparedness and response to affected communities?	☐ YES ☒ NO ☒ NA
---------------------------	---	--

If the answer is "yes" or "potentially" to any of the above questions, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.

Please add text here....

[P.9.3 | BIOSAFETY AND GENETIC RESOURCES](#)

P.9.3.1 	Does the project involve the transfer, handling, and use of genetically modified organisms/living modified organisms that may result in adverse effects on biological diversity?	☐ YES ☒ NO
---------------------------	--	--

If the answer to question above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements.

Considering is not a greenfield project.

Would the project involve or lead to:

P.9.3.1 	the transfer, handling and use of genetically modified organisms/living modified organisms (GMOs/LMOs) that result from modern biotechnology	☐ YES ☐ POTENTIALLY ☒ NO
---------------------------	--	--

P.9.3.1 	If answer to above question is "yes" has a risk assessment by a competent Expert stakeholder been carried out in accordance with Annex iii of the Cartagena protocol on biosafety to the convention on biological diversity?	☐ YES ☐ NO ☒ NA
---------------------------	--	---

P.9.3.2 	If answer to above question is "yes" has any risks identified in the risk assessment?	☐ YES ☐ NO ☒ NA
---------------------------	---	---

P.9.3.3 	Forestry (for example Afforestation/Reforestation) involving GMO planting? <i>Note - Forestry projects (for example Afforestation/Reforestation) involving GMO planting are not eligible for Certification under Gold Standard for the Global Goals.</i>	☐ YES ☐ NO ☒ NA
---------------------------	---	---

If the answer is "yes" or "potentially" to any of the above questions, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.

Under assessment by the project developer

P.9.4 | RELEASE OF POLLUTANTS

P.9.4.1	Does the project have a risk of releasing pollutants to air, water, and land in routine, non-routine, or accidental circumstances?	☐ YES ☒ NO
---------	--	--

If the answer to question above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements.

Please add text here....

Would the project involve or lead to:

P.9.4.1	any potential risk of pollutant release that cannot be avoided?	☐ YES ☐ POTENTIALLY ☒ NO
P.9.4.3	If answer to above question is "Yes" or "potentially", has the project identified all potential pollution sources that may degrade the quality of soil, air, surface, and groundwater in the project area?	☐ YES ☐ NO ☒ NA
P.9.4.2	If answer to above question is "Yes" or "potentially", do the pollution prevention and control technologies and practices applied during the project life cycle align with national regulations or international best practices?	☐ YES ☐ NO ☒ NA
P.9.4.3	If answer to above question is "Yes", is there a monitoring plan to ensure that mitigation measures are implemented, and resources are protected?	☐ YES ☐ NO ☒ NA

If the answer is "yes" or "potentially" to any of the above questions, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.

Please add text here....

P.9.5 | HAZARDOUS AND NON-HAZARDOUS WASTE

P.9.5.1	Does the project involve the generation of waste materials (both hazardous and non-hazardous)?	☒ YES ☐ NO
P.9.5.3	Does the project involve risk of release of hazardous materials resulting from their production, transportation, handling, storage, or use?	☒ YES ☐ NO
P.9.5.5	Does the project involve the use of any chemicals or materials subject to international bans or phase-outs?	☐ YES ☒ NO

If the answer to any of the questions above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements.

Hazardous waste regulations are complied with. A small quantity of hazardous waste may be generated during project operation. The project owner will monitor the "Quantity of hazardous wastes disposed (kg)"

Would the project involve or lead to:

P.9.5.1	the generation and management of waste materials?	☒ YES
---------	---	---

		☐ POTENTIALLY ☐ NO
P.9.5.1 	treatment, destruction, or disposal of waste material?	☒ YES ☐ NO ☐ NA
P.9.5.1 	If answer to above question is "Yes", does the project involve an environmentally friendly method that includes appropriate control of emissions and residues resulting from the handling and processing of waste material?	☒ YES ☐ NO ☐ NA
P.9.5.3 	risk of release of hazardous materials resulting from their production, transportation, handling, storage, or use?	☒ YES ☐ NO ☐ NA
P.9.5.3 	If answer to above question is "yes", does project has measures in place to address health risks?	☒ YES ☐ NO ☐ NA
P.9.5.4 	Involve manufacture, trade, and use of chemicals and hazardous materials subject to international bans or phase-outs due to their high toxicity to living organisms, environmental persistence, potential for bioaccumulation, or potential for depletion of the ozone layer	☐ YES ☐ POTENTIALLY ☒ NO

If the answer is "yes" or "potentially" to any of the above questions, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.

