



Project Implementation Report

(1 July 2021 – 30 June 2022)

Project Title:	<i>Biogas applications for the Brazilian agro-industry</i>
GEF ID:	<i>9057</i>
UNIDO ID:	<i>150014</i>
GEF Replenishment Cycle:	<i>GEF-6</i>
Country(ies):	<i>Brazil</i>
Region:	<i>LAC - Latin America and Caribbean</i>
GEF Focal Area:	<i>Climate Change Mitigation (CCM)</i>
Integrated Approach Pilot (IAP) Programs¹:	<i>NA</i>
Stand-alone / Child Project:	<i>Stand-alone</i>
Implementing Department/Division:	<i>ENV / IPM</i>
Co-Implementing Agency:	<i>NA</i>
Executing Agency(ies):	<i>UNIDO</i>
Project Type:	<i>Full-Sized Project (FSP)</i>
Project Duration:	<i>60</i>
Extension(s):	<i>1</i>
GEF Project Financing:	<i>USD 7,000,000</i>
Agency Fee:	<i>USD 665,000</i>
Co-financing Amount:	<i>USD 58,392,070</i>
Date of CEO Endorsement/Approval:	<i>5/4/2017</i>
UNIDO Approval Date:	<i>5/17/2017</i>
Actual Implementation Start:	<i>8/10/2017</i>
Cumulative disbursement as of 30 June 2022:	<i>USD 4,959,932</i>
Mid-term Review (MTR) Date:	<i>6/30/2021</i>
Original Project Completion Date:	<i>8/10/2022</i>

¹ Only for GEF-6 projects, if applicable

Project Completion Date as reported in FY21:	8/10/2022 <i>Insert the project completion date as reported in the previous PIR for Fiscal Year 2021 (FY21)</i>
Current SAP Completion Date:	8/10/2024 <i>Insert the project completion date as currently seen in the system</i>
Expected Project Completion Date:	8/10/2024 <i>If the date is the same as above, please confirm; if you plan to extend the project completion date, please indicate here and elaborate further under section III.2</i>
Expected Terminal Evaluation (TE) Date:	6/01/2024 <i>Insert expected/actual date of TE submission to the GEF</i>
Expected Financial Closure Date:	10/8/2025 <i>Insert a date <u>no later than</u> 12 months after the TE submission date</i>
UNIDO Project Manager²:	<i>Alessandro Amadio</i>

I. Brief description of project and status overview

Project Objective		
<p><i>The answer to the question should include: (i) the project's objective consistent with the one introduced in the CEO Endorsement/Approval document and (ii) core indicators. Project managers are encouraged to use the description from earlier PIRs, if applicable, unless changes have occurred during the reporting period.</i></p> <p>To reduce GHG emissions and dependence on fossil fuels through the promotion of biogas-based energy and mobility solutions within agro-industrial value chains in Southern Brazil and strengthening of national biogas technology supply chains.</p>		
Project Core Indicators	Expected at Endorsement/Approval stage	
6	Greenhouse Gas Emissions Mitigated (metric tons of CO ₂ e)	2,300,000 t CO ₂ direct 5,350,000 t CO ₂ indirect
11	Number of direct beneficiaries disaggregated by gender as co-benefit of GEF investment	Total: 3,825 Male: 2.0655 Female: 16830

Baseline
<p><i>Project managers are encouraged to use the baseline description from earlier PIRs, if applicable, unless changes to the project's baseline have occurred during the reporting period.</i></p> <p>The Brazilian energy mix is characterized by a high share of renewable energy sources, predominantly ethanol (used for transport), large and small hydropower systems (electricity), and sugar-cane bagasse (for heat and electricity). This situation is the result of national policy formulated in the 1970s and 1980s in an attempt to reduce vulnerability to global oil price markets. Brazil's natural resources in terms of land area, hydrological resources, biomass, and more recently, oil and gas, have been a key asset to achieve this objective. In line with the increase in population and GDP, final energy consumption grew from 102,934 ktoe</p>

² Person responsible for report content

in 1990 to 196,168 ktoe (2010), and fossil fuels consumption increased from 72,207 ktoe (1990) to 143,831 ktoe (2010). There is a trend towards an increased use of renewable energy sources and higher-quality fossil fuels, at the expense of heavier hydrocarbons including coal, lignite, fuel oil, and charcoal.²⁵

24. Brazil's electricity sector is dominated by renewable energy sources (79.3%), primarily hydropower (71%), biomass (8%) and wind energy (1%), as depicted in the below figure. Fossil fuels make up 21% of total generation including natural gas (11%) and oil products (4%).²⁶ The figures also make evident the traditional focus on large-scale, centralized energy supply systems. However, there is growing awareness that Brazil's continental dimensions are an impediment for bringing centrally produced energy (both electricity and natural gas) to all consumers outside the demand centers in a cost-effective manner. This is also the case in Southern Brazil, where, for example, the gas distribution network is located mainly along the coast.

The cornerstone for Brazil's energy policy is the National Energy Policy (Law 9.478), enacted in 1997, which created the National Agency of Oil, Gas and Biofuels (ANP). The National Electricity Agency (ANEEL) was established one year later by Decree 2,665 (1998). In 2002, support for (non-conventional) renewable energy-based electricity generation was initiated under the Alternative Electricity Sources Incentive Program (PROINFA) programme, set out by Article 3 of Federal Law 10.438 (2002) issued by the Ministry of Mines and Energy (MME).

In 2003 and 2004, the Government created a new framework for the national electricity sector, through the enactment of Law 10,847 and 10,848, and Decree 5,163. This framework foresaw in the establishment of an institution responsible for long-term energy planning, the Empresa de Pesquisa Energetica (EPE) which oversees supply security in the electricity market through the Electricity Sector Monitoring Commission (CMSE27), including the activity of the Mercado Atacadista de Energia Eletrica²⁸ (MAE) and the Electric Energy Commercialization Chamber²⁹ (CCEE).

Based on data from the National Institute for Geography and Statistics (IBGE)³⁶, the biogas production potential is estimated at 296,597 million m³ biogas per year, equivalent to an energy volume of 424,134 GWh. Animal breeding makes up 3.2% of this total, comparable to the waste sector (3.3%). The largest potential is found in agro-industries (93.5%), specifically the beer breweries (90.1%). Biogas represents 14% of Brazil's total energy potential based on agricultural and industrial residues, the majority being non-woody biomass waste from the sugar cane, corn, soy and cassava sectors (2,615,360 GWh/yr, or 96% of total if combusted for electricity generation).

ANEEL's Database on Electricity Generation (BIG)³⁷ provides information about all authorized power plants under construction and in operation in the country; this database is continuously updated but does not cover micro-generation systems. The biogas plants registered in the BIG account for only 26 out of 4,477 power plants (0.58%) installed in the country and an installed capacity of 87 MW (0.06%) (on a total of 143 GW). 14 biogas plants installed at landfills, which demonstrates the incipient stage of biogas energy production in agro-industries, accrue nearly all capacity (83.7MW). In fact, detailed information on the technology and operational performance of these biogas plants seems not publicly available.

Please refer to the explanatory note at the end of the document and select corresponding ratings for the current reporting period, i.e. FY22. Please also provide a short justification for the selected ratings for FY22.

In view of the GEF Secretariat's intent to start following the ability of projects to adopt the concept of adaptive management³, Agencies are expected to closely monitor changes that occur from year to year and demonstrate that they are not simply implementing plans but modifying them in response to developments and circumstances or understanding. In order to facilitate with this assessment, please introduce the ratings as reported in the previous reporting cycle, i.e. FY21, in the last column.

