UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

SUSTAINABLE DEVELOPMENT GOALS

Project Implementation Report

(1 July 2022 – 30 June 2023)

Project Title:	*Reduction of Green House Gas Emission through Promotion of Commercial Biogas Plants*
GEF ID:	*5421*
UNIDO ID:	*120118*
GEF Replenishment Cycle:	*GEF-5*
Country(ies):	*Cambodia*
Region:	*SA - Southeast Asia*
GEF Focal Area:	*Climate Change Mitigation (CCM)*
Integrated Approach Pilot (IAP) Programs[1]:	*IAP – Commodities, IAP – Cities or IAP – Food Security*
Stand-alone / Child Project:	*Stand-alone*
Implementing Department/Division:	*ENE / CTI*
Co-Implementing Agency:	*N/A*
Executing Agency(ies):	*Ministry of Agriculture, Forestry and Fisheries (MAFF)* *Ministry of Environment (MOE)* *Foreign Trade Bank of Cambodia (FTB)*
Project Type:	*Medium-Sized Project (MSP)*
Project Duration:	*48 months*
Extension(s):	*1st: from 22 May 2019 to 22 May 2020* *2nd: from 22 May 2020 to 31 Dec 2021* *3rd: from 1 Jan 2022 to 31 Dec 2022*
GEF Project Financing:	*USD 1,500,499*
Agency Fee:	*USD 142,547*
Co-financing Amount:	*USD 12,504,265 (cash +in-kind)*
Date of CEO Endorsement/Approval:	3/25/2015
UNIDO Approval Date:	5/7/2015
Actual Implementation Start:	5/22/2015
Cumulative disbursement as of 30 June 2022:	USD 1,499,822.32
Mid-term Review (MTR) Date:	*Not applicable*
Original Project Completion Date:	5/22/2019
Project Completion Date as reported in FY21:	12/31/2021

[1] Only for **GEF-6 projects**, if applicable

Current SAP Completion Date:	12/31/2022
Expected Project Completion Date:	12/31/2022
Expected Terminal Evaluation (TE) Date:	8/30/2021
Expected Financial Closure Date:	6/30/2023
UNIDO Project Manager[2]:	*Jossy THOMAS*

I. Brief description of project and status overview

Project Objective

The UNIDO/GEF project focuses on promoting the production and use of biogas technology for electricity generation as an alternative energy source to replace diesel usage in commercial animal farms. At the same time the project has the potential for reducing methane emission from animal waste and converting it to energy for productive uses. This area was selected due to its potential to allow for rapid up-scaling and at the same time for reduction of greenhouse gas (GHG) emissions. This is in line with the GEF-5 Climate Change Focal Area Strategic Programme CCM-3: Promoting investment in RE technologies.

The project acts locally, but it solves global issues and brings clean electricity, capacity building plus a number of socioeconomic and environmental co-benefits.

The project consists of four components:

1. Creating awareness on climate change (CC) and building capacity in commercial biogas based mini-grids
2. Creating enabling environment for investments in commercial biogas technology
3. Demonstration of biogas based mini-grid technologies in commercial farms
4. Monitoring and Evaluation

Project Core Indicators		Expected at Endorsement/Approval stage
1	Cumulative Installed capacity of the biogas power plant (MW)	1 MW
2	Greenhouse Gas Emissions Mitigated during Lifetime of the biogas power plant (metric tons of CO2e)	1,348,707 tCO2e

Baseline

Cambodia is a country with one of the lowest electrification rates in Asia, owing to its poor investments in the electricity sector and inadequate exploitation of available renewable energy (RE) resources. In 2015, only 40% of the rural population was connected to the grid network. Around 55% of the rural population uses automobile batteries to meet their electricity demand, 3% use individual power generating units and the remaining 36% has no access to electricity. In the absence of a grid network, the small independent

[2] Person responsible for report content

private entrepreneurs i.e., REEs, supply electricity to nearby areas using diesel generators to meet the rural electricity demand. Usage of diesel generators further increases the vulnerability to climate change. Diesel generators accounts for around 60% of all the electricity generation capacity. This project targets animal farms, since most of them dispose their waste in open pits causing large amounts of methane emissions. This contributes not only to risks for the health, but is also detrimental to groundwater quality attributable to seepage of such wastes into the water table. In addition, uncontrolled livestock waste management causes significant air pollution around the farms.

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 management[3], 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.