Hazardous waste regulations are complied with. A small quantity of hazardous waste may be generated during project operation. The project owner will monitor the "Quantity of hazardous wastes disposed (kg)"

[P.9.6 | PESTICIDES & FERTILISERS](#)

P.9.6.1 	Does the project involve the use of chemical pesticides?	☐ YES ☒ NO
P.9.6.5 	Does the project involve purchase, store, manufacture, trade or use products that fall in Classes IA (extremely hazardous) and IB (highly hazardous)	☐ YES ☒ NO
P.9.6.6 	Does the project use fertilisers, and if so, are measures being taken to minimise their use and nutrient losses to the environment?	☐ YES ☒ NO

If the answer to any of the questions above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements.

Please add text here....

Would the project involve or lead to:

P.9.6.1 	chemical pesticides use for pest management?	☐ YES ☐ POTENTIALLY ☒ NO
P.9.6.4 	If answer to question above is "yes" or "potentially", does project has documented Chemical Pesticides Policy in place?	☐ YES ☐ NO ☒ NA
P.9.6.5 	purchase, store, use, manufacture, or trade in Class II (moderately hazardous) pesticides?	☐ YES ☐ POTENTIALLY

		☒ NO
P.9.6.5 	If answer to question above is "yes" or "potentially", does project have appropriate controls on manufacture, procurement, or distribution and/or use of these chemicals?	☐ YES ☐ NO ☒ NA

If the answer is "yes" or "potentially" to any of the above questions, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.

-

[P.9.7 | HARVESTING OF FORESTS](#)

P.9.7.1 	Does the project have a risk of unsustainable forest management, including timber harvesting?	☐ YES ☒ NO
P.9.7.1 	Does the project pose a risk of depleting biodiversity and ecosystem functionality in areas where improved forest management is undertaken?	☐ YES ☒ NO
P.9.7.1 	Does the project risk not meeting requirements for environment-friendly, socially beneficial, and economically viable plantations using native species whenever possible?	☐ YES ☒ NO

If the answer to any of the questions above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements.

Please add text here....

[P.9.8 | FOOD SECURITY](#)

P.9.8.1 	Does the project involve the risk of negatively influencing access to and availability of food for people affected?	☐ YES ☒ NO
---------------------------	---	--

If the answer to the question above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements.

Please add text here....

Would the project involve or lead to:

P.9.8.1 	modification of the quantity or nutritional quality of food available such as through crop regime alteration or export or economic incentives?	☐ YES ☐ POTENTIALLY ☒ NO
---------------------------	--	--

If the answer is "yes" or "potentially" to the above question, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.

Please add text here....

[P.9.9 | ANIMAL WELFARE](#)

P.9.9.1 	Does the project involve any risks to animal welfare?	☐ YES ☒ NO
	Animal welfare shall be ensured by providing access to water and food, appropriate environment, humane	

	treatment, and staff training. Evidence of mistreatment will be treated as an immediate non-conformity.	
P.9.9.2 	Does the project involve any potential risk of excessive or inadequate use of veterinary medicines?	☐ YES ☒ NO
P.9.9.4 	Does the project involve the risk of administering synthetic growth promoters, including hormones?	☐ YES ☒ NO

If the answer to any of the questions above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements.

Please add text here....

Would the project involve or lead to:

P.9.9.1 	animal husbandry or harvesting of fish populations or other aquatic species? ⁷⁴	☐ YES ☐ NO ☒ NA
P.9.9.1 	limiting access for animals to basic needs like drinking water, adequate food, daylight, appropriate shelter etc.?	☐ YES ☐ POTENTIALLY ☒ NO
P.9.9.3 	inadequate measures to isolate sick animals and control the spread of disease, especially zoonotic diseases?	☐ YES ☐ NO ☒ NA
P.9.9.5 	inadequate low-stress methods, equipment, and facilities that facilitate calm animal movement.	☐ YES ☐ NO ☒ NA
P.9.9.6 	inadequate measures to ensure that animals are exposed to the least stress possible during transportation and slaughtering?	☐ YES ☐ NO ☒ NA
P.9.9.7 	inappropriate spacing per animal and stocking rates per land unit?	☐ YES ☐ NO ☒ NA
P.9.9.8 	inadequate measures to address the specific needs of aquatic animals?	☐ YES ☐ NO ☒ NA
P.9.9.9 P.9.9.10 	primary production of living natural resources such as animal husbandry, aquaculture, and fisheries? If the answer is yes, implement industry-standard sustainable management practices in line with to one or more relevant and credible standards and utilise available technologies.	☐ YES ☐ NO ☒ NA

If the answer is "yes" or "potentially" to any of the above question, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.

