

## Summary of the Project Disclosure Package for Subproject FP198 Biotérmica Innovation

Sub Project Grant Agreement Title / Name of Project	<b>Biotermica Innovacion</b>
Implementation country	Colombia
Location of the project (including facilities to be used)	Carrera 20 No. 182 – 35 Int. 7 - 304, Barrio San Antonio Norte, Bogotá D.C. Colombia. Google reference: <a href="https://maps.app.goo.gl/juigmKmkCMK7eXKT6">https://maps.app.goo.gl/juigmKmkCMK7eXKT6</a>
Facilities to be used:	Commercial office: less than 100 square meters Laboratory: No applicable Production plant: more than 500 m2 and less than 1,000 square meters. Production center: No applicable.  Venture pretends to rent an additional 120 square meters in the next 6 months.
Grant Period	May 2024 – February 2026 (tentative)
Volume Grant	100,000 EUR (in case of being selected for the CATAL1.5°T Acceleration Program)
Amount of Co-Finance / Own Contribution	TBC
Total Budget	TBC
Project Summary	<p>Biotérmica develops mobile biorefineries "as a service" for on-site processing of organic waste. Producing biomaterials and energy: biochar, bio-oils and syngas. The waste transformation is performed on-site, where the customer pays for the disposal of the waste, since the biorefinery is portable, the products generated (biochar, bio-oils and syngas) are marketed with the same customer, or externally.</p> <p>All by-products of the biorefinery are marketable, there is no by-product or waste that they have to manage. Not even the ash, sometimes the biomass comes contaminated. Biochar is an activated carbon that encapsulates heavy metals and neutralizes them. They have a 96% utilization, because the other 4% is used for the self-generation of heat from the reactor itself, what comes out in liquid and gas has a use.</p>

	<p>The waste used in the biorefinery can be as varied as: (WWTP sludge, MSW, MSW, RACs, food waste, organic industrial waste, manure),</p> <p>The reactor used is hybrid pyrolysis and gasification for transformation at source, in line with SDGs 2.6.7.9.11.12 and 13; and the principles of circular and regenerative economy.</p> <p>Mobile biorefineries "as a service" for the processing at source of organic waste producing biomaterials and energy, biochar, bio-oils and synthesis gas.</p> <p><b>Results area:</b> Energy generation and access.</p> <p><b>Annual sales</b> of 100,000 USD in 2022.</p>
<p>Activities description:</p>	<ol style="list-style-type: none"> <li>1. Design and construction of mobile biorefineries: Prototype to validate in a real environment (TRL 7); Prototype ready for launch, ready for transfer and manufacturing (TRL 8); Product delivered for manufacturing, commercialization and scale-up (TRL 9); Manufacturing of mobile biorefineries.</li> <li>2. Operation of the mobile biorefinery: Collection of residues (raw material); Conditioning (drying, grinding among others) and separation of components; Dosing and feeding of biomass; Transformation of the organic mass; Obtaining and separation of products (Biomaterials and Biofuels).</li> <li>3. Maintenance, cleaning and required repairs.</li> <li>4. Commercialization "as a service" with income per day or ton processed by the mobile biorefineries. In addition to the commercialization of the products obtained.</li> </ol> <p><b>Production plant:</b>  BIOTERMICA is an integrator of manufactures, materials and components of the bio refineries, so it has a network of qualified suppliers. The assembly and assembly of the bio refining plants is done at the customer's facilities, adopting the HSEQ measures required by the customer in its management system scheme and in the mandatory and legal requirements. In turn, BIOTERMICA requires its suppliers to apply these regulatory schemes, as indicated in point 1 of this mail, in the facilities of each supplier, which is supervised in the monitoring and auditing visits to the manufacture of each component, which follow protocols such as the one presented in the annex with the name of "Dossier construction of reactors - supplier PINTUSEL - UPTC CAR project".</p>