Overall Ratings[4]	**FY23**	**FY22**
Global Environmental Objectives **(GEOs)** / Development Objectives **(DOs)** Rating	*Highly Satisfactory (HS)*	*Highly Satisfactory (HS)*
• 2 pig farms (M's Pig ACMC and Prak Sophal farm) and 1 starch processing factory (Song Heng) has co-financed the investment of deploying a biogas system within their facility. Total cumulative capacity of biogas-based power generation plant installed is 2 MW. ○ M's Pig ACMC farm (640 kW biogas system) ○ Song Heng Starch Factory (1,120 kW biogas system) ○ Prak Sophal farm (240 kW) ○ Sok Nalen farm (300 kW).		
Implementation Progress **(IP)** Rating	*Highly Satisfactory (HS)*	*Highly Satisfactory (HS)*
The project achieved and surpassed its implementation target and objectives		
Overall **Risk** Rating	*Low Risk (L)*	*Low Risk (L)*
The project is successfully completed		

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.

Project Strategy	KPIs/Indicators	Baseline	Target level	Progress in FY23
Component 1 – Creating awareness on climate change (CC) and building capacity in commercial biogas based mini-grids				
Outcome 1: Human and institutional capacity available on commercial biogas based mini-grids				

[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

[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

Output 1.1: A Technical information Centre for commercial biogas power plants established	1. Information &Technical Centre on biogas established. 2. Implemented business plan and annual work plan for the Centre	Lack of biogas based electricity generation information & technical centre	Information &Technical Centre established with qualified personnel and equipped with adequate tools and systems	• BTIC carries out periodic and preventive maintenance schedule for the pilot digesters according to the user manual (repainting metal parts, cleaning, etc.) and it is in the process of producing a short video on the O&M of the pilot digesters as knowledge management tool for the Center and prolong the life span of the digesters.
Output 1.2: Capacity developed among policy makers, project developers and financial institutions on commercial biogas based mini-grids	1. Number of policy makers, project developers and financial institutions trained 2. Number of women trained	Inadequate capacity among the policy makers, project developers and financial institutions	1. At least 10 personnel trained on biogas technology from each of the identified groups 2. To target at least 20% women participation in each group	No new progress in this FY 23
Component 2 – Creating enabling environment for investments in commercial biogas technology				
Outcome 2 1: Established financing facility and increased involvement of farm owners and financing institutions in commercial biogas technology				
Output 2.1: Soft loan facility established for commercial biogas- based electricity generation power plants	Incentive scheme stablished and soft loan available	No existing soft loan facility	At least one soft loan facility designed	No new progress in this FY 23
Component 3 – Demonstrating biogas based mini-grid technologies in commercial farms				
Outcome 3: Established biogas based rural electricity enterprises (REEs)				
Output 3.1: Bankable feasibility study report prepared for 11 participating farms	Project progress status	Lack of bankable feasibility study reports for further project development	Detailed plant design reports for the participating farms	No new progress in this FY 23.
Output 3.2: Incentive mechanism established for investors of commercial biogas plants	USD incentives based on incremental cost principle to Biogas projects	Inadequate financing facilities to attract investments in Biogas projects	Establish incentive scheme with GEF grant for the participating farms and potential investors	• A RBF grant was issued to Mr. Sok Nalen farm to provide incentive to the tune of USD 12,000 in order to finance the biogas project
Output 3.3: Cumulative of at least 1MW of biogas based mini-grid established at participating farms	MW of installed capacity	No biogas power plant at medium to large scale animal farms	At least cumulative 1 MW biogas power plant should be established at the end of the project	No new progress in this FY 23.
Component 4 – Monitoring and evaluation (M&E)				
Outcome 4: Effectiveness of the outputs assessed, corrective actions taken and experience documented				
Output 4.1: Mid-term M & E report prepared				No new progress in this FY 23.
Output 4.2: Experience and information dissemination workshop and publication and websites				No new progress in this FY 23.

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.