-

⁷⁴ 'Involve' means if the project mechanism and/or impact(s) are achieved via changing animal husbandry practices in some way.

P.9.10 HIGH CONSERVATION VALUE AREAS AND CRITICAL HABITATS		
P.9.10.1 	Does the project have the risk of negatively impacting HCV areas and/or critical habitats?	☐ YES ☒ NO
P.9.10.2 	Does the project in the project area or area of downstream impacts have risks to the following: native tree patches, individual native trees, freshwater resources (including rivers, lakes, swamps, temporary water bodies, and wells), habitats of rare, threatened, and endangered species, and biodiversity-enhancing areas?	☐ YES ☒ NO
If the answer to any of the questions above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements.		
-		
Would the project involve or lead to:		
P.9.10.1 	identified habitats as HCV areas and or Critical habitats?	☐ YES ☐ POTENTIALLY ☒ NO
P.9.10.1 	If answer to above question is "yes", does the project have any risks that could negatively impact the catchment, project success, and surrounding HCV and ecological assets, as well as any measurable adverse impacts on the criteria or biodiversity values for which the critical habitat was designated, and on the ecological processes supporting that biodiversity?	☐ YES ☐ NO ☒ NA
P.9.10.1 	If answer to above question is "yes", is a robust, appropriately designed, and long-term Habitats and Biodiversity Action Plan absent which will make the project unable to achieve net gains of those biodiversity values for which the critical habitat was designated?	☐ YES ☐ NO ☒ N/A
P.9.10.2 	Does the project area or area of downstream impacts have native tree patches, individual native trees, freshwater resources (including rivers, lakes, swamps, temporary water bodies, and wells), habitats of rare, threatened, and endangered species, and biodiversity-enhancing areas?	☐ YES ☐ POTENTIALLY ☒ NO
P.9.10.2 	If the answer to the above question is "yes", will the project have any adverse effects on these areas?	☐ YES ☐ No ☒ NA
P.9.10.3 	If the answer to above question is "yes", does the project has opportunities to minimise unwarranted conversion or degradation of the habitat and to enhance the habitat as part of its development?	☐ YES ☐ No ☒ NA
P.9.10.4 	Is the project applying Land Use & Forest Activity Requirements and managing a minimum 10% of the project area to protect or enhance the biological diversity of native ecosystems following HCV approach as per the given requirements?	☐ YES ☐ No ☒ NA
P.9.10.5 	Are opinions and recommendations of an Expert Stakeholder(s) not sought and demonstrated as being included in the project design?	☐ YES ☐ NO ☒ NA

If the answer is "yes" or "potentially" to any of the above question, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.

-

P.9.11 | ENDANGERED SPECIES

<u>P.9.11.1 </u>	Does the project lead to the reduction or negative impact on any recognised Endangered, Vulnerable or Critically Endangered species?	☐ YES ☒ NO
-------------------	--	--

If the answer to question above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements.

Please add text here....

Would the project involve or lead to:

<u>P.9.11.2 </u>	distortion of habitats of endangered species?	☐ YES ☐ POTENTIALLY ☒ NA
<u>P.9.11.2 </u>	If answer to the above question is "yes", does the project plan to protect and enhance them?	☐ YES ☐ POTENTIALLY ☐ NO ☒ N/A
<u>P.9.11.2 </u>	Are opinions and recommendations of an Expert Stakeholder(s) not sought and demonstrated as being included in the project design?	☐ YES ☐ NO ☒ NA

If the answer is "yes" or "potentially" to any of the above question, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.

-

P.9.12 | INVASIVE ALIEN SPECIES

<u>P.9.12.1 </u>	Does project introduce any alien species (not currently established in the country or region of the project) into new environments?	☐ YES ☒ NO
-------------------	---	--

If the answer to question above is "yes," please explain project situation and how the project will ensure compliance with applicable requirements.