	<p>The HSEQ management, which includes environmental and social risks, is managed by personnel hired by the project with specialty and official certification regulated by the authorities, to develop these activities, since the refineries are assembled and mounted in the client's facilities, also under their HSEQ standards. We do not have a bio-refinery factory, but rather a supplier scheme that supplies the elements, equipment and components that are assembled at the client's facilities under an EPCM scheme. The specialist is in charge of the Technical Management that applies the PHVA scheme per project.</p>
<p>Materials, supplies and waste management</p>	<p><b>Materials used</b>  Raw materials:  Residual biomass: municipal organic solid waste - MSW, urban pruning and agricultural harvest residues - CAR;  The biorefineries have a capacity of 1 to 50 tons per day TPD. The reactor can be fed with some of these wastes at 100% and with mixtures of these biomasses.</p> <p><b>Waste generated.</b>  140 kg/ton of compostable organic waste per day.  Uses sewage treatment plant sludge, municipal organic solid waste, agricultural crop residues, food waste, industrial organic waste and manure as feedstocks.  The biorefineries have a capacity of 1 to 50 tons per day. The reactor can be fed with some of these wastes at 100% and with mixtures of these biomasses.</p> <p><b>Consumption</b>  The volume of water used in the company's operation is 45 cubic meters per month.  The company's operations do not generate wastewater.</p>
<p>Number of employees, organizational structure, and capacity for ESMP/ESMS implementation</p>	<p>The company currently has five employees, three of whom are women.</p> <p>Its organizational structure is composed of: General manager, steering committee, areas of marketing and sales, administration and projects. The latter is subdivided into technical management, engineering, Health, Safety, Environment and Quality (HSEQ), project engineer, and innovation and development.</p> <p>The company has policies and/or strategies on gender, child labor, forced labor, anti-discrimination, and equal opportunity, and has submitted information on gender training and a plan for prevention, training, and attention to occupational risks and emergencies.</p> <p>The company also has developed:</p>

	<ul style="list-style-type: none"> <li>- Annual Work Plan of the Occupational Health and Safety Management System "Plan Anual de Trabajo del SG SST.pdf" corresponding to its consulting and management activities (Code 7020 of the Registro Único Tributario), with an update date of June 2022.</li> <li>- Professional Code of Ethics ("Code of Ethics BIOTERMICA INNOVACION.pdf) which aims to define the professional obligations (knowledge, skills, image, respect, honesty) of employees and contractors to protect the interests of Biotermica Innovación.</li> <li>- Organization chart showing the existence of a Health, Safety, Environment and Quality (HSEQ) manager.</li> <li>- Proof (diplomas) of an employee who was trained in February 2024 in gender issues in a course given by UN Women.</li> </ul> <p>If selected, the implementation of the ESMP and ESMS will be the responsibility of the General Management and the Management Committee, for which the company will receive training during the Acceleration Program.</p>
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Table 1: **A.** The purpose, nature, and scale of the activities, and the intended beneficiaries & **B** The duration of proposed activities. This section describes the purpose that the venture would give to the resources, if selected in the CATAL1.5°T Acceleration Program.

Activity / Action	Purpose	Nature and scale of the activity/action	Materials used (including raw materials), waste generation, wastewater generation.	Duration of the activity/action	Intended beneficiaries
1	Attract international VC investors and strategic allies for market development	Their production scale is very small, in the last 12 months they have had only 3 customers. It is financed from its own resources. If selected, it will use the resources to finance marketing and sales promotion	It uses sludge from sewage treatment plants, municipal organic solid waste, agricultural crop residues, food waste, organic industrial waste, and manure, as raw materials.	Indefinite	Authorities responsible for municipal solid waste management, agribusiness (sugar cane, palm, banana, coffee), food processing plants, animal processing plants.
2	Accelerate the sustainable and organized growth of the company, projecting it as a multinational of circular economy solutions.	(participation in innovation events, startups, accelerators, climate finance, clean tech during 2024 - 2025 at the national level and an international event of VCs and promotion of the biochar	Biorefineries have a capacity of 1 to 50 tons per day. The reactor can be fed with some of this 100% waste and with mixtures of these biomasses.	Indefinite	

		<p>market); acquisition of machinery and equipment (a state-of-the-art commercial demonstration plant, with a process capacity of 1 ton per day, consisting of: continuous vertical pyrolysis-gasification reactor, feeding system, pyrolytic oil condenser and catalyst bank and control panel with IoT/AI, and to achieve environmental and climate certifications (filing of a new patent for product and process invention at the national level, quality and carbon capture certifications for biochar before the accredited certifier, and licensing before the country's environmental entity.</p>	<p>The volume of water used in the company's operation is 45 cubic meters per month.</p> <p>The operation generates 140 kilograms of compostable organic waste for every ton processed per day. The company's operation does not generate wastewater.</p>		
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Table 2: **C** summary of stakeholder consultations and the planned stakeholder engagement process. Information about the virtual interview phase and delivery of additional information in the screening phase.