	(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	Technical risk: Biogas generations in medium and large-scale commercial farms are not common in Cambodia.	Low risk (L)	Low risk (L)	Capacity building will mitigate the technical risk. As Cambodia already has the technology for domestic biogas units, further improvement on development of commercial biogas units can be achieved with lesser difficulty. Moreover, a Technical Service Centre for commercial biogas power plants will be established at Department of Animal Health and Production of MAFF. This centre will provide continuous technical support on design, development, operation and maintenance of commercial biogas power plants even beyond the project duration.	• In close cooperation with the General Department of Animal Health and Production and Biogas Technology and Information Center (BTIC) organized following awareness raising events including trainings: o Social and Legal Aspects of Biogas Project in Cambodia on 22 Jul 2021, via Zoom was organized with participation of 25 stakeholders of which seven were female. o Training for policy makers: accelerating adoption of commercial biogas plants in Cambodia: policy and financing opportunities was held on 18 Aug 2021 via Zoom with participation of 25 stakeholders of which five were female. o Training workshop 'Financing of commercial biogas system in Cambodia for financial institutions was held on 09 Sept 2021 via Zoom for 30 stakeholders of which 10 were female participants. o A webinar series consists of 4 webinars: Webinar 1: Introductory to commercial biogas technology; Webinar 2: The criteria for the development of model animal farms that include biogas systems as waste management solution ; Webinar 3: Good O&M practices of bio-digesters and biogas power facilities part 1; Webinar 4: Good O&M practices of bio-digesters and biogas power facilities part 2 • Beside awareness raising events, upon the request of owners of pig farms that have existing biogas plants, BTIC has also extended its technical assistance in checking performance of biogas power plants that are not part of the project demonstration sites to ensure that those biogas plants operate well in accordance to the technical requirement (news can be found here: https://btic-rua.org/pages/view_news/85)	☐
2	Market risk: No off-takers to adapt to biogas technology at commercial level	Low risk (L)	Low risk (L)	The demand supply gap is high in Cambodia for the commercial biogas technology.	• Learning from its first demo project, M's Pig ACMC farm has invested in upgrading its biogas power plants in other farms that are not part of the project. The farm has deployed a complete set of commercial biogas technology that consists of key components including covered lagoon biodigester, desulfurization unit, and biogas genset (https://www.youtube.com/watch?v=Tu3NtuogugA&t=98s) • A few more existing biogas power plants have been equipped with desulfurization units with the farm's investment.	☐
3	Financial risks: Financial / credit constraints prevent investors from investing in the project.	Low risk (L)	Low risk (L)	Soft loan will be established for supporting biogas based mini-grids investments.	• With support from the project, BTIC signed two Memorandums of Understanding (MOU) with two financial institutions. One MOU was signed with Cambodia Postbank to consider financing biogas projects in the country. Another Memorandum of Understanding (MOU) was signed with Credit Guarantee Corporate Cambodia (CGCC) to provide the guarantee scheme to farm owners who want to borrow money from the bank without collateral to finance biogas projects.	☐
4	Sustainable operation risk: Application of biogas technology might be halted by the shortage of inputs. The sustainability of mini-grids is often highly dependent upon the efficient operation and	Modest risk (M)	Low risk (L)	The installations will be done only after conducting a proper resource assessment study in order to ensure the supply of wastes from animal farms. All the O&M staff of the demonstration projects will be trained by the	• According to a statistic of commercial produced by the General Department of Animal Health and Production (GDAHP), commercial swine farm shared in total swine production has increased 59% in 2021 from 55% in 2020. This increase would ensure the availability of feedstock. Meanwhile, with the new Policy on Biodigester Development in Cambodia 2021-2030 in place, the sector will be enhanced. • In addition, at the request of GDAHP, the project is in close cooperation with the Biogas Institute of Ministry of Agriculture and Rural Affairs, People's Republic of China	☐