³ Adaptive management in the context of an intentional approach to decision-making and adjustments in response to new available information, evidence gathered from monitoring, evaluation or research, and experience acquired from implementation, to ensure that the goals of the activity are being reached efficiently

Overall Ratings ⁴	FY22	FY21
Global Environmental Objectives (GEOs) / Development Objectives (DOs) Rating	<i>Satisfactory (S)</i>	<i>Moderately Satisfactory (MS)</i>
<i>By the time of the FY21 report there were still several products and reports on the pipeline for publication as well as activities that were being finalized. After 12 months of execution, the project has achieved a satisfactory rating regarding GEOs and DOs.</i>		
Implementation Progress (IP) Rating	<i>Satisfactory (S)</i>	<i>Moderately Satisfactory (MS)</i>
<i>By the time of the FY21 report there were still several products and reports on the pipeline for publication as well as activities that were being finalized. After 12 months of execution, the project has achieved a satisfactory rating regarding implementation.</i>		
Overall Risk Rating	<i>Low Risk (L)</i>	<i>Moderate Risk (M)</i>
<i>The project implementation and execution has achieved most of the established indicators from the project document. A two years extension was awarded in August 2021 to run the project up to August 2024, aiming to guarantee the achievement of the goals and to ensure continuity to the processes initiated. Budget available and planned activities for the next 18 months are on track to reach 100% of all indicators.</i>		

II. Targeted results and progress to-date

Please describe the progress made in achieving the outputs against key performance indicator's targets in the project's **M&E Plan/Log-Frame at the time of CEO Endorsement/Approval**. Please expand the table as needed.

Please fill in the below table or make a reference to any supporting documents that may be submitted as annexes to this report.

Project Strategy	KPIs/Indicators	Baseline	Target level	Progress in FY22
Component 1 – Policy framework and information.				
Outcome 1.1: Enhanced inter-ministerial coordination and implementation of policies, regulation and instruments to promote the adoption of biogas and biomethane energy systems based on agro-industrial organic waste.				
Output 1.1: Output 1.1.1: Establishment of an inter-ministerial coordinating unit on biogas and biomethane market development receiving support from the Project.	(1.1.1) Number of meetings held during project timespan (#/yr).	0 meetings/yr	3 meetings/yr	This output aims to foster coordination between key authorities in the field of biogas and biomethane policy at the federal level, including energy (MME), agriculture (MAPA), environment (MMA), technology and innovation (MCTI), regional development (MDR), and

⁴ Please refer to the explanatory note at the end of the document and assure that the indicated ratings correspond to the narrative of the report

				<p>the Civil House. There are other federal bodies in the Interministerial Unit such as the National Water Agency (ANA), Energy Research Company (EPE) and the Brazilian Agricultural Research.</p> <p><i>3 meetings/yr happened in September 2021, November 2021 and April 2022. Please find the link to the minutes and recordings of them https://xfiles.unido.org/index.php/f/6610454</i></p>
<p>Output 1.1.2: Updating and detailing of federal and state policies and programmes, and regulatory and financial instruments to facilitate biogas and biomethane market development based on agroindustrial organic waste.</p>	<p>(1.1.2) a) Number of biogas policies and regulations enhanced (-); b) Number of financial instruments adapted to biogas (-).</p>	<p>a) 0 policies and regulatory instruments; b) 0 financial instruments</p>	<p><i>a) 3 policies and instruments; b) 1 financial instrument adapted.</i></p>	<p><i>This activity aims to complement the existing body of legislation and regulation and enhance consistency with overarching energy, agricultural and environmental policy (including climate change policy), focusing on: (i) biogas for energy self-supply in agro-industries; (ii) biomethane for mobility; (iii) biogas for distributed electricity generation, and (iv) biomethane for state gas markets.</i></p> <p><i>In previous years (2019), four regulation proposals were delivered to the biogas sector. For the reporting period, four regulation proposals were delivered for the Government of Federal District as per the list below:</i></p> <ul style="list-style-type: none"> <i>- Proposal for a Regulatory Framework for Biogas and Biomethane</i> <i>- Proposal for a Decree on the Reverse Logistics System for Packaging in General.</i> <i>- Proposal Revision for the Norm for Biological Treatment of Organic Waste.</i>

				<p>- <i>Proposal Revision for the Normative Instrument on Legal Modeling.</i></p> <p><i>The project has already delivered improvement of one financial instrument, for the state of Paraná, and for the reporting period, two financial instruments improvements were delivered, namely:</i></p> <ul style="list-style-type: none"> - <i>Improvement of ABC plan.</i> - <i>Performance insurance</i> <p><i>The report on Financing for the Biogas Sector: Financial mechanisms for investments in biogas projects in Brazil was finalized on April and is awaiting publication</i></p>
Output 1.1.3: Integration of biogas and biomethane into federal and state-level energy and agriculture sector programmes.	(1.1.3) Number of sector programmes and plans specifically promoting biogas and biomethane investments (-);	0 programmes	3 programmes	<p>The activities related to this output aim at anchoring biogas and biomethane technologies into energy, agricultural and environmental sector policies and programmes.</p> <p><i>During the reporting period, the following programmes were concluded:</i></p> <ul style="list-style-type: none"> - <i>Proposal for a Regulatory Framework for Biogas and Biomethane</i> - <i>Proposal for a Decree on the Reverse Logistics System for Packaging in General</i> - <i>Proposal for the Revision of Biological Treatment Standard for Organic Waste</i> - <i>Proposal for Revision of Normative Instrument on Legal Modelling</i> - <i>3 proposals for the treatment of urban solid waste using biogas for the intermunicipal</i>

				<p>consortium of solid waste in western São Paulo (ten municipalities).</p> <p>The project is developing a methodology for an automatic tool to help municipalities, states and the federal government to integrate biogas, biomethane and fertilizers in national and local public policies, providing security to investments and supporting bidding and decision processes.</p>
Output 1.1.4: Design of an MRV system for tracking of GHG emission reductions from anaerobic digestion in agro-industries.	(1.1.4) Delivery of envisaged MRV systems for biogas plants.	Not implemented	MRV system implemented	<p>This output will support the Ministry of Environment (MMA) to set up a MRV system targeting agro-industries.</p> <p>During the reporting period, the project has delivered a tool to calculate MRV, a manual to the tool and a report about the methodology to make the tool. The product is finalized, and awaiting publication and a training exercise.</p>
Outcome 1.2: Information on biogas and biomethane technology and market development updated, consolidated, and made accessible to public and private stakeholders.				
Output 1.2.1 Collection, validation and publication of technical, legal, economic, and other relevant information for biogas market development based on agro-industrial organic waste.	(1.2.1) Number of information packages with validated information on biogas and biomethane delivered per year (#/yr).	0 packages/yr	2 packages/yr	<p>This output aims to produce packages of validated information on biogas and biomethane that will be available for the public.</p> <p>There are expressive results regarding this target. The Project managed to produce 22 information packages so far, of which 9 were published in 2021 and 01 in 2022. There are 08 waiting for publication.</p>
Output 1.2.2 Operationalization	(1.2.2) a) Status of Biogas	a) not implemented;	a) implemented;	The purpose of this output is to establish a

<p>of a Biogas Information Platform (BIP) to update, manage and disseminate validated information to stakeholders.</p>	<p>Information Platform (BIP);</p> <p>b) Number of information requests to BIP (1/yr).</p>	<p>b) 0 requests per year</p>	<p>b) 50 requests per year.</p>	<p>Biogas Information Platform (BIP) that assumes the following functions:</p> <p>(i) collection and validation of information on legal, technical, financial and operational aspects of biogas and biomethane plants;</p> <p>(ii) effective dissemination of such information to stakeholders, including local authorities, energy market agents and project developers; and</p> <p>(iii) to act as a clearinghouse for information, inquiries, experiences and proposals from and for sector stakeholders.</p> <p><i>a) Implemented. The full platform was launched on 29 June 2021 and is hosted by the MCTI. The BIP is available and has three tools included:</i></p> <p><i>1) Data Sebrae Biogas, which was launched in September 2020 (link: https://www.gefbiogas.org.br/datasebrae.html) (and,</i></p> <p><i>2) Biogas Invest web App, a free digital tool that allows producers, entrepreneurs, financing agents and public managers to independently carry out a customized analysis on the feasibility of new biogas projects,</i></p> <p><i>3) Biogas Community, a blog for stakeholders in the biogas market to share experiences and discuss common topics (link: https://comunidadesebrae.com.br/biogas-brasil).</i></p> <p><i>b) 40612 access during 2022 in all platforms combined (BIP, Youtube, Newsletter and Website).</i></p>
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Component 2 – Biogas and biomethane technology and value chain.

