Environmental and Social Review Summary (ESRS)

Project Name:	Carbono Positivo: Transformando las cadenas de valor agrícolas en sumideros de carbono
Project Number	CR-G1012
Project Location:	Costa Rica
Executing Agency:	Poás Bioenergy
Type of Operation:	Contingent Recovery Investment Grant (CRIG)
ESRS Issuance Date:	July 2024

1. General Information of the Project and Scope of IDB Lab´s Environmental and Social (E&S) Review

The transaction is a Contingent Recovery Investment Grant in favor of Poás Bioenergy ("Poas" or the "Company") to finance the capital expenditure for the Company's project on the production of high-energy synthetic gas and biochar from biomass.

Poas is a circular economy company dedicated to decarbonizing the agricultural sector by converting potentially environmentally harmful agricultural waste into valuable products, initially focusing on coffee waste, and potentially expanding to include pineapple waste in the future. These products will be reintegrated into the soil as amendments and for carbon sequestration, thus avoiding environmental impacts. Additionally, the preprocessing of high-moisture wastes will produce sugar-rich water, an ideal feedstock for bioethanol production. The first commercial pilot will turn 6,000 tons of coffee waste into ethanol inputs, syngas, biochar, and carbon credits.

2. Environmental and Social Categorization and Rationale

This is a category B project, according to IDB's Environmental and Social Policy Framework ("ESPF"), because it can have limited, specific environmental and social impacts that can be avoided or mitigated by adhering to generally recognized Environmental and Social performance standards, good international industry practices, environmental, health and safety ("EHS") practices, and design criteria as described in the following sections.

3. Environmental and Social Risks and Impacts

The potential Environmental and Social ("E&S") risks and impacts associated with the Project activities include: (i) working conditions including occupational health and safety ("OHS") for direct workers and those in the supply chain, (ii) child labor in the supply chain, (iii) fire and explosion risks, (iv) monitoring and management of emissions.

The environmental and social desk due diligence indicates that the Project will have impacts, which must be managed in a manner consistent with the following Environmental and Social Performance Standards ("PS"): PS 1 - Assessment and Management of Environmental and Social Risks and Impacts; PS 2 - Labor and working conditions; PS 3 - Resource Efficiency and Pollution Prevention; PS 4 - Community Health, Safety and Security. PS 6 - Biodiversity Conservation and Sustainable Management of Living Natural Resources; and PS 9 - Gender Equality.

4. Environmental and Social Context

Poás will be located inside the grounds of a coffee company (Café de Altura de San Ramón Especial S.A.; a coffee mill, that receives coffee fruit from farmers and processes it to sell coffee beans) that will provide the biomass and the security system for their holdings.

Contextual risks include E&S supply chain risks, natural disasters (earthquakes, hurricanes with resulting landslides and flooding), child labor in coffee operations, potential deforestation, and other threats to natural resources in the coffee supply chain, water availability, climate change, gender, and workplace exclusion.

5. Environmental and Social Risks and Impacts and Proposed Mitigation Measures

PS 1 - Assessment and Management of Environmental and Social Risks and Impacts.

As part of this transaction, Poás will develop and implement a PS1-compliant ESMS and submit examples of its implementation (such as E&S due diligence reports, E&S screening tools, and E&S risk management procedures), together with an annual report to IDB Lab.

Policy: The Company shall develop a PS 1-compliant overarching policy. Additionally, Poás will develop a Supply Chain Policy that will exclude the purchase of agricultural waste known to be produced in violation of national environmental and social legislation (such as harmful child labor and illegal deforestation) and/or the Environmental and Social Performance Standards. The Company will present to IDB LAB for review a copy of the overarching and Supply Chain Policy and management procedure and will include this supplier code of conduct in all contractual agreements with suppliers. The policies will be communicated internally to project staff and externally to all stakeholders, including business partners and contractors.

Identification of Risks and Impacts: Poás will develop and implement a risk evaluation and prioritization plan that allows the identification and management of risks and impacts on its overall operations and those in the supply chain.

Management Programs: The Company will need to develop and implement formal, written ESMS procedures to avoid, minimize, and manage identified E&S risks and impacts, including those related to the supply chain.

Organizational Capacity and Competency: E&S issues are currently managed by the Company's CEO. Going forward, Poás will be required to appoint a person to manage these issues. Poás will develop an E&S Training Plan for staff and supply chain

Emergency Preparedness and Response ("EPR") Plans: The Company shall develop EPR plans and procedures to manage all emergency scenarios (e.g., earthquakes). In preparing the EPR plans, Poás will incorporate topics identified during the analysis of E&S risks and impacts, including unexpected hazard events. The emergency plans must consider possible unplanned scenarios such as fires, explosions, chemical spills, and medical emergencies. They must include emergency contact information, and communication procedures. Additionally, the plans should include the availability of emergency equipment, employee training, and periodic drills to test readiness and capability to execute emergency response procedures.

Stakeholder engagement and External Grievance Mechanism: The Company must implement and disseminate transparent E&S communications and reporting with external stakeholders in appropriate ways. The External Grievance Mechanism ("EGM") must be publicized for external communications with general stakeholders (communities, and other stakeholders), to accept and act upon their potential grievances. All grievances publicly or anonymously resolved, must be recorded by Poás and presented in the Annual Report to IDB LAB.