Please add text here....

Would the project involve or lead to:

<u>P.9.12.1 </u>	risk of introducing any alien species with a high risk of invasive behaviour regardless of whether such introductions are permitted under the existing regulatory framework?	☐ YES ☐ POTENTIALLY ☒ NO
<u>P.9.12.1 </u>	risk of potential accidental or unintended introductions including the transportation of substrates and vectors (such	☐ YES

	as soil, ballast, and plant materials) that may harbour alien species.	☐ POTENTIALLY ☒ NO
P.9.12.2	risk of spreading alien species into areas in which they have not already been established?	☐ YES ☐ POTENTIALLY ☒ NO

If the answer is "yes" or "potentially" to any of the above question, please provide a brief description of the project situation below. Also, provide justification and/or evidence as necessary to demonstrate compliance with applicable requirements.

-

APPENDIX 2 - CONTACT INFORMATION OF PROJECT DEVELOPER(S)

Organization name	FS INDUSTRIA DE BIOCOMBUSTÍVEIS LTDA
Registration number with relevant authority	
Street/P.O. Box	Est Linha 1A a 900m do KM 07 da Av. das Industrias, sn – Bairro Distrito Industrial Senador Atilio Fontana
Building	
City	Lucas do Rio Verde
State/Region	Mato Grosso
Postcode	78455-000
Country	Brazil
Telephone	
E-mail	daniel.lopes@fs.agr.br
Website	https://www.fs.agr.br/
Contact person	Daniel Costa Lopes
Title	VP - Sustainability & Business Development
Salutation	Mr.
Last name	Lopes
Middle name	Costa
First name	Daniel
Department	Sustainability & Business Development
Mobile	
Direct tel.	
Personal e-mail	daniel.lopes@fs.agr.br

APPENDIX 3 - LUF ADDITIONAL INFORMATION

Not applicable as the proposed GS project activity is not a Land-use & Forest Activity (LUF) project.

APPENDIX 4 - DESIGN CHANGES

A4.1. Details of proposed or actual design change

>> Not applicable. There are no design changes valid for the GS project activity.

A4.2. Describe the impacts of design change on the following

a. Additionality

>> Not applicable. There are no design changes valid for the GS project activity.

b. Applicability of methodology and other methodological regulatory documents with which the project activity has been certified

>> Not applicable. There are no design changes valid for the GS project activity.

c. Compliance with the monitoring plan of the applied methodology

>> Not applicable. There are no design changes valid for the GS project activity.

d. Level of accuracy and completeness in the monitoring of the project activity compared with the requirements contained in the registered monitoring plan

>> Not applicable. There are no design changes valid for the GS project activity.

e. Scale of the project activity

>> Not applicable. There are no design changes valid for the GS project activity.

f. Stakeholder consultation

>> Not applicable. There are no design changes valid for the GS project activity.

g. Sustainable development criteria

>> Not applicable. There are no design changes valid for the GS project activity.

h. Safeguarding assessment

>> Not applicable. There are no design changes valid for the GS project activity.

i. Compliance with applicable legislation

>> Not applicable. There are no design changes valid for the GS project activity.

j. **Only for LUF Projects:** Transparent summary of all approved changes in Project Area, Eligible Area and accompanying changes in ex-ante emissions removals.

DATE OF APPROVED DESIGN CHANGE (MM/DD/YYYY)	PROJECT AREA (HA)		ELIGIBLE AREA (HA)		EX-ANTE ESTIMATE (TCO ₂ E)	
	INCREASE OR DECREASE ?	VALUE (HA)	INCREASE OR DECREASE?	VALUE (HA)	INCREASE OR DECREASE ?	PERCENTAG E (%)

APPENDIX 5 – STORAGE SITE MONITORING PROGRAM

Due to the sensitive nature of the data, the monitoring plan will be presented as a separate document. The complete document will be provided as evidence.