Outcome 2.1: Strengthening of the biogas and biomethane value chain by promotion of cost-effective, standardized technologies, consolidation of market strategies and business models, and transfer of know-how and skills to project developers and other stakeholders

<p>Output 2.1.1 Validation of biogas and biomethane business models for agro-industries, including associative biogas production schemes</p>	<p>(2.1.1) Delivery status of reports</p>	<p>No reports delivered</p>	<p>Reports delivered</p>	<p><i>This output delivered consolidated business models for ownership and operation of biogas and biomethane energy systems covering the legal, management and operational aspects thereof, among others. The objective was to provide off-the-shelf solutions for project structuring by market parties (project developers, biomass owners, energy companies), which is particularly relevant given the incipient status of the market.</i></p> <p><i>Three reports were published on September 2021, named:</i></p> <ul style="list-style-type: none"> <i>-Mapping of Strategies for Value Generation in the Biogas Chain.</i> <i>-Methodology for Technical, Economic and Financial Evaluation of Projects for Value Generation in the Biogas Chain</i> <i>-Biogas Cluster (Mathematical Model for Location Optimization and Clustering for Value Generation in Biogas Projects</i> <p><i>Moreover, several business models were developed throughout different sectors:</i></p> <ul style="list-style-type: none"> <i>-Aurora (swine sector - slaughtering 2,000 hogs/day and producing 8,000 tons/day of processed products)</i> <i>-Coperdia (Form a biogas production cluster with 8 swine farmers of Coperdia and Indicate alternatives for the biodigestion of waste and biogas energy use)</i>
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				<p><i>-Adecoagro (sugar cane sector - energy use of biogas using vinasse and filter cake)</i></p> <p><i>-Ingredion (biogas energy use for effluents treatment)</i></p> <p><i>-Castrolanda (business models that optimize the use of effluents as a substrate for the generation of biogas and digestate from swine and cattle production)</i></p> <p><i>- SIMP (Manioc Industries Union of Parana - identify business models that optimize the use of effluent as a substrate for the generation of biogas and digestate)</i></p> <p><i>-GDF - Government of the Federal District (use of municipal solid waste for biogas generation)</i></p>
<p>Output 2.1.2 Preparation of recommendations and guidelines for standardization of technical designs, feedstock, equipment, and operational procedures for biogas production schemes.</p>	<p>(2.1.2) Delivery status of recommendations and guidelines (yes/no).</p>	<p>Recommendations not delivered</p>	<p>Recommendations delivered</p>	<p>This project output will depart from an inventory of currently used technologies, equipment, and practices in biogas plants in Brazil. It will further draw on experiences and technical standards of the use of biogas in other countries to, in dialogue with the sector and considering specific needs for local standards, define and promote voluntary standards and best practices.</p> <p><i>Recommendations Delivered.</i></p> <p><i>Several reports were finalized and published:</i></p> <ul style="list-style-type: none"> <i>- Report on Stakeholders existing recommendations and guidelines on biogas and biomethane in South of Brazil.</i> <i>- Technical guide to biodigester operation.</i>

				- <i>Safety guide for biogas plants.</i>
Output 2.1.3 Adaptation of equipment, components and processes for biogas and biomethane production to local socio-economic and technical conditions ("tropicalization").	(2.1.3) a) Number of produced proposals and concepts for technology adaptation (-); b) Percentage of technological issues and components successfully improved (%); c) Number of industry partnerships in biogas and biomethane technology established (-).	a) 0; b) 0%; c) 0	a) 8 (sex-disaggregated data to be recorded); b) 67%; c) 5 partnerships	This output prioritize opportunities for adaptation of biogas and biomethane technologies to the specific conditions and market circumstances of Brazil and generate detailed proposals to start innovation in this direction. The concepts and designs produced under this output will be available for third parties to initiate (public or proprietary) technology and product development processes. The concepts can be used for underpinning partnerships between national companies and foreign technology suppliers. a) 7; b) 50% of technological issues solved; <i>Six main challenges were identified and 3 challenges addressed:</i> - #1 Cost reduction and/or integrated solutions for biomethane and CO2 production. - #3 Cost reduction and plug and play automation in peripheral equipment. - #6 Biogas purification solutions. c) 8 partnerships <i>The programme aims to promote cooperation between Brazilian and foreign companies to identify business opportunities that meet the demands of the local market.</i> <i>Part of this action included receiving</i>

				<i>proposals (called Concept Notes, or CNs) for technology adaptation by participating companies. There was 4 cycles and 6 CN were received, and 3 approved.</i>
Output 2.1.4 Implementation of training, capacity building and promotional activities for biogas producers, project developers and other stakeholders.	(2.1.4) a) Annual number of training events held (#/yr); b) Number of biogas professionals trained per year (m;f, #/yr).	a) 0; b) 0m, 0f per year	b) 1 event/yr; c) 30m; 20f per year	This output designed and implemented training activities for biogas producers, project developers, and other stakeholders. Cooperation with local universities and national research bodies is emphasized, as is the train-the-trainer concept. <i>a) Six events were organized and conducted since the start of the project execution and one during the reporting period.</i> <i>- South Brazilian Forum (April 2022)</i>
Output 2.1.5 Development and approval of market introduction strategies and business models for biogas-based electricity and biomethane by electricity and gas companies in Southern Brazil.	(2.1.5) Number of market introduction strategy documents and action plans (-).	No strategies (0)	At least 3 strategies and action plans delivered	<i>3strategies</i> <i>3 strategies and action plans were delivered to the following gas companies:</i> <i>- Compagás;</i> <i>- SCGás and,</i> <i>- COPEL.</i>
Component 3 – Demonstration and optimization of biogas projects.				
Outcome 3.1: Demonstration and optimization of the technical and economic feasibility of biogas and biomethane production and utilization based on agroindustrial organic waste.				
Output 3.1.1 Verification and implementation of demonstration pilots for biogas production and utilization based on agroindustrial organic waste in Southern Brazil.	(3.1.1) a) Number of projects approved (-); b) Investment by project partners in pilot project installations (US\$)	a) 0 pilot projects; b) US\$ 0	a) 4 pilot projects; b) US\$32,170,000.	This output encompasses the verification and implementation of biogas and biomethane demonstration pilots, entailing the verification and specification of the pilots and procurement of engineering services, equipment, civil works, electrical systems, and auxiliary systems. A Technical Committee was

				<p>established to make a selection from initiatives seeking support from the Project based on agreed criteria. The committee also reviewed proposals for enhancement and optimization, and submitted to the PSC for approval.</p> <p>a) 7 pilot projects;</p> <p>b) US\$ 5,403,801.67 Financial and economic co-finance from the 7 pilot projects</p>
<p>Output 3.1.2 Investment and technical services to ensure operational performance and sustainability of the installed demonstration pilots.</p>	<p>(3.1.2) a) Average time between project delivery and satisfactory operation (months, per pilot project);</p> <p>b) Additional investment needed for satisfactory project operation (% of initial CAPEX).</p>	<p>a) 0;</p> <p>b) Not defined</p>	<p>a) < 18 months;</p> <p>b) < 20% (average).</p>	<p>The purpose of this output is to ensure the technical and financial sustainability of the implemented demonstration projects and optimize system performance when possible. The demonstration pilots will be monitored on technical and performance aspects, including critical issues for project sustainability according to Output 3.1.3.</p> <p>a) 0</p> <p>b) Defined. A need to hire monitoring services was identified. Procurement process was conducted and finalized in the first semester of 2022.</p>
<p>Output 3.1.3 Monitoring of operational aspects and performance of established pilots, including systematization of lessons learned and recommendations for enhancement.</p>	<p>(3.1.3) a) Annual production of biogas (m3/yr, per pilot project);</p> <p>b) Unscheduled down-time per year (hour/yr, per pilot project);</p> <p>c) Delivery status of report with lessons learned and</p>	<p>a) 0 m3 biogas /yr;</p> <p>b) Not defined;</p> <p>c) No report delivered.</p>	<p>b) 15.7 m3 biogas/yr (total);</p> <p>b) <100 hours/yr, per pilot;</p> <p>c) Report delivered.</p>	<p>This project output will set up a mechanism for monitoring the technical performance and operational parameters of the biogas energy systems installed under Output 3.1.2. Consultancy services will be hired for the definition of key technical, financial, economic, social and environmental performance indicators</p>

	recommendations (yes/no).			<p>for biogas plants and respective monitoring methodologies, and establishment of a measurement program.</p> <p>a) 0 m3 biogas /yr;</p> <p>b) Not defined;</p> <p>c) No report delivered.</p> <p>As monitoring the demonstration pilots have not been yet started, no activities were carried out</p>
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III. Project Risk Management

1. Please indicate the overall project-level risks and the related risk management measures: (i) as identified in the CEO Endorsement document, and (ii) progress to-date. Please expand the table as needed.