Consultation [if applicable, place]	Date	Participants	Information and/or further Engagements Planned
Mandate fit check (virtual)	01-26-2024	<p>CTO of the venture</p> <p>Instituto Tecnológico de Monterrey</p> <p>GIZ México – CATAL1.5°T</p> <p>LATAM</p> <p>Climate-KIC</p>	<p>Delivery of the necessary documentary evidence identified in the screening stage</p>

D. The available grievance mechanism(s) to receive complaints and facilitate the resolution of such from affected and potentially affected communities, groups, and individuals.

The Grievance Redress Mechanism (GRM) is a formal process for managing complaints and minimizing social risk linked to the CATAL1.5°T Initiative. The GRM process is published on the CATAL1.5°T (<https://catalist-initiative.eco/es>) website, and all Start-Ups receive brochures and all information about the GRM.

- Annex A:** Sub Project Disclosure Form (mandatory)
- Annex B+C:** ESIA and ESMP (mandatory)
- Annex D: Land Acquisition (if applicable)
- Annex E: IPP (if applicable)

Disclosure Package **Annex B & C**: ESIA and ESMP for Sub- Projects with Categorization B of GCF co-financed projects with GIZ as Accredited Entity

Tick box  of the PS Categorization by the Sub-Project: Biotérmica Innovación, Colombia

- A  B  C  Does not apply  *Performance Standard 1. Environmental and Social Assessment and Management System*
- A  B  C  Does not apply  *Performance Standard 2. Labor and working conditions*
- A  B  C  Does not apply  *Performance Standard 3. Resource efficiency and pollution prevention*
- A  B  C  Does not apply  *Performance Standard 4. Community Health & Safety*
- A  B  C  Does not apply  *Performance Standard 5. Land acquisition and involuntary resettlement*
- A  B  C  Does not apply  *Performance Standard 6. Biodiversity conservation and sustainable management of living natural resources*
- A  B  C  Does not apply  *Performance Standard 7. Indigenous Peoples*
- A  B  C  Does not apply  *Performance Standard 8. Cultural heritage*

**Table 1: Environmental and social impact analysis (ESIA) and management plan (ESMP) (safeguard measures) of the FP198 Sub-Project Biotérmica Innovación, Colombia**

Performance standard (PS 1-8)	Risks of negative impact and type of risk	Risk mitigation measure	Assumed Risk mitigation effectiveness	Expected results of mitigation	Execution Period and Responsibility	Budget allocated for mitigation measures
<i>PS 1. Environmental and Social Assessment and Management System</i>	<i>Risks due to the appearance or aggravation of impacts derived from the inadequate management of environmental and social risks due to the total or partial lack of an environmental and social evaluation and management system that includes those responsible for its implementation, monitoring and evaluation</i>	<i>Establish an environmental and social management system (ESMS) specific to its operations that includes: i) Environmental and social policy and occupational health and safety (expresses the commitment of the organization and management to environmental, social and labor sustainability); (ii) Internal procedures for identifying, assessing and managing potential environmental, social and occupational health and safety risks and impacts; (iii) procedures for implementing and ensuring compliance with the environmental and social management plan; iv) strengthen</i>	High	<i>The environmental and social risks and impacts of the undertaking are identified, assessed, and managed quickly and effectively through the ESMS.</i>	<i>8 months CEO &amp; Management Team</i>	