APPENDIX 6A – DEMONSTRATION OF RENEWABILITY OF FERMENTED BIOMASS (CORN) UNDER CDM EB23 ANNEX 18

1. Renewability of biomass – Fermented biomass (Corn)

In the context of corn, GS4GG allows the determination of the parameter Renewability of biomass_{i,n,k} by two options, given an existing biomass fermentation unit:

- Option 1: During validation and at each verification, presentation of adequate evidence to the biomass validation bodies (BVOs) that the biomass used in the biomass fermentation facility(ies) during the monitoring period complies with the criteria for the definition of renewable biomass provided for in Annex 18 of the CDM EB 23 Report and with any applicable laws and regulations; or,
- Option 2: During validation and each verification, presentation of adequate evidence confirming the registration or certification of the biomass fermentation facility(ies) or fermentation product(s), under any jurisdictional standard, regulation or program of the eligible host country identified in Appendix 1 of the Methodology.

For the fermented biomass, Option 1 is applied. Therefore, the fermented biomass (corn) used in the project is considered renewable in accordance with Annex 18 of the CDM EB23 Report.

GS4GG indicates the following sources of information and procedures for evaluating this parameter: “Operational records of the biomass fermentation plant (e.g., purchase invoices, supply contracts with producers, records or supply contracts with the fermentation plant or fermentation products) that indicate the type and origin of the biomass used in the plant during the monitoring period.”

2. Corn

2.1. Corn Supplier Profiles

In the context of the corn supply chain, FS operates with different supplier profiles, classified according to the level of traceability of the grain's origin:

- Traceable Direct Suppliers: contracts in which negotiation occurs directly with the rural producer, who provides the origin of the grain through the Rural Environmental Registry (CAR) of the municipality of negotiation.
- Traceable Indirect Suppliers: contracts in which negotiation is carried out through an intermediary agent (example: cooperatives) that informs the responsible producer and provides the origin of the grain (CAR).

2.2. Criteria evaluated

To ensure socio-environmental compliance, all corn purchase negotiations carried out by FS are mandatorily submitted to socio-environmental analysis on the TerraMatrix platform of the company Agrottools, regardless of whether it is a new or recurring supplier. Depending on the type of negotiation and the supplier's profile, specific protocols may be applied, including differentiated socio-environmental criteria compatible with the identified risk level. The main socio-environmental criteria evaluated in the analysis process include, but are not limited to:

- Consultation of CPF or CNPJ in the current and historical lists related to forced labor and/or labor analogous to slavery, according to official databases of the Ministry of Labor and Employment (MTE) and the Secretariat of Labor Inspection (SIT);
- Verification of environmental embargoes due to deforestation, both in the form of lists and polygons, issued by the competent environmental agencies, including IBAMA, SEMA/MT and ICMBio;
- Identification of illegal deforestation under any circumstances and legal deforestation that occurred after 01/01/2022;
- Analysis of overlap with protected areas, such as: Special Areas (KBA, RAMSAR and AZEs); Indigenous Lands; Quilombola Territories; Integral Protection and Sustainable Use Conservation Units; Restricted Use Areas defined by SEMA/MT (Guaporé and Araguaia biomes).

All criteria are described in the Social and Environmental Responsibility Policy in the Supply and Sales Chain (POL-SUS-0002 – V.4), and the detailed operational application of these criteria is documented in the Social and Environmental Assessment Procedure – Corn Origination (POP-SUS-0003 – V.2).

2.3. Data Extraction, Processing, and Analysis Dynamics

Every corn purchase negotiation is formalized by the sales team through contract registration in the SAP system. From this registration, the Sustainability area performs daily contract extraction with the objective of verifying the socio-environmental compliance of the negotiations. The extracted contracts are consolidated in an Excel control spreadsheet, called "Daily Evaluation," which serves as an operational tool and evidence of the controls performed by the Sustainability team. Some of the information entered in the spreadsheet originates directly from SAP, while others were specifically structured to support the socio-environmental analysis, allowing the identification of the compliance status of the contracts, as well as the recording of the verifications performed.

2.4. Monitoring during the contract term

After the contract is registered in the SAP system, it is automatically integrated into the FLINT platform, where it is monitored weekly until its termination, corresponding to the end of grain receipt. If changes are identified in the previously evaluated socio-environmental criteria, the Sustainability team performs a detailed analysis of these changes and issues an advanced report on the new scenario identified. When the result of the advanced report indicates non-compliance, the business partner's contract(s) have their status changed to "non-compliant" and are duly blocked in the SAP system by the Sustainability team. In parallel, the Sustainability team, together with the business area (Corn Origination), seeks clarification on the identified non-compliance, with the aim of adopting corrective measures that allow its reversal. If there is sufficient time to regularize the socio-environmental liability before grain delivery, the contract receives the status of "action plan"; otherwise, the contract is canceled.