Monitoring and Review: The Company will need to develop a monitoring procedure to evaluate the effectiveness of its ESMS, including the creation of Key Performance Indicators ("KPIs") for critical environmental, labor, and social issues. This procedure will outline the monitoring process, including frequency, responsibilities, and internal audit protocols. The KPI list will include, but not be limited to, accident statistics, the ratio of total annual lost time due to accidents to total hours worked, the number of labor-related complaints, the incidence of child labor in the supply chain (aiming for zero), the number of reports on potential land conversion/deforestation in the supply chain, the number of women trained,

percentage of women in key managerial roles at Poás, GHG emissions accounting and monitoring, external water use (m^3).

PS 2 - Labor and Working Conditions

The Company plans to engage 6 employees as an estimated total workforce. By 2027, Poás expects to create 216 job positions within the agribusinesses using their technology, and additional 47 direct employees for a total of 263 jobs. Equal employment opportunities are expected for women, who should receive similar benefits as men. All new employees at must undergo induction training that covers information on national labor regulations and PS2.

Human Resources ("HR") Policy: Poás must develop and implement an HR Policy. This policy must be communicated to all employees during induction and cover terms of employment, including wages and benefits, hours of work, overtime arrangements and compensation, annual and sick leave, maternity leave, vacation or holiday, non-discrimination, sexual/moral harassment, work/life balance, hiring period, compensation, leave, promotions, salary increases, termination procedures, and conflict of interest. It shall also include provisions for respecting the culture of indigenous workers.

Protecting the Work Force: Child labor and forced labor are contextual risks in coffee field operations. The HR Policy must include a clear statement against the use of child or forced labor, specifying that Poás will only hire direct or temporary employees aged 18 years and older. For its suppliers, the Company must implement a "Child Labor and Forced Labor Monitoring Action Plan" in its supply chain to prevent child or forced labor by coffee husk suppliers during field operations and cease procurement from suppliers found with cases of child or forced labor.

Occupational Health and Safety (OHS): Key issues in OHS relate to the gasification operations. During the induction period, technical and OHS procedures in the gasification technology must be fully explained to workers. OHS statistics and accident rates must be recorded, cause-effect relations and trends must be analyzed rigorously, and corrective action must be taken to mitigate accident causes and prevent further similar events. The ratio of total annual lost time due to accidents to total hours worked should be reported to IDB LAB.

Life & Fire Safety ("L&FS"): Poás will present to IDB LAB the L&FS engineering design and master plan. The design will comply with international Life and Fire Safety Standards, such as NFPA. Smoke detectors, fire and explosion alarms, and fire extinguishers will be properly maintained at regular intervals.

Internal Grievance Mechanism (IGM): The Company must implement a PS2-aligned internal grievance procedure for employees, including the requirement to provide feedback on anonymous grievances, and the specific steps for workers to raise any concerns, as well as the contact name of the person responsible for providing feedback on grievance resolutions. It should indicate that there will be no retaliation. The IGM procedure should be communicated to all employees during induction.

Workers' Organizations: Poás shall inform all employees that it will respect the national and PS2 freedom of association requirements.

Workers contracts: Poás must ensure employment contracts in its processing operations. Additionally, the company shall incorporate strict protections against child/forced labor into their procurement contracts, as they operate in a market where such a risk exists.

PS 3 - Resource Efficiency and Pollution Prevention

The gasification of biomass residues involves the transformation of agricultural biomass through heat into a synthetic gas (Syngas: Methane, 10.8 - 18%; Hydrogen 9 - 12%, CO_2, 10.4 – 10.8 %), and biochar from the spent biomass. Utilizing biomass reduces agricultural waste and carbon emissions from plant degradation, promoting a circular and sustainable approach to resource utilization.

Resource Efficiency: Energy for the processing is expected to be obtained from the grid. The main electricity use will be for the controls on our gasification and drying system, air blowers, motors, drives on the system office, and other domestic uses. The exothermic gasification process itself is an energy source. Initially, mechanical pressure will produce dry biomass and sugar-rich water which is a source of energy as a bioethanol input. The syngas has up to 18% Methane and is quite high in energy density (the best estimate in other gasification processes is 5%) and can be combusted in thermal applications or run generators for electricity. Some 85% of energy is recovered from biomass and synthetic gas and at the same time producing 15% biochar. Water for domestic use, processing, and cleaning of the equipment will be obtained from a municipal water source and should be monitored throughout the project cycle.

Waste: The process uses biomass, the husk of the coffee cherry, which otherwise would be dumped into the environment. This ends up in biochar which can be used as a soil amendment agent to improve cation exchange, water management, and sequester carbon with a potential for carbon credits. The effluent from the initial mechanical pressing ends up as a bioethanol input and is not discharged into the environment. In the interim, some 150 Kg of ash per year would be placed in a landfill.

GHG emissions and Ozone-depleting substances: Poás will implement equipment to monitor CO_2 emissions and gas leaks in the gasification process. During processing operations, Poás must avoid using ozone-depleting substances (chemicals) and comply with the Montreal Protocol.