Describe in tabular form the risks observed and priority mitigation activities undertaken during the reporting period in line with the project document. Note that risks, risk level and mitigations measures should be consistent with the ones identified in the CEO Endorsement/Approval document. Please also consider the project's ability to adopt the adaptive management approach in remediating any of the risks that had been sub-optimally rated (H. S) in the previous reporting cycle.

	(i) Risks at CEO stage	(i) Risk level FY 21	(i) Risk level FY 22	(i) Mitigation measures	(ii) Progress to-date	New defined risk ⁵
1	Delay to implement improvements to the policy and regulatory framework would impede biogas and biomethane market development.	Medium Risk (M)		The Government of Brazil (GoB) is increasingly committed to the incorporation of decentralized energy sources into the national energy system. The development of a biogas and biomethane value chain is key for the adequate treatment of agro-industrial effluents and residues, and urban waste streams and wastewater. The Project builds upon the GOB/GIZ PROBIOGAS programme implemented by the Ministry of Cities (MCIDADES), which set up an inter-ministerial working group to coordinate biogas and biomethane policy and regulation among the various sectors: technology and innovation (MCTI); energy (MME); environment (MMA); industry (MDIC) and agriculture	<p>In the state of Paraná, the project carried out an assessment of the biogas legal framework, upon request of the government, presenting an analysis and a concrete proposal for the regulation of biogas at state level, both delivered in July 2020. Moreover, the private sector has been mobilized with the great support of the project and their stakeholders. For the states of SC and RS there is favorable public and private movement for biogas and biomethane.</p> <p>Important progress was achieved through a partnership with the Federal District Government, when a relevant administrative reference was produced for the modernization of urban solid</p>	<input type="checkbox"/>

⁵ New risk added in reporting period. Check only if applicable.

				(MAPA). Awareness and specific knowledge about biogas and biomethane in the federal government is still limited and scattered. Moreover, policy development processes are lengthy due to the federal organization of Brazil and some uncertainties in terms of competences of involved legislative entities. As such, amendments to the regulatory framework may not materialize as swiftly as hoped. The Project will therefore make an effort to keep biogas technology on the political agenda at the highest level, while meanwhile pursuing tangible results by a practical approach to enhance existing legislation where possible and required, including financial incentives and tax benefits.	waste management, fostering the technical and economic use of biogas and other co-products in the national territory. The outcome was four proposals to improve legislation and support the biogas and biomethane market development.	
2	The executing entities would lack managerial and technical capacities to implement the Project.	Medium Risk (M)		Part of the project will be executed with the support of national executing entities, specifically CIBiogas, as well as national research institutions and universities. With the aim of building national capacities, MCTI has requested UNIDO to provide technical and administrative assistance in the execution of the Project. The here identified risk is thus controlled through this arrangement as well as by continuous high-level oversight by UNIDO.	The implementation team continued working on developing further partnerships with several institutions and stakeholders to ensure the effectiveness and continuity of actions, such as SEBRAE, FIEP, FAEP, UTFPR, ABiogás, SANEPAR, TECPAR, BRDE, PTI, EMBRAPA, Klabin, Ingredion, Adecoagro, SIMP, SIMA, Aurora, CRVR, Ambar/JBS, SENAI, GDF Government, among others. There was continuous monitoring and support to the execution of the activities. In 2021, a complete manual was started to replicate the Project's approach, which should guide the expansion of initiatives in Brazil or in other territories. The publication should be launched in August/2022.	<input type="checkbox"/>
3	Lack of confidence in biogas technology would lead to agro-industries refraining from implementing biogas projects.	High Risk (H)		While this issue has not been systematically investigated, the PPG phase found a considerable number of investments in biogas technology and the apparent reliable operation of these plants. This observation particularly holds true for large, high-end systems. Examples are urban biogas plants processing wastewater (more than ten systems in operation) and, in	In the period 2021-2022 there was an addition of 102 biogas plants in operation in Brazil, an increase of 16% compared to the previous period. This is the 4th year in a row where growth in the 2-digit range has been registered. Major investments in biogas generation from agro-industrial waste were announced across the country, especially in the South, Southeast and	<input type="checkbox"/>

			<p>Paraná, cassava starch effluent (Amidonaria Navegantes) and sugar cane vinasse treatment (Geo Energética). There is also co-investment from the demand side, as demonstrated by COPEL (biogas-based electricity), SULGAS (biomethane), and Itaipu (biomethane for mobility), among others. The main challenges are system scale, and return on the investment. Smaller installations still lack consolidated “off-the-shelf” plant designs, as is the case with the associative (condominium) business model. Moreover, capital opportunity costs for farmers are high; by consequence, farmers would prefer alternative investments under a rational business approach (typically upscaling of core business activities). However, farmers (in Paraná) show great interest in biogas technology as an option for reducing energy costs and increasing energy security as well as to reduce the environmental footprint of their business activities. The Project aims to reduce capital and operating costs for this group of producers while increasing technical maturity and introducing standardized designs and materials.</p>	<p>Midwest regions. At least 4 of the main companies operating in the provision of technology and services related to Biodigestion pivoted their business models to EaaS or other models that aim to reduce investors' risks, such as leasing, instead of selling equipment and systems. In addition, there is an increase in the number of projects in Special Purpose Entities (SPE), a more suitable arrangement for mitigating risks and receiving investments from the capital market. Such signs are understood as progressive maturation of the value chain, with the recognition of sets of good practices that should enable the healthy maintenance of the expected growth rate.</p>	
4	Lack of adequate technological support would undermine the success of proposed biogas demonstration pilots.	High Risk (H)	<p>Given the incipient market, a comprehensive value chain for biogas and biomethane production has not yet developed. It must be noted that anaerobic digester systems operate embedded into the core business process and require a certain level of active management. Large companies including sugar mills often have in-house know-how for designing and operating energy systems; note that outsourcing of energy activities, for example through an ESCO model, is poorly developed in Brazil. Smaller farmers would require training to operate biogas systems and are likely to need stand-by technical support, which</p>	<p>Training and knowledge transfer actions were implemented to ensure sustainability in operations and for the expansion of the sector. In addition, partnerships with institutions such as SEBRAE and also SENAI at regional and national levels, ensured capillarity in actions to strengthen the technical and managerial capacity of new businesses in the biogas value chain. The partnership with SENAI is designed to discuss replication, on a large scale, of the business models used. to The Biogas Training Trail was a great success and received the Highly Commended Award for Best Anaerobic Digestion/Biogas</p>	□