2.5. Consolidation of the monitored parameter

The Renewability of Biomass parameter considers the amount of corn received at the Lucas do Rio Verde Unit throughout the monitoring period. The first monitoring period will begin on the date the CO₂ injection starts. From this date onwards, it is expected that all corn received will be classifiable as "Traceable," both for direct and indirect suppliers, after the application of the Socio-environmental Responsibility Policy in the Supply and Sales Chain and the Socio-environmental Assessment Procedure – Corn Origination.

The contracts, the daily assessments performed, the socio-environmental statements, and the visualization of the FLINT platform can be consulted on-site during the audit to verify this parameter.

2.6. Option 1 applicability

The biomass fermented in this project is 2nd crop corn, a non-woody biomass. So, to be aligned with CDM EB 23 Annex 18 and be considered as renewable it must be originated from croplands and/or grasslands where:

- (a) The land area remains cropland and/or grasslands or is reverted to forest; and
- (b) Sustainable management practices are undertaken on these land areas to ensure in particular that the level of carbon stocks on these land areas does not systematically decrease over time (carbon stocks may temporarily decrease due to harvesting); and
- (c) Any national or regional forestry, agriculture and nature conservation regulations are complied with.

Regarding item (a) satellite images of the areas have been analyzed, year by year, since 2022 in order to assess land-use patterns over recent years. This evaluation aimed to verify whether the land has remained as cropland and/or grassland, or if it has undergone reversion to forest. By examining this temporal sequence of images, it was possible to identify consistent land-use trends and confirm the stability or changes in land cover over the analyzed period. The year 2022 was selected in accordance with FS's internal policy.

The complete shapefile will be provided as supporting evidence.

Regarding item (b), sustainable agricultural practices play a fundamental role in maintaining and increasing soil organic carbon (SOC), especially in tropical agroecosystems such as those found in Brazil. Among these practices, crop diversification, no-tillage systems, and double cropping—particularly the 2nd corn system—stand out as key strategies for improving soil health and ensuring long-term productivity. Soil organic carbon is closely linked to soil health, as it supports essential ecosystem functions such as nutrient cycling, water regulation, and climate mitigation. Healthy soils with higher carbon content are more resilient and productive, contributing to stable agricultural systems under climate variability (CHERUBIN et al., 2025)□. In

this context, practices that increase plant biomass inputs and maintain soil cover throughout the year are critical for enhancing carbon sequestration.

Crop diversification systems, including rotations and successions, are particularly effective in increasing SOC. By replacing monocropping systems with diversified cropping systems, farmers increase the quantity and diversity of plant residues returned to the soil, which enhances soil biological, physical, and chemical properties. Long-term studies show that these systems improve soil multifunctionality, increase yields, and enhance resilience to climate stress (CHERUBIN et al., 2025)⁷⁵.

The adoption of 2nd crop corn after soybean is a key example of sustainable intensification in Brazil. This system maximizes land use efficiency by producing two crops in the same area within a single year, without the need for expanding agricultural land. Importantly, 2nd crop corn contributes to maintaining soil cover during the off-season, improving nutrient cycling and increasing biomass inputs, which are essential for building soil organic carbon (MOREIRA et al., 2020)⁷⁶.

In addition, the 2nd crop corn system contributes to carbon sequestration by increasing root biomass and maintaining continuous ground cover, which enhances soil carbon accumulation over time (ABFA, 2025)⁷⁷. This continuous input of organic matter reduces carbon losses and promotes long-term soil carbon storage, making agricultural systems more sustainable and climate-resilient.

Furthermore, double cropping systems have broader environmental benefits, including reduced greenhouse gas emissions and more efficient land use. By intensifying production on existing agricultural land, these systems avoid deforestation and contribute to climate change mitigation (GURGEL et al., 2024)⁷⁸.

Another important sustainable practice is the sanitary void (*"vazio sanitário"*). It is a phytosanitary measure adopted in the state of Mato Grosso, Brazil, to control the spread of soybean rust and other pests. It consists of a legally defined period during which no living soybean plants may remain in the fields, including volunteer plants (*"soja*

⁷⁵ CHERUBIN, M. R. et al. Long-term effects of crop diversification on soil health, crop yield and resilience of tropical agroecosystems. *Journal of Environmental Management*, 2025.