Performance standard (PS 1-8)	Risks of negative impact and type of risk	Risk mitigation measure	Assumed Risk mitigation effectiveness	Expected results of mitigation	Execution Period and Responsibility	Budget allocated for mitigation measures
		<i>organizational capacity and competence including the definition of functions, roles and the assignment of activities to implement the ESMS; (iv) external mechanisms for communication and handling of complaints; (v) mechanism for evaluation and continuous improvement of the ESMS; (vi) mechanisms to ensure compliance with environmental, social and labor requirements according to regulations in Colombia.</i>				
	<i>Risk of increasing the effects on the health of workers derived from the lack of a current Occupational Health and Safety Plan in accordance with current legal regulations.</i>	<i>Prepare the Occupational Health and Safety Plan in accordance with the requirements established in the Occupational Health and Safety Management System that includes all the key activities of Biotérmica (Decree 1072 of 2015)</i>	High	<i>Occupational risks are managed in accordance with applicable regulations, reducing the incidence of events.</i>	<i>4 months HSEQ Manager &amp; Technical Manager</i>	
<i>PS 2. Labor and working conditions</i>	<i>Security risks to employees due to the lack of an emergency preparedness and response plan based on a vulnerability analysis.</i>	<i>Develop a specific emergency preparedness and response plan that includes; (i) Objectives and scope, (ii) Definitions, (iii) responsibilities, (iv) work instructions or procedures for responding to specific emergency situations; (v) response teams or brigades (first aid, evacuation, fire) (vi) reference documents (e.g. facility plans, guides, etc.), (vii) contacts and communication mechanism; (viii) records of activities such as training courses, drills, facility reviews, (ix) revisions of the emergency plan or</i>	High	<i>Accidents are prevented and workers' health is ensured in the face of emerging events</i>	<i>Prior to the TRL 9 stage (product ready for production and commercialization) HSEQ Manager &amp; Technical Manager</i>	



Performance standard (PS 1-8)	Risks of negative impact and type of risk	Risk mitigation measure	Assumed Risk mitigation effectiveness	Expected results of mitigation	Execution Period and Responsibility	Budget allocated for mitigation measures
		<i>procedure and interaction with local authorities; (x) equipment (fire extinguishers, first-aid stations); (xi) evacuation routes and rendezvous points; (xii) training program (drills, first aid, and others) for employees, visitors, and suppliers.</i>				
	<i>Risk of hiring minors (under 18 years of age) and forced labor due to the lack of an explicit policy against child labor (Biotérmica, only states the prohibition), which establishes measures to identify, prevent and correct cases of child labor, including its suppliers and potential contractors. In the area of forced labour and freedom of association, there are no policies or pronouncements on the subject</i>	<p>Develop and disseminate Biotérmica Innovation's policies against child labor and forced labor and freedom of association, as well as complement existing policies so that they contain: i) commitment or positioning of the organization and management, ii) objectives and goals, iii) concrete actions and measures, iv) follow-up and v) dissemination.</p> <p><i>It is recommended to concentrate Biotermica's labor policies in a single independent document; gender, equality and non-discrimination, labour abuse, violence and sexual harassment, freedom of association and policies against child labour and forced labour and the internal complaints and grievance mechanism. This document would facilitate the consultation, dissemination, and training of the policies throughout the organization.</i></p>	<i>High</i>	<i>The human rights of workers are duly protected</i>	<i>3 months Operations</i>	
	<i>Potential risk that workers will not use the established grievance mechanism due to the lack of designation of</i>	Complement and strengthen the established complaints and grievance mechanism, to include all types of labor complaints that affect workers.	<i>High</i>	<i>Workers' complaints and denunciations are dealt with effectively</i>	<i>2 months Human resources</i>	

Performance standard (PS 1-8)	Risks of negative impact and type of risk	Risk mitigation measure	Assumed Risk mitigation effectiveness	Expected results of mitigation	Execution Period and Responsibility	Budget allocated for mitigation measures
	<i>responsible persons and definition of procedures for receiving, recording, evaluating, investigating, and following up on complaints and that includes a gender approach.</i>	<i>Present this mechanism in a document separate from the Internal Work Regulations to facilitate dissemination and full knowledge by workers and those responsible for its implementation.</i>				
	<i>Occupational hazards related to the operation of biorefineries, (when the operation is carried out with Biotermica Innovación personnel), which may include falls at different heights, injuries due to heavy loads, burns.</i>	Prepare or update the Annual Work Plan of the Occupational Health and Safety and Management System, to include the activities corresponding to the rental and operation of biorefineries, including the identification and control of occupational hazards due to the exposure of workers to special handling waste outside Biotermica's facilities. As well as the identification of risks associated with transport and their prevention.	<i>High</i>	<i>Accidents are prevented and workers' health is ensured in the face of identified, assessed, and managed occupational hazards</i>	<i>2 months Operations</i>	
	<i>Risks to workers due to exposure to special handling waste (WWTP sludge, organic waste, industrial waste, manure) and equipment cleaning materials</i>		<i>High</i>		<i>3 months Operations</i>	
	<i>Risk of traffic accidents affecting workers during the transfer and delivery of Biotermica Innovación's mobile biorefineries to the companies that rent the service.</i>		<i>High</i>			
<i>PS 3. Resource efficiency and</i>	<i>Risk of excessive consumption of energy, water, or wastewater</i>	<i>Design of mitigation measures for emission control, energy use, water</i>	<i>Medium</i>	<i>The volume is reduced, and the waste generated of all</i>	<i>Prior to the TRL 9 stage (product ready for production</i>	