				<p>implies a major cost. The condominiums in Paraná receive operational support from CIBiogas, but a sustainable support model targeting the small farmers has not yet emerged. The Project will address this weakness by systematically monitoring system operations and performance and working towards an efficient and cost-effective operational model.</p>	<p>Support during the AD and Biogas Industry Awards 2022 during the World Biogas Summit 2022 in Birmingham. This was a 270-hour and free online course about biogas production. The Trail consisted of six individual courses of professional level, each focused on a specific biogas theme, generating interest and engagement.</p>	
5	<p>Bioenergy projects would be considered not feasible due to a lack of feasible business models, adequate revenues, and high operational and financial risks.</p>	<p>Medium Risk (M)</p>		<p>This risk is inherent to biogas development in many countries. From the project site, it can be mitigated by ensuring system reliability and performance and by optimization of project designs and cost parameters. A systemic problem is the lack of monetization of delivered social and environmental benefits (avoided externalities such as pollution, GHG emissions and nuisance). In the absence of strict enforcement of environmental regulation (effluent control), the economic value of biogas technology is not acknowledged. Meanwhile, the produced biogas, electricity and biomethane can generate revenues by replacing baseline fuel options; biofertilizers may provide additional income, but several market barriers must be addressed. The Project aims to strengthen biogas business models from various angles: (a) cost reduction and system optimization; (b) advocating for adequate pay-back prices for electricity and biomethane; (c) recognition of the economic value of biogas technology ; (d) recognition of its strategic value for decentralized biomethane and electricity production, and for further expansion of the agroindustrial sector (including animal farming).</p>	<p>The tool to evaluate business models was developed and made accessible to the general public through the Biogas Information Platform. The tool was developed with the support of the federal university of Paraná, financial institutions, representatives of the private sector and other partners in order to guarantee its effectiveness and relevance.</p> <p>The project team also carried out activities with the financial sector, which contemplated the creation of specific financial instruments, from credit lines to operational efficiency insurance, and the improvement of existing instruments, facilitating their adoption and expansion.</p> <p>Under the Component 2, several business models with high replicability have been evaluated and validated in partnership with the private sector. During the period 2022-2023, some of these models will have their implementation monitored by the Project in order to guarantee the production of reliable information about adequate, predictable and verifiable implementation and financing arrangements.</p>	<input type="checkbox"/>
6	<p>Implementation of project activities and pilot systems would be affected by</p>	<p>Medium Risk (M)</p>		<p>The exchange rate of the real with the US dollar is subject to substantial fluctuations (approx. 20% increase compared to the USD between 1 Jan 2016 and 1 Jan 2017). The euro to USD rate</p>	<p>Currency fluctuation had a significant impact on the value of the Real against the US dollar, with devaluation of around 10% of the Real for the reporting period. Thus, the resources</p>	<input type="checkbox"/>

	inflation and currency risks.			also varies considerably. The impact of these fluctuations on the Project budget is uncertain, but may lead to a reduced value of Project resources to purchase foreign equipment and services. Meanwhile, the prices for national procurement are subject to inflation on the internal market. This risk is mitigated by conservative budgeting of goods and services.	allocated to the project remain sufficient to carry out the planned activities. Possible increases in costs for acquisition of technologies are mitigated by technology tropicalization and development of a national value chain of equipment and service suppliers. In cooperation with the Ministry of Economy (ME), the project worked to implement a tax free system for all imported equipments related to the biogas and biomethane sector and final approvals for implementation are with the ME	
7	Social and gender issues with bioenergy systems would hamper replication and/or exacerbate social and gender inequalities.	Medium Risk (M)		Social and gender issues directly caused by the Project have not been identified, or can be mitigated by promoting the participation of women in training activities, project management and contracted services and consultancies. Indirect effects may occur in the influence areas of the demonstration pilots. Note that the targeted sectors (energy, agroindustry) are typically male-dominated. Special attention will be given to potential gender issues resulting from environmental externalities and informal labor. Family-run farms typically have determined roles for men and women, which vary according to the scale of the farm. Land tenure issues may play a role affecting women's rights. Weak enforcement of effluent control may contaminate soils and aquifers affecting health and livelihoods of neighboring rural settlements, where women, children and elderly typically make up the larger share of the population. The envisaged gender screening is aimed at identifying such situations, proposing corrective actions and raising red flags if necessary.	During the reporting period, no changes were identified regarding gender issues within the sector. The project actions provided specific care to ensure the inclusion of women, especially in training. The results obtained so far in the project, considering the activities monitored for the gender dimension, resulted in about 40% of participation by women.	<input type="checkbox"/>
8	Environmental factors, including the effects of global climate change, would cause bioenergy projects being	Low Risk (L)		The effects of climate change are felt worldwide. Brazil's TNC reports (summary p.47) that the Itajaí Valley witnessed prolonged heavy rains resulting in extensive flooding and multiple landslides in November 2008. About 1.5	The will to avoid climate change and pollution of water resources have been drivers in favor of the project. For this reason, technological advances were incorporated into local projects such as digester atmosphere	<input type="checkbox"/>

	delayed or abandoned.			<p>million people in Santa Catarina were directly affected, 69,000 people were displaced, 120 lives were lost and a state of emergency was declared. Roads were blocked, electricity service collapsed and part of the gas pipeline Bolivia- Brazil was damaged, suspending supply for part of the state of Santa Catarina and the entire state of Rio Grande do Sul.</p> <p>The likeliness that proposed demonstration pilots be affected by natural hazards is small, but cannot be ignored. Most structural risks and changes in ambient parameters can be controlled by adequate system design and the use of appropriate materials and constructions. The Project shall review existing construction practices to ensure that proper risk probability assessments are being made.</p> <p>Water shortages associated with climate change are unlikely to affect the Project as the technology does not rely on water as a resource as such. However, water shortages may affect (the expansion of) farming practices; adaptive measures are expected to be taken to minimize any expected impacts.</p>	control, including temperature and CO ₂ /O ₂ ratio.	
9	Delay from the national approval process of the project that impacted the project activities start with 16 months of delay	High Risk (H)		An extension on the implementation of the project will be requested to the GEF Coordination in order to have the proper 60-months timeframe for implementation.	After the Mid Term Review was concluded, the project management team forwarded the request of extension of the project to the GEF Coordination, and the project has been granted the extension of two years to be implemented up to August 2024.	<input type="checkbox"/>
10	Delays due to the COVID-19 pandemic, which has not enabled the implementation of activities that require physical presence, such as the on-site training of biogas and	Medium Risk (M)		Online training and webinars should be conducted to minimize the impossibility of local training for as long as the pandemic lasts.	<p>Several online and webinars were conducted throughout the period of the pandemic with considerable success and attendance from the different stakeholders and interested parties.</p> <p>The prioritization of online actions generated indirect positive results. Since the digital training and qualification materials were produced with a</p>	<input type="checkbox"/>

	biomethane experts.				focus on facilitating their use by multipliers, including suggestions for didactic activities, partners with large capillarity, such as SEBRAE and public universities, have been interested in adopting them as a reference for the implementation of Biogas in their course schedules or in existing curricula.	
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2. If the project received a [sub-optimal risk rating \(H, S\)](#) in the previous reporting period, please state the [actions taken](#) since then to mitigate the relevant risks and improve the related risk rating. Please also elaborate on reasons that may have impeded any of the sub-optimal risk ratings from improving in the current reporting cycle; please indicate actions planned for the next reporting cycle to remediate this.

Not applicable

3. Please indicate any implication of the **COVID-19** pandemic on the progress of the project.

Please indicate whether the outbreak of COVID-19 has affected the project implementation. If so, have particular project activities/outputs been significantly impacted by the pandemic? Do you expect COVID-19 to have implications on the project's ability to finish by the expected completion date? In case the project has already been extended because of COVID-19, please mention it here and assure that the arguments presented in the extension request are aligned with the information provided in this section.

Project implementation has been progressing accordingly despite the coronavirus and social distancing on 2021. For 2022, way of work had been back to normal again. Several actions were accelerated due to the opportunity to conduct online meetings. Biogas in Brazil has become an opportunity in times of uncertainties. Aligned with a good communication strategy, the project gained visibility and relevant partnerships were built, optimizing the resources, and working with different projects also investing in renewable energies and waste management. The ESG agenda is on the rise, especially for the agribusiness and the forestry sectors, generating excellent opportunities for cooperation and great demand for Project assistance.

4. Please clarify if the project is facing delays and is expected to request an **extension**.

The project faced a delay to start its implementation back in 2019, and extension for implementation has already been awarded in August 2021, after the Mid Term Review Evaluation. Project will run until August 2024, and initial implementation end date was August 2022.

5. Please provide the **main findings and recommendations of completed MTR**, and elaborate on any actions taken towards the recommendations included in the report.

If the project has undergone a Mid-Term Review, please summarize the outcome and elaborate on specific actions taken towards implementing the recommendations included in the report.

NB: The information provided in this section will be used by the GEF Secretariat to measure the project's ability to adopt an [adaptive management approach](#). This will be measured through the assignment of a [project-level proactivity index](#).