⁷⁶ MOREIRA, M. M. R. et al. Socio-environmental and land-use impacts of double-cropped maize ethanol in Brazil. *Nature Sustainability*, 2020.

⁷⁷ ABFA. Dynamics of second-crop corn expansion in Brazil. 2025.

⁷⁸ GURGEL, A. C. et al. Contribution of double-cropped maize ethanol in Brazil to sustainable development. *Nature Sustainability*, v. 7, 2024.

guaxa”), thereby interrupting the life cycle of the pathogen and reducing inoculum levels for the next crop season.

This requirement is formally established by Instrução Normativa Conjunta INDEA/SEDEC nº 2, de 29/09/2015⁷⁹, which defines the concept, rules, and enforcement of the sanitary void in the state. Its legal basis is supported by Lei nº 8.589/2006 (Defesa Sanitária Vegetal de Mato Grosso)⁸⁰, which provides the framework for plant health protection, inspection, and penalties in case of non-compliance.

The sanitary void provides important agronomic and economic benefits, especially in soybean-producing regions. Its main purpose is to reduce the survival and spread of harmful pathogens, particularly Asian soybean rust (*Phakopsora pachyrhizi*), by eliminating host plants during a defined period.

One of the key benefits is the reduction of disease pressure. By ensuring that no soybean plants remain in the field, the life cycle of the pathogen is interrupted, which lowers the initial inoculum for the next planting season. As a result, farmers often experience less severe disease outbreaks.

Another important advantage is the decreased need for fungicide applications. With lower disease incidence at the beginning of the crop cycle, producers can reduce the number of chemical treatments, leading to lower production costs and less environmental impact.

The sanitary void also contributes to delaying the development of fungicide resistance. When disease pressure is reduced, fewer applications are required, which helps preserve the effectiveness of available chemical controls over time.

Additionally, it promotes better crop productivity and stability. Healthier plants with reduced disease incidence tend to achieve higher yields and more consistent results across seasons.

Regarding item (c) the 2nd crop corn fully complies with all applicable national and regional forestry, agriculture, and nature conservation regulations.

⁷⁹ https://www.normasbrasil.com.br/norma/instrucao-normativa-conjunta-2-2015-mt_304021.html#google_vignette

⁸⁰ <https://www.jusbrasil.com.br/legislacao/2777353472/lei-8589-06-mt>

First, compliance is ensured through adherence to the Brazilian Forest Code (Law No. 12,651/2012)⁸¹, which establishes mandatory requirements for land use, including the maintenance of Permanent Preservation Areas (APPs) and Legal Reserves, as well as the obligation to register rural properties in the Rural Environmental Registry (CAR). All supplying areas are required to be registered and compliant with these legal provisions, ensuring that agricultural production occurs within legally authorized boundaries.

Additionally, as explain in item b), agricultural practices comply with phytosanitary regulations, including the soybean sanitary void, established by state-level regulations such as Instrução Normativa Conjunta INDEA/SEDEC nº 2/2015. This measure enforces a mandatory period without live soybean plants to control pests and diseases, demonstrating alignment with regional agricultural and environmental requirements.

Furthermore, FS has implemented a robust internal governance framework through its Social and Environmental Responsibility Policy in the Supply and Sales Chain. This policy ensures that all suppliers comply with applicable environmental and legal requirements by:

- Integrating and monitoring social and environmental commitments in the daily life of the FS business, in the context of corn and biomass origination, in addition to the commercialization of animal nutrition products;
- Demonstrating to investors, shareholders and stakeholders the compliance of the FS business with the global sustainable development agenda;
- Developing a more sustainable supply chain, contributing to the conservation, protection and effective restoration of forests in the territories where it operates;
- Structuring and applying mechanisms to defend and enhance the image and reputation of the FS, aiming to minimize negative impacts;
- Promoting respect for Human Rights based on the continuous improvement of socioenvironmental performance.

⁸¹ https://www.planalto.gov.br/ccivil_03/_ato2011-2014/2012/lei/l12651.htm

APPENDIX 6B – DEMONSTRATION OF RENEWABILITY OF BENEFICIALLY COMBUSTED BIOMASS UNDER PARAMETER 48

1. Renewability of biomass – Beneficially combusted biomass

In the context of biomass beneficially combusted within the project boundary (e.g., for captive power generation and heat production), the determination of renewability is conducted in accordance with Parameter 48 of the methodology Biomass Fermentation with Carbon Capture and Geologic Storage v2.0.