Hazardous Materials: Any hazardous material used will need to be stored and manipulated following the WBG EHS Guidelines.

PS 4 - Community Health, Safety and Security

The working idea is that Poás will obtain its biomass directly inside the gate. If in the future biomass is carried out from external sources, Poás will need to establish contracts with trucking operators with trained drivers to minimize transport risks to local communities.

Poás will ensure that a management system procedure for security personnel is in place. Procedural directions will include how security forces will be managed following PS4 requirements. It will also ensure that all security personnel of the coffee company must have a background check on file that shows they have no record of human rights abuses and have had training in responding to threats guided by the principle of proportionality.

PS 5 - Land Acquisition and Involuntary Resettlement

PS5 is not triggered as no land acquisition will be required as part of the project.

PS 6 - Biodiversity Conservation and Sustainable Management of Living Natural Resources

ESMS procedure to halt potential land conversion of natural and/or critical habitats and collateral effects on biodiversity loss to be avoided in the supply chain and monitored during the project life cycle.

PS 7 - Indigenous Peoples (IP)

The Project is not expected to have adverse impacts on IP. However, Poás will need to ensure adequate stakeholder engagement if any recognized IP participates in any form of stakeholders.

PS 9 - Gender Equality

Poás indicates that it will prevent risks and adverse impacts on women. Poás plans to consider training opportunities to improve the livelihoods of women.

PS 8 – Cultural Heritage

PS8 is not triggered as the project will not have any impact on cultural heritage.

6. Environmental and Social Action Plan (ESAP)

To fully implement the ESAP obligations in line with the ESPS's requirements, ESAP items must be examined with the specific description in the ESRS above, where the problem and avoidance/mitigation measures are fully described.

Topic	Activity	Deliverable	Deadline
ESMS	Develop and implement a PS1-compliant ESMS	PS1-compliant ESMS	1st disbursement (D) + 365 days
Policy	Develop PS1-compliant Overarching Policy	Overarching Policy	D + 60 days
Identification of Risks and Impacts	Develop a procedure for the identification of risks and impacts.	i) Identification of Risks and Impacts. ii) Risk Matrices	D + 90 days
Management Programmes	Develop and implement formal, written Management Programmes to handle identified E&S risks and impacts	Management Programmes developed	D + 120 days
Organizational Capacity and Competency	1. Appoint an E&S Manager 2. Develop an E&S Training Plan for staff and supply chain	1. E&S Manager appointed. 2. E&S Training Plan.	D + 30 days D + 60 days
Emergency Preparedness and Response (EPR)	Develop EPR plans and procedures.	EPR Plan developed	D + 90 days
Stakeholder engagement	Develop an ESMS Procedure for stakeholder engagement.	Stakeholder Engagement Procedure.	D + 60 days
External Grievance Mechanism (GM)	Develop an external GM, including a copy of the external communication to the public for dissemination of the GM.	External GM.	D + 90 days
Monitoring and Review	Implement an internal monitoring and review program. The updated program shall add E&S KPIs.	Monitoring and review program implemented	D + 120 days
Supply Chain	1. Develop and implement Supply Chain Policy. 2. Implement a training program to ensure knowledge of the supply chain policy and procedures to staff, stakeholders, suppliers, and business partners	1. Supply Chain Policy 2. Supply chain training.	D + 60 days D + 90 days
Human Resources (HR) Policy	Develop and communicate to all employees its HR Policy	HR Policy	D + 60 days
Child Labour in supply chain	Implement a "Child Labour Monitoring Action Plan" in the supply chain.	Child Labour Monitoring Action Plan implemented.	D + 90 days
OHS	Develop and implement OHS manuals and procedures for its operations.	OHS manuals and procedures.	D + 120 days
Internal Grievance Mechanism (GM)	Develop and implement an internal GM procedure communicated to all employees during induction.	Internal GM Procedure.	D + 60 days
Worker relationship	Ensure employment contracts for all employees and incorporate protections against child labour into procurement contracts.	Contracts of employees and procurement contracts implemented.	D + 60 days
Life and Fire Safety (L&FS) Master Plan	Develop and implement L&FS engineering design	L&FS engineering design implemented	D + 30 days
Resource Efficiency	Implement monitoring of external water use throughout the project cycle	Water monitoring Plan	D + 90 days

Topic	Activity	Deliverable	Deadline
Waste	Develop a Waste Management Plan.	Waste management plan.	30 days before the operation begins
Emissions	Develop and implement and Air Quality Management Plan that comprises i) the installation of equipment to monitor CO_2 emissions and gas leaks; ii) the quantification of the Company's net CO_2 emissions.	1. Air Quality Management Plan 2. Equipment to monitor gas leaks and CO_2 emissions installed.	D + 90 days Report annually after the beginning of operations
Community Security	Ensure implementation by biomass supplier of a Community Security Plan for security personnel.	1. Community Security Plan implemented	D + 180 days
Land Conversion/ Deforestation	ESMS procedure to report land conversion in the supply chain	ESMS procedure	D + 180 days