*“Key Findings of the Evaluation Project Design
The project components, as formulated in the GEF CEO Endorsement, are sound, appropriate and consistent with the stated project objective. The GEF Biogas Brazil Project remains relevant today, and the main outputs and the outcomes remain unchanged. The institutional and implementation arrangements also*

remain valid and relevant. The GEF CEO Endorsement defined the quantitative goals and main project objective as well as clearly identified, assessed, rated and proposed mitigation measures for the project risks, which are still adequate. However, four risks were not foreseen at the project design stage: (i) delay in the country project approval, (ii) difficulty in establishing the inter-ministerial unit, (iii) digestate management and (iv) COVID-19 pandemic. The Project Results Framework (PRF) includes an adequate structure with outcomes and outputs including specific, measurable, attainable, reachable and time bound target indicators. It describes the assumptions at output and outcome level, but not the risks. The indicators seem, in general, appropriate to measure the expected outputs quantitatively and qualitatively. However, the Review Team found that it could (i) be directly linked to the outcome/output level, (ii) be more specific in some cases, (iii) reflect the different audiences to be reached, (iv) follow a pattern and (v) be consistent in terms of the metric units in which they are to be measured.”

“Recommendations

R1. The Project Management Unit should consider revising the current implementation plan and adapt it to new circumstances and challenges encountered. The Review Team has suggested a follow-up plan that can help the Project Management Unit with the implementation and monitoring of GEF Biogas Brazil Project’s activities.

Action followed: implementation has been reviewed and by the second quarter of 2022, 90% of the implementation on both component 1 and 2 have been achieved.

R2. UNIDO Headquarters and Project Management Unit should request a project extension to GEF based on the delay of 16 months to start the project due to the national approval process as well as due to the COVID-19 pandemic, which has not enabled the implementation of activities that require physical presence, such as the onsite training of biogas and biomethane experts.

Action followed: extension requested and granted. Project will run up to August 2024 and budget implementation management is updated as well.

R3. The Project Management Unit should make sure that the project is spending the GEF grant appropriately, and that results will start to appear now with less spending associated (the spending reported on PC3 has been very high for the results accomplished so far).

Action followed: despite the delay on the selection and monitoring of the demonstration projects expenses will follow the implementation achieved but the next upcoming months.

R4. When designing a project, UNIDO should make sure that: • The indicators put forward to monitor the outputs/outcomes of the project at the design stage are specific, realistic, properly chosen, use the correct measuring units throughout and are all linked to the project activities, thus mitigating the risks related to external factors. • Reporting process under the Monitoring&Evaluation plan clearly indicates the minimal reporting information. • It includes a budget to build the capacity of the Project Management Unit in the implementation of the project’s Monitoring&Evaluation plan and on reporting activities. • The log-frame should include a column highlighting the time for the implementation of each activity, reducing the error of interpretations between the Project Results Framework and the Chronograms of Implementation. • There is a budget integrated for communication activities. Integrate more media coverage, advertising, and communication activities.

R5. At the start of a new project, UNIDO should make sure that all the necessary reporting structures are put together according to the plan and that capacity is built on how to apply the Monitoring&Evaluation plan.

R6. The Project Management Unit should compile and maintain a record of partnerships built throughout the project implementation as well as establish partnerships with stakeholders from other areas than the biogas sector that have climate change as the main area of action to sensitize new actors with whom the project may collaborate in the future.

Action followed: the National Water Agency strated to take part of the Interministerial Unit, participating in the meetings held, and a partnership with SENAI (National Service of Industrial Training) to train the trainers and leave a legacy on knowledge share from the biogas trainings the project had provided in the previous years.

R7. Given the opportunities that exist for biogas development in Brazil as well as across South America, the identified potential for scalability and replicability as well as the partnerships that have been established, there are opportunities for a follow up project. The Review Team recommends that the Project Management Unit together with the UNIDO Headquarters start exploring the development of a proposal for a follow-up

project that makes use of the body of knowledge and partnerships already created by the GEF Biogas Brazil Project and enlarge its scope in terms of type of waste to be used for biogas production as well as geographical coverage – across other Brazilian states and South American countries, most of which have a significant and very active agricultural sector.”
Action followed: a concept note proposing a follow up project is being written and should be delivered in the upcoming months.

IV. Environmental and Social Safeguards (ESS)

1. As part of the requirements for **projects from GEF-6 onwards**, and based on the screening as per the UNIDO Environmental and Social Safeguards Policies and Procedures (ESSPP), which category is the project?

Category A project

Category B project

Category C project

(By selecting Category C, I confirm that the E&S risks of the project have not escalated to Category A or B).

Notes on new risks:

- *If new risks have been identified during implementation due to changes in, i.e. project design or context, these should also be listed in (ii) below.*
- *If these new/additional risks are related to Operational Safeguards #2, 3, 5, 6, or 8, please consult with UNIDO GEF Coordination to discuss next steps.*
- *Please refer to the UNIDO [Environmental and Social Safeguards Policies and Procedures \(ESSPP\)](#) on how to report on E&S issues.*

Please expand the table as needed.

	E&S risk	Mitigation measures undertaken during the reporting period	Monitoring methods and procedures used in the reporting period
(i) Risks identified in ESMP at time of CEO Endorsement	<ul style="list-style-type: none"> - Effluent leakages (groundwater contamination, and soil pollution) - Gas leakages - Increase in agricultural activities (e.g, energy-crop cultivation for co-digestion to increase the plant’s efficiency) - Increased transportation 	<p>During the selection of biogas production plants for the establishment of the Demonstration Units, diligences composed by CIBiogás technicians visited each pre-selected project to verify if they were in accordance with the current regulatory framework, as well as in full safe operating conditions.</p> <p>New visits were carried out after the selection, prior to the signing of the contracts by UNIDO, in order to verify any points still in doubt and confirm the operational viability of the plants.</p>	<p><i>On-site due diligence, and process of contracting specialized services for real-time monitoring to be implemented in Q3/2022.</i></p>

		As an additional mitigation measure, a process was carried out to hire specialized monitoring services for the plants, through which real-time monitoring systems will be guaranteed with the main indicators necessary to guarantee safety and efficiency. The installation of the systems should start in August 2022, and the monitoring will take place for a minimum period of 12 months.	
(ii) New risks identified during project implementation (if not applicable, please insert 'NA' in each box)		NA	NA

V. Stakeholder Engagement

1. Using the previous reporting period as a basis, please provide information on **progress, challenges and outcomes** regarding engagement of stakeholders in the project (based on the Stakeholder Engagement Plan or equivalent document submitted at CEO Endorsement/Approval).

In the reported period, the Project made progress in delivering the results of the partnerships established. Priority was also given to the transfer of knowledge and the strengthening of the leading role of networks built locally with regard to the development of the Biogas value chain.

Two new partnerships were established with actors that complement the existing networks: one with SENAI, the National Service for Industrial Learning; and the second with ANA, the National Water Agency.

Both partnerships have as main actions the dissemination of knowledge and tools previously developed by the project, as well as eventual adaptations and customizations. Such actors have a national scope, which meets the interest of federal public actors, especially MCTI and MDR, to expand the results throughout the national territory, respecting the scope and restrictions of the Project.

2. Please provide any feedback submitted by national counterparts, GEF OFF, co-financiers, and other partners/stakeholders of the project (e.g. private sector, CSOs, NGOs, etc.).

“Several states and development entities are already showing interest in the Brazil GEF Biogas project. The project is strategic due to its sustainability characteristics, increased productivity, and possibilities for generating income and jobs. For the Federal Government, biogas is already being treated as a concrete alternative” Secretary of Entrepreneurship and Innovation at MCTI, Paulo Alvim, during a webinar in partnership with SEBRAE/SC.

“The Brazil GEF Biogas project presented something beyond our expectations. We expected the implementation cost to be higher. We saw that the specialists were concerned with carrying out the feasibility and implementation studies in each city”. President of CISORP and mayor of Álvares Machado city, Roger

Fernandes Gasques, during the presentation and delivery of the feasibility studies for the municipalities consortium - CIRSOP.

“With this model developed and applied at CISORP, it is possible to expand to other parts of Brazil, consortia and larger municipalities, and use all the expertise, experience and methodology that was worked here. The Brazil GEF Biogas Project mainly seeks replicability, and the MCTI seeks greater interaction between municipalities, between state governments and between the federal government”. GEF National Project Coordinator and Associate Coordinator in Sectoral Technologies from MCTI Gustavo de Lima Ramos, during the presentation and delivery of the feasibility studies for the municipality's consortium - CIRSOP

3. Please provide any **relevant stakeholder consultation** documents.

- *Monthly newsletters*
- *Steering Committee minutes from the meeting of December 2021*
- *Interministerial meeting minutes from the meeting of September 2021*
- *Interministerial meeting minutes from the meeting of November 2021*
- *Interministerial meeting minutes from the meeting of April 2022*
- *Webinars invitations*

VI. Gender Mainstreaming

1. Using the previous reporting period as a basis, please report on the **progress achieved on implementing gender-responsive measures and using gender-sensitive indicators**, as documented at CEO Endorsement/Approval (in the project results framework, gender action plan or equivalent),.