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

	maintenance systems along with effective tariff recovery schemes.			respective suppliers. In addition, local engineering and O&M companies will be trained in O&M of biogas based mini-grid plants. Efficient tariff recovery schemes will be implemented to ensure the financial sustainability of the mini-grids.	and the Biogas Technology and Information Center (BTIC) of Royal University of Agriculture, the Kingdom of Cambodia, to update the drafted technical norms for domestic scale biodigesters (DSB) as well as small, medium and large scale covered lagoon biodigester (SMLSB). The final technical norms will provide technical guidelines on the requirements of Design, Construction, Inspection, Start-up, Operation, Maintenance and Safety for DSB and covered lagoon SMLSB. • National Cassava Policy 2020-2025 has also encouraged agro-processor to process more starch-based product in the country and it encourages agro-processor to invest in biogas technology to reduce production costs. • The biogas project is being realized based on detailed techno-economic feasibility studies of commercial biogas systems, which were carried out thoroughly looking at several important factors determining technical and economic feasibility of biogas production such as farm scale, fluctuating waste availability, on-site energy demand and returns for electricity produced particularly for onsite consumption. • Operation and Maintenance (O&M) training and manual for installed biogas system made available to the operator of farms/factory. Furthermore, a list of available biogas engine repairers, covered lagoon constructor as well as local suppliers were documented and shared to the farms/factory when needed.	
5	Operation risk: Demonstration plants face operational problem due to lack of training to the operators.	Low risk (L)	Low risk (L)	Capacity building at all levels is included in the project which will mitigate this risk.	• No operational risk encountered yet. • Operation and Maintenance (O&M) training and manual for installed biogas system were provided to the farms/factory. • Demo projects were visited by BTIC at least 2 times from the day of installation and commencement. According to the O& M plan, at least 3 times monitoring schedules to be carried out by BTIC to inspect the performance of all biogas equipment before the contract with individual demo project concluded. • Demo projects are contacted via telegram, and information and technical assistance are provided on the regular basis. Those demo projects were invited to all trainings which were organized by BTIC.	☐
6	Co-financing mobilization risk: Co-financing not being committed by the co-financiers	Low risk (L)	Low risk (L)	Letter of commitment will be obtained from the co-financiers to ensure their financing for the project.	• All participating farms and factory have provided co-financing reports to the project during the evaluation process.	☐
7	Climate Change risk: Flooding	Low risk (L)	Low risk (L)	Biogas plant and site office will be located on an elevated area to prevent flooding. All buildings and structures will be designed and built appropriately to avoid flooding.	• Participating farms and factory have constructed proper genset houses and deployed operators to oversee the whole biogas power plants to ensure that the plants are working properly and to detect any potential risks or abnormality.	☐
8	Newly defined risk: Drop in baseline fuel prices: Diesel prices has dropped by 40-50% compared to the prices at the time of project document preparation. This strongly affects financial viability of	Substantial risk (S)	Low risk (L)	As diesel fuel is imported into Cambodia its price is unpredictable, however, the future oil price is expected to be expensive (assuming that it is a nonrenewable source of energy).	• During the reporting period, Cambodia experiences the increase in diesel price from 3,750 riel ($0.92) per litre in December 2021 to 6,100 riel or $1.50 per litre in June 2022[6]. Meanwhile, with the modernization of the swine raising sector which requires all farms to equip with EVAP system that requires more electricity, the owners of the farms and other agro-processing facilities are willing to explore more biogas potential to reduce the electivity bills. • The implementation of the government's Prakas 549, which requires commercial livestock farms to properly manage waste and animal manure by building	☒

[6] https://www.phnompenhpost.com/business/petrol-diesel-rates-increased-5800-6100-riel-ministry

	biogas systems leading to increased difficulty to convince the farmers to adopt biogas technology			Optimization in biogas system designs will be able to optimize cost without compromising performance of the technology. Also when more units of biogas technology are installed, more awareness from farmers, enabling environment and policy for biogas technology, perceived risks and costs by farmers will be decreased leading to more convenience in adopting the technology. In addition, the project seeks to develop a financial mechanism that will incentivize the adoption of biogas by offsetting partially the low oil price. Moreover, discussions will be sought with the government to promote adoption of a special tariff for biogas so that it can be competitive with electricity produced from oil.	biodigesters, as well as the new Policy on Biodigester Development in Cambodia 2021-2030, encourage owners to invest in this biogas technology.	
9	Newly defined risk: Rapid grid expansion and unfavorable policy to purchase biogas power. Grid network expansion has happened more rapidly than planned even in areas where grid network was unlikely to reach. Electricité du Cambodge (EdC), the national power utility, is only willing to buy electricity during dry season (6 months per year) at a very low price. Due to the rapid grid expansion and the fact that most licenses to distribute and supply electricity to rural households have already been granted might make it necessary to rethink the incremental reasoning of the project.	Modest risk (M)	Modest risk (M)	The project has a component on capacity building and sharing of policy inputs. Demonstration of biogas power will emphasize biogas power integration to the grid network. This will contribute to better understanding on how biogas power/renewable electricity can be integrated to national grid. In addition, Ministry of Mines and Energy with support from Scaling UP Renewable Energy Program (SREP) of Climate Investment Fund will assess and hopefully reform the existing grid code. National Council for Sustainable Development (NCSD), UNIDO, UNDP and other development partners/NGOs also participate in Informal Working Group Meetings on Sustainable Energy (IWGM-SE) to share	• With support from JICA, Cambodia is preparing the Kingdom's transition to clean energy and a roadmap to carbon neutrality[7]. • With recently approved policy on Biodigester Development in Cambodia 2021-2030 in place, the General Directorate of Animal Health and Production (GDAHP) of Ministry of Agriculture, Forestry and Fisheries (MAFF) will liaise with the Ministry of Mines and Energy (MME), especially Electricité Du Cambodge (EDC) on the development of a feed-in tariff policy enabling the sale of biogas-electricity to the grid against attractive rates or allowing its sale directly to nearby households at the same rates as local private and/or state suppliers. The brief inventory on the existing biogas systems in the pig farms has been documented by GDAHP and shared with MME in late 2021.	☒