Unlike fermented biomass, the renewability of beneficially combusted biomass is demonstrated through monitoring procedures based on operational records, rather than through the application of Annex 18.

During monitoring and verification, the validation and verification body (VVB) will assess these records to confirm that the biomass used in captive power generation is of biogenic origin and complies with the project's sourcing requirements.

This approach is consistent with the requirements of Parameter 48 and ensures that biomass used for energy generation within the project boundary can be considered renewable for the purposes of emissions accounting under $PE_{P7,Y}$.

2. Biomass

2.1. Biomass Supplier

The FS unit in Lucas do Rio Verde consumes biomass of different categories for steam and energy generation. The use in the absence of the FS BECCS Project and the use in the project scenario is the same: on-site energy cogeneration.

For biomass consumed in the boiler, GS4GG indicates the following sources of information and procedures for evaluating this parameter: "Operational records from the combustion equipment operator (e.g., purchase invoices, supply contracts with producers, records or supply contracts with the combustion equipment operator) indicating the type and origin of biomass consumed by the combustion equipment at the facility during the monitoring period, to demonstrate the renewability of the biomass."

2.2. Criteria evaluated

The business areas (corn, biomass, and animal nutrition) are responsible for prospecting negotiations and sending information about the business partner and their territories (CARs – Rural Environmental Registry) for evaluation by the sustainability team. These requests are made for both new partners (via the Linkana platform) and recurring partners (via the TopDesk platform). Socio-environmental analyses are carried out using the Agrottools TerraMatrix platform and are recorded in Excel spreadsheets called “socio-environmental assessments + [business area]”, saved in OneDrive folders.

2.3. Monitoring during the contract period

The dynamics of monitoring and continuity of the contract follow the same rationale as for corn.

2.4. Consolidation of the monitored parameter

The Renewability of Combusted Biomass parameter considers the amount of biomass directed to the boiler at the Lucas do Rio Verde Unit that to generate the electricity consumed by the FS BECCS Project during the monitoring period. The first monitoring period will begin on the date of commencement of CO₂ injection.

The amount of electricity consumed in the FS BECCS Project is attributed to energy generated from biomass sources, , according to the energy available in these materials, boiler efficiency and the amount of electricity consumed in the FS BECCS Project.

Currently, the facility operates with a surplus of electricity generation, with most of the energy being consumed internally in the industrial process and the excess exported to the national grid. Under these conditions, the estimated electricity consumption of the FS BECCS Project is equal to or lower than the amount of electricity exported, indicating that no additional biomass is required to be combusted specifically to supply the project.

However, this balance is dynamic and depends on the operational capacity of the ethanol plant. Variations in production levels directly affect both energy generation and consumption. In scenarios of increased production, energy demand may rise, potentially requiring additional biomass combustion or, alternatively, electricity imports from the grid. Conversely, in periods of reduced production, biomass consumption decreases, which may result in a higher surplus of electricity available for export. The contracts, the daily assessments carried out, the socio-environmental reports, and the visualization of the FLINT platform can be consulted on-site during the audit to verify this parameter.

DOCUMENT HISTORY

Version	Date	Remarks
1.5	29 June 2023	Editorial changes to match V2.1 of the Safeguarding Principles Requirements
1.4	21 June 2023	Editorial changes to match V2.0 of the Safeguarding Principles Requirements
1.3	14 April 2023	Integrated the design change memo as annex of the document. Editorial changes
1.2	14 October 2020	Hyperlinked section summary to enable quick access to key sections Improved clarity on Key Project Information Inclusion criteria table added Gender sensitive requirements added Prior consideration (1 yr rule) and Ongoing Financial Need added Safeguard Principles Assessment as annex and a new section to include applicable safeguards for clarity Improved Clarity on SDG contribution/SDG Impact term used throughout Clarity on Stakeholder Consultation information required Provision of an <u>accompanying Guide</u> to help the user understand detailed rules and requirements
1.1	24 August 2017	Updated to include section A.8 on 'gender sensitive' requirements
1.0	10 July 2017	Initial adoption