Please note that the UNIDO GEF Coordination team will copy-paste the answer to this question into the GEF Portal.

The project provides for special attention in the fulfillment of gender-related goals in training and capacity building actions. The project staff is formed with 67% female in the PMU, 50% in UNIDO HQ, 32% in contracted individual services, 20% in the PSC. ToRs for contracting staff and (individual) consultants/services encourage women to apply

Capacity building activities encouraged the participation of women. The Biogas Training Trail, trained 837 trainers and 34% (285) are women.

VII. Knowledge Management

1. Using the previous reporting period as a basis, please elaborate on any **knowledge management activities / products**, as documented at CEO Endorsement / Approval.

Please note that the UNIDO GEF Coordination team will copy-paste the answer to this question into the GEF Portal.

Throughout the reporting period, many products and reports delivered by the project team were published and have received the International Standard Book Number from the MCTI library, to organize all the knowledge the project has been producing and delivering to the sector.

The communication tools such the Biogas Information Platform, Data Sebrae, Sebrae Biogas Collaborative Community Portal You Tube and Instagram Chanel continue to manage knowledge and publish all the information from the project, as well as eventual articles to both UNIDO and GEF newsletters and websites. A LinkedIn account is being created as well to share knowledge and information on a network with a more professional focus

2. Please list any **relevant knowledge management mechanisms/ tools** that the project has generated.

- Throughout the implementation, the project continues updating the following tools for Knowledge management:
- Biogas Information Platform, where all relevant products from the project are published – <https://www.gov.br/mcti/pt-br/acompanhe-o-mcti/pibiogas>
- YouTube Project Channel - <https://www.youtube.com/channel/UCH3EdWqVjVwWejisu1D7Q>
- Project Website - www.gefbiogas.org.br
- In partnership with SEBRAE, it has been developed a Digital Community to discuss biogas, where experienced professionals regularly produce content: <https://comunidadesebrae.com.br/biogas-brasil>
- The project also makes available the results produced through the Field Office Brazil page: <https://www.unido.org/who-we-are/unido-worldwide/latin-america-and-caribbean-offices/brazil>
- Instagram Profile: @gefbiogasbrasil
- Monthly newsletter with main activities about the project for internal communication
- Customized Communications on whatsapp to the Biogas Sector, specially in the Group Women in the Biogas.

VIII. Implementation progress

1. Using the previous reporting period as a basis, please provide information on **progress, challenges and outcomes achieved/observed** with regards to project implementation.

Please note that the UNIDO GEF Coordination team will copy-paste the answer to this question into the GEF Portal.

As we are in the middle of the project implementation and the project is progressing, some results have been achieved:

On the Policy Framework and Information component, 90% of the results have been achieved and now the project will focus on the inter-ministerial coordination unit meetings and enhancing financial instruments to promote the adoption of biogas. The application of the MRV system to track GHG emission reductions will be applied in the demonstration pilots in the upcoming months.

On the Biogas and Biomethane Technology and Value Chain component, the project has achieved 90% of implementation as well. Governance in the three states of the South of Brazil have been strengthened and the project continues to play a crucial role on it. The project finalized seven biogas and biomethane business models, capacity building was a great success with 837 multipliers trained and certified and awarded Best Anaerobic Digestion/Biogas Support during the AD and Biogas Industry Awards 2022 during the World Biogas Summit 2022 in Birmingham. Concerning access to technology, the call on tropicalization had a good adherence from the companies and 7 concepts notes have been already approved, with 50% of the technological challenges solved. Three organizational strategy modeling for the inclusion of biogas and biomethane in the portfolio of 2 gas companies were delivered with success.

On the Demonstration and Optimization of Biogas Projects component, seven demonstration pilots were selected and are finalizing the improvements on them. Performance Monitoring should start in the upcoming months. The project changed its scope from new pilot projects to support efficiency improvements on already existing biogas projects, and other activities such as digestate management and business models opportunities are foreseen to be integrated in the demonstration projects.

Monitoring and Evaluation is a continuous component implemented throughout the project period with specific tasks. All reporting stages and monitoring activities of project progress have been carried out up to date without significant constraints or issues to be mentioned.

The project faced several delays; however, it was able to demonstrate progress and achieved results. The project implementation has been affected by 16 months delay due to factors out of the project's control and the COVID-19 pandemic. For this reason, following the MTR recommendation that the project should request an implementation extension to GEF to allow it to achieve the objectives that were proposed to be achieved at the design stage, extension has been awarded and project will be implemented up to August 2024.

2. Please briefly elaborate on any **minor amendments**⁶ to the approved project that may have been introduced during the implementation period or indicate as not applicable (NA).

Please tick each category for which a change has occurred and provide a description of the change in the related textbox. You may attach supporting documentation, as appropriate.

<input type="checkbox"/>	Results Framework	N/A
<input type="checkbox"/>	Components and Cost	N/A
<input type="checkbox"/>	Institutional and Implementation Arrangements	N/A
<input type="checkbox"/>	Financial Management	N/A
<input checked="" type="checkbox"/>	Implementation Schedule	The project faced a delay to start its implementation back in 2019, and extension for implementation has been awarded in August 2021, after the Mid Term Review Evaluation. Project will run until August 2024.
<input type="checkbox"/>	Executing Entity	N/A
<input type="checkbox"/>	Executing Entity Category	N/A
<input type="checkbox"/>	Minor Project Objective Change	N/A
<input type="checkbox"/>	Safeguards	N/A
<input type="checkbox"/>	Risk Analysis	N/A
<input type="checkbox"/>	Increase of GEF Project Financing Up to 5%	N/A
<input type="checkbox"/>	Co-Financing	N/A
<input type="checkbox"/>	Location of Project Activities	N/A
<input type="checkbox"/>	Others	N/A

3. Please provide progress related to the **financial implementation** of the project.

Please provide a description of the main expenditures during the reporting period. Describe the current status of funds mobilization activities and the related implications for project implementation. Provide information on status of obtained / mobilized co-financing, etc. as per CEO Endorsement/Approval document.

Project still have 30% of budget to implement the remaining activities up to August 2024, as the project has been extended. As the local currency had devaluated significantly, the budget in USD allowed to implement and deliver all the activities planned as per the CEO Endorsement and beyond, with a substantive positive impact locally and nationally in the biogas and biomethane sector.

Component 1 is 90% implement and has spent 83% of its budget.

Component 2 is 91% implemented and has spent 83% of its budget.

Component 3 is 17% implemented and has spent 46% of its budget. Although the implementation does not correspond with the expenditure, the demonstration pilots are about to finalize the improvements and to start the monitoring, which will raise the implementation status and get closer to the expenditure figures.

Financial report will be attached to this document.

IX. Work Plan and Budget

1. Please provide **an updated project work plan and budget** for the remaining duration of the project, as per last approved project extension. Please expand/modify the table as needed.

⁶ As described in Annex 9 of the *GEF Project and Program Cycle Policy Guidelines*, **minor amendments** are changes to the project design or implementation that do not have significant impact on the project objectives or scope, or an increase of the GEF project financing up to 5%.

Please fill in the below table or make a reference to a file, in case it is submitted as an annex to the report.