[7] https://www.phnompenhpost.com/national/japan-help-cambodia-roadmap-carbon-neutrality

				and advocate better renewable energy policy and practices. These parallel activities will help advocate renewable energy policy reform.		
10	Newly defined risk: Animal disease: Pig farms are not investing in biogas systems due to the current outbreak of the African Swine Fever (ASF). Since ASF is posing serious risk to their business farms have temporarily stopped pig raising, or are stopping any additional unnecessary investment.	Substantial Risk (S)	Modest risk (M)	The project has sent project progress report with the emphasis on the need to diversify other locally available feedstocks beyond piggery farms to PSC and it is agreed to pursue the possibility of potential feedstocks generated from other agro-processing sectors including cassava starch, palm oil, and sugar	• Although the swine industry is still under threat from African Swine Fever (ASF), it is better prepared than it was during the first attack. Many swine farms have been converted to closed barns and are equipped with modern infrastructures that adhere to biosecurity protocols, significantly lowering the risks. This is supported by a statistic reported in the General Department of Animal Health and Production's (GDAHP) annual progress report, which shows an increase in commercial swine farms from 55% in 2020 to 59% in 2021. • The project is still looking for a new sector to work in. For example, in collaboration with BTIC, the project is investigating the biogas potential of fishery processing enterprises. • The project remains proving assistance to the demo project that is a cassava starch processing factory.	☒
11	Newly defined risk: Covid-19 pandemic:	Substantial Risk (S)	Low risk (L)	COVID 19 community outbreak called "20th February Event 2021" has made situation critical. Each day, a few hundred people tested COVID 19 positive and fatality rate has also increased. With preventive measures in place, the project holds essential physical meeting with a few participants, especially with project developers/farms and or factories at UNIDO office or at farm/factory location. Virtual/ digital ways of carrying out works have been adapted.	• The project adheres with "new normal" protocols. Many gathering events, particularly, training or awareness raising events were organized virtually. And for the field visits or small group meetings, all participants are advised to were masks and conduct social distancing when space allows.	☒

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.

N/A

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

N/A

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

Project is operationally complete.

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

N/A

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).

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	*N/A*	*N/A*	*N/A*
(ii) New risks identified during project implementation (if not applicable, please insert 'NA' in each box)	*N/A*	*N/A*	*N/A*

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).

N/A since project is operationally complete.

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

N/A since project is operationally complete.

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

N/A since project is operationally complete.

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),.

In relevant technical capacity building activities organized by the project, at least 20% of participants were reported to be women. The following information pertains to the participation of female participants.

- Training on Social and Legal Aspects of Biogas Project in Cambodia on 22 Jul 2021, via Zoom was organized with participation of 25 stakeholders of which seven were female.
- Training for policy makers: accelerating adoption of commercial biogas plants in Cambodia: policy and financing opportunities was held on 18 Aug 2021 via Zoom with participation of 25 stakeholders of which five were female.
- Training workshop 'Financing of commercial biogas system in Cambodia for financial institutions was held on 09 Sept 2021 via Zoom for 30 stakeholders of which 10 were female participants.
- A webinar series consists of 4 webinars were organized in close cooperation with BTIC and the General Department of Animal Production and Health (GDAHP) through the National Biodigester Program (NBP) from March 2022 to 30 June 2022 to further disseminate the good practice of biogas technology and Practical Biogas Plant Development Handbook. The events were participated by around 30-50 participants mainly from 14 provincial biodigester programs, financial institutions, farms owners and biogas and engine technician. Each webinar was attended by at least 7 female participants.

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.