Performance standard (PS 1-8)	Risks of negative impact and type of risk	Risk mitigation measure	Assumed Risk mitigation effectiveness	Expected results of mitigation	Execution Period and Responsibility	Budget allocated for mitigation measures
<i>pollution prevention</i>	<i>discharges at the manufacturing stage of mobile biorefineries (when the product is ready for production and scale-up).</i>	use, and comprehensive and adequate waste management.		<i>kinds is properly managed</i>	<i>and commercialization) in case Biotermica carries out the manufacture directly or in case of subcontracting to a manufacturer</i>  <i>Operations and/or environmental and social responsible when designated</i>	
	<i>Generation of waste without proper management at the manufacturing stage of mobile biorefineries (when the product is ready for production and scale-up)</i>	Develop and implement a waste management plan, based on a specific diagnosis of the characteristics and manufacturing stages of biorefineries.	<i>Medium</i>		<i>Prior to the TRL 9 stage</i> <i>Operations and/or environmental and social responsible when designated</i>	
<i>PS 4. Community Health &amp; Safety</i>	Risks to the health and safety of people or nearby communities due to the generation of bad odors and harmful fauna in waste collection and management sites (raw material consisting of WWTP sludge, organic and industrial waste, manure) and accidents caused by the movement of vehicles for the transfer of rented mobile biorefineries.	<i>Put in place a community risk management program that includes identification of individuals or communities near mobile biorefinery operation sites; risk identification and management; measures to prevent or mitigate risks and impacts (by site or service provided) and dissemination of an external complaint mechanism (mailbox, telephone, email, website) so that those who are perceived or affected can express their reports and complaints.</i>	<i>High</i>	<i>The health of the community is ensured</i>	<i>Prior to the TRL 9 stage</i> <i>Operations and/or environmental and social responsible when designated</i>	

## **Additional support for FP198 Environmental and Social Management Framework (ESMF) start-ups: CATAL1.5°T environmental and social support for climate start-ups.**

As part of the CATAL1.5°T ESMF, the following complementary activities are carried out to implement measures to mitigate the adverse environmental and social effects of the accepted subprojects, in accordance with PS1:

1. Accepted ventures will receive support in the development of business plans, which will necessarily include environmental and social management plans. Environmental and Social Due Diligence will provide the necessary guidance to identify what type of management plans are required in accordance with the **Green Climate Fund's (GCF) Interim Social and Environmental Safeguards** and guide companies in establishing and monitoring management plans.
2. The companies selected in the Acceleration program will benefit from a reimbursable subsidy of up to 100 thousand euros. The use of reimbursable grants will be governed by a grant agreement signed with each climate venture and the Executing Entity (Instituto Tecnológico de Monterrey), which will include environmental and social clauses on:
  1. Compliance with environmental and social requirements on excluded activities.
  2. Establishment of reasonable conditions of employment, protection of the workforce, establishment of a safe and healthy working environment.
  3. Non-violations of human rights.
  4. Zero tolerance for gender-based violence and sexual exploitation, abuse, and harassment.
  5. Cumplimiento de condiciones ambientales y sociales adicionales incluidas en los planes de manejo ambiental y social.
3. In addition, the Acceleration Program will offer mentoring on environmental, social and gender issues.
4. All reports will include environmental and social reports. Environmental and social reporting requirements will be defined in the business plans.

In preparation for graduation from the Acceleration Program, supported companies will receive assistance in the preparation of long-term environmental and social management plans.