Outputs by Project Component	Year 3				Year 4				Year 5				Year 6	GEF Grant Budget Available (US\$)
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	
1.1.1 Establishment of an inter-ministerial coordinating unit on biogas policy and technology development receiving tailored expertise from the Project														14,183
1.1.2 Updating and detailing of federal and state policies and programmes, and regulatory and financial instruments to facilitate biogas and biomethane market development based on agroindustrial organic waste														298,284
1.1.3 Integration of biogas and biomethane into federal and state-level energy and agriculture sector programmes														(25,410)
1.1.4 Design of an MRV system for tracking of GHG emission reductions from anaerobic digestion in agro-industries														77,920

1.2.1 Collection, validation and publication of technical, legal, economic, and other relevant information for biogas market development based on agroindustrial organic waste																	1,095
1.2.2 Operationalization of a Biogas Information Platform (BIP) to update, manage and disseminate validated information to stakeholders																	227,824
2.1.1 Validation of biogas and biomethane business models for agroindustries including associative biogas production schemes																	(63,310)
2.1.2 Preparation of recommendations and guidelines for standardization of technical designs, feedstock, equipment, and operational procedures for biogas production schemes																	89,311

<p>2.1.3 Adaptation of equipment, components and processes for biogas and biomethane production to local socio-economic and technical conditions ("tropicalization")</p>															641,256
<p>2.1.4 Implementation of training, capacity building and promotional activities for biogas producers, project developers and other stakeholders</p>															(13,218)
<p>2.1.5 Development and approval of market introduction strategies and business models for biogas-based electricity and biomethane by electricity and gas companies in Southern Brazil</p>															16,046
<p>3.1.1 Verification and implementation of demonstration pilots for biogas production and utilization based on agroindustrial organic waste in Southern Brazil</p>															668,640

3.1.2 Investment and technical services to ensure operational performance and sustainability of the installed demonstration pilots																		909,938
3.1.3 Monitoring of operational aspects and performance of established pilots including systematization of lessons learned and recommendations for enhancement																		179,938
4.1.1 Monitoring of project progress and compliance with UNIDO and GEF guidelines and safeguards on social (including gender) and environmental impact																		68,614
4.1.2 Implementation of Mid-term Review																		54,942
4.1.3 Implementation of independent Terminal Evaluation																		100000
Project Management Expert (PME)																		115,977
Project Assistant (PA)																		37,626

X. Synergies

1. Synergies achieved:

Describe potential synergies arising out of UNIDO internal cooperation and/or cooperation with (external) bilateral and multilateral projects/programmes, if applicable.

Since the beginning of its implementation, the Project has prioritized the construction of network partnerships, aimed at identifying priority actions of high impact in the short term, as well as with a view to the continuity of actions in a sustained manner.

This model has brought to light several opportunities for partnership and learning for UNIDO and its partners, especially the Brazilian government. An arrangement based on territorial dialogue, in itself, has several positive impacts for the construction of synergies. However, it is worth noting that the identification of short-impact priority actions, when observed within the scope of UNIDO as an implementing and executing party, has allowed the Agency to participate directly in the development of solutions and the delivery of results.

From this direct action, UNIDO has its role recognized by a growing number of actors, and as a consequence, it has been called to act as a reference in the renewable energy and circular economy sector in various spaces of strategy construction, both in the public sector as in private. Several ministries have sought the Agency to seek to build solutions in similar molds, as they see great added value by the presence and effectiveness of the works implemented and executed by UNIDO.

This perception is verifiable by the results achieved. The numbers related to the engagement of actors far exceed the objectives established in the project's conception. With the planned resource, the project should also impact a larger territory than expected, in addition to expanding its benefits to the biogas value chain well beyond just applications in the agroindustry. The Midterm Review already indicated this trend, which only consolidated in the following year.

3. Stories to be shared (Optional)

Please provide a brief summary of any especially interesting and impactful project results that are worth sharing with a larger audience, and/or investing communications time in. Please include links to any stories/videos available online.

A project partnership with the Federal District Government (GDF) to work with municipal solid waste might become a mandatory federal policy to assist municipalities, consortiums, states and consulting companies to develop waste treatment projects.

In 2019, a partnership was signed with the Federal District Government to prepare a bid proposal for three mechanical and biological treatment units, to treat more than 690,000 tons of garbage annually, not segregated at source, and deliver proposals for laws and other regulations to support bidding execution, integrating biogas and biomethane in the local energy policy and digestate in the agricultural policy.

During this activity, it was identified that waste treatment is an important demand from the municipalities needing assistance to structure projects regarding waste management in most of the country, despite the current legislation already requiring proper waste destination.

In this sense, the project worked with the federal and local agencies to identify these bottlenecks and seek solutions that would help these entities, while not overlapping with other ongoing activities, but complementing existing activities to use the knowledge acquired with the GDF to develop solutions .

In this way, a methodology and a tool were developed to automate the analyzes, evaluating optimized technological routes for waste treatment, comparing and generating recommendations for the study of technical, economic and environmental feasibility, in line with the legal aspects of waste treatment. The methodology and the tool also incorporated results from the Protegeer Project and recommendations from the Ministry of Development.

Currently, the methodology and the tool are being consolidated and applied in case studies. Due to the good progress, the Ministry of Development and the Ministry of Economy are considering incorporating both of them as mandatory for waste treatment projects. The FEP (Fund for Project Structuring) and ANA (National Water Agency) are also considering applying them throughout the national territory.

EXPLANATORY NOTE

1. **Timing & duration:** Each report covers a twelve-month period, i.e. 1 July 2021 – 30 June 2022.
2. **Responsibility:** The responsibility for preparing the report lies with the project manager in consultation with the Division Chief and Director.
3. **Evaluation:** For the report to be used effectively as a tool for annual self-evaluation, project counterparts need to be fully involved. The (main) counterpart can provide any additional information considered essential, including a simple rating of project progress.
4. **Results-based management:** The annual project/programme progress reports are required by the RBM programme component focal points to obtain information on outcomes observed.

Global Environmental Objectives (GEOs) / Development Objectives (DOs) ratings	
Highly Satisfactory (HS)	Project is expected to achieve or exceed <u>all</u> its major global environmental objectives, and yield substantial global environmental benefits, without major shortcomings. The project can be presented as “good practice”.
Satisfactory (S)	Project is expected to <u>achieve most</u> of its <u>major</u> global environmental objectives, and yields satisfactory global environmental benefits, with only minor shortcomings.
Moderately Satisfactory (MS)	Project is expected to <u>achieve most</u> of its major <u>relevant</u> objectives but with either significant shortcomings or modes overall relevance. Project is expected not to achieve some of its major global environmental objectives or yield some of the expected global environmental benefits.
Moderately Unsatisfactory (MU)	Project is expected to achieve <u>some</u> of its major global environmental objectives with major shortcomings or is expected to <u>achieve only some</u> of its major global environmental objectives.
Unsatisfactory (U)	Project is expected <u>not</u> to achieve <u>most</u> of its major global environmental objectives or to yield any satisfactory global environmental benefits.
Highly Unsatisfactory (HU)	The project has failed to achieve, and is not expected to achieve, <u>any</u> of its major global environmental objectives with no worthwhile benefits.

Implementation Progress (IP)	
Highly Satisfactory (HS)	Implementation of <u>all</u> components is in substantial compliance with the original/formally revised implementation plan for the project. The project can be presented as “good practice”.
Satisfactory (S)	Implementation of <u>most</u> components is in substantial compliance with the original/formally revised plan except for only few that are subject to remedial action.
Moderately Satisfactory (MS)	Implementation of <u>some</u> components is in substantial compliance with the original/formally revised plan with some components requiring remedial action.
Moderately Unsatisfactory (MU)	Implementation of <u>some</u> components is <u>not</u> in substantial compliance with the original/formally revised plan with most components requiring remedial action.
Unsatisfactory (U)	Implementation of <u>most</u> components is <u>not</u> in substantial compliance with the original/formally revised plan.
Highly Unsatisfactory (HU)	Implementation of <u>none</u> of the components is in substantial compliance with the original/formally revised plan.

Risk ratings	
Risk ratings will assess the overall risk of factors internal or external to the project which may affect implementation or prospects for achieving project objectives. Risk of projects should be rated on the following scale:	
High Risk (H)	There is a probability of greater than 75% that assumptions may fail to hold or materialize, and/or the project may face high risks.
Substantial Risk (S)	There is a probability of between 51% and 75% that assumptions may fail to hold or materialize, and/or the project may face substantial risks.
Moderate Risk (M)	There is a probability of between 26% and 50% that assumptions may fail to hold or materialize, and/or the project may face only moderate risk.
Low Risk (L)	There is a probability of up to 25% that assumptions may fail to hold or materialize, and/or the project may face only low risks.