Followings are knowledge management activities / products that have been developed by the project during the reporting period:

Knowledge management activities/ products:

- Social and Legal Aspects of Biogas Project in Cambodia on 22 Jul 2021, via Zoom was organized with participation of 25 stakeholders of which 7 were female.
- Training for policy makers: accelerating adoption of commercial biogas plants in Cambodia: policy and financing opportunities was held on 18 Aug 2021 via Zoom with participation of 25 stakeholders of which 5 were female.
- Training workshop 'Financing of commercial biogas system in Cambodia for financial institutions was held on 09 Sept 2021 via Zoom for 30 stakeholders of which 10 were female participants.
- A webinar series consists of 4 webinars were organized during March to June 2022: Webinar 1: Introductory to commercial biogas technology; Webinar 2: The criteria for the development of model animal farms that include biogas systems as waste management solution; Webinar 3: Good O&M practices of bio-digesters and biogas power facilities part 1; Webinar 4: Good O&M practices of bio-digesters and biogas power facilities part 2
- For each training and webinar, a respective Telegram group was created to share relevant materials and facilitate the exchange of information about the biogas sector. Furthermore, all relevant records of the webinars were made available on the BTIC website.

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

The knowledge management materials produced by the projects have been shared in previous reporting FYs.

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.

Detailed information on the project progress can be found under section II.

During the course of reporting period, though the project has made substantial progress with positive outcomes, it has encountered key challenges as followings:

1. Challenge: Missing confidence in biogas of FIs. FTB and general Banking Sector cautious stance to Biogas since it is a very nascent market in Cambodia, with relatively small credit transactions, perceived low volume business, unclear business models and exit risks, general financial weakness in working capital and guarantees, as well as a general gap in knowledge of the biogas value chain.

Measures taken including:

a) Capacity activities to disseminate knowledge on commercial biogas technology among financial institutions:

b) Two Memorandums of Understanding (MOU) were signed by BTIC with:

1. Cambodia Postbank to consider financing biogas projects in the country.

2. Credit Guarantee Corporate Cambodia (CGCC) to provide the guarantee scheme to farm owners who want to borrow money from the bank without collateral to finance biogas projects.

2. Challenge: commercial biogas technology promotion is hampered by high cost, limited in-country experience and capacity, and unfamiliarity with the technology.

Measures taken including:

a) Under the project's incentive scheme, the purchased equipment has at least 1 year warranty period. All necessary spare parts have been included in the package to ensure the operation of the system.

b) New Policy on Biodigester Development in Cambodia 2021-2030 is in place

c) At the request of GDAHP, the project is in close cooperation with the Biogas Institute of Ministry of Agriculture and Rural Affairs, People's Republic of China and the Biogas Technology and Information Center (BTIC) of Royal University of Agriculture, the Kingdom of Cambodia, to update the drafted technical norms for domestic scale biodigesters (DSB) as well as small, medium and large scale covered lagoon biodigester (SMLSB). The final technical norms will provide technical guidelines on the requirements of Design, Construction, Inspection, Start-up, Operation, Maintenance and Safety for DSB and covered lagoon SMLSB.

2. Please briefly elaborate on any **minor amendments**[8] 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.

☐	Results Framework	**NA**

[8] 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%.

☐	Components and Cost	**NA**
☐	Institutional and Implementation Arrangements	
☐	Financial Management	**NA**
☒	Implementation Schedule	**Previous extensions**
☐	Executing Entity	**NA**
☐	Executing Entity Category	**NA**
☐	Minor Project Objective Change	**NA**
☐	Safeguards	**NA**
☐	Risk Analysis	**NA**
☐	Increase of GEF Project Financing Up to 5%	**NA**
☒	Co-Financing	**Increased co-financing compared to project start**
☐	Location of Project Activities	**NA**
☐	Others	**NA**

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

Total budget: USD 1,500,499
Cumulative disbursement : USD 1,499,910

Co-financing mobilized from participating farms and factory:

Name	*Type of co-financing*	*Amount*	*Reference*
M's Pig Farm	*Cash/Investment*	*USD 151,120*	*Letter of co-financing spent*
	Cash/Investment	*USD 700,893*	
Prak Sophal Pig Farm	*Cash/Investment*	*USD 103,348*	*Letter of co-financing spent*
Song Heng Starch Manufacturer	*Cash/Investment*	*USD 254,348*	*Letter of co-financing spent*

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.

N/A since project is operationally complete.

X. Synergies

1. **Synergies** achieved:

The National Biodigester Program of GDAHP together with BTIC as well as the project has successfully organized a webinar series aimed at raising awareness of biogas technologies and their application in Cambodia.

3. Stories to be shared (Optional)

As a female teacher in the domain of science and technology, Vong Pisey is so content and proud to work

in this field. She has always had the strong desire to support and encourage more women to get involved in various aspects of science and technology, from animal science to the application of waste to energy technologies. Pisey is one of the few women from the rural south of Cambodia to go beyond the barrier of social and cultural norms about women in science to pursue her education and career in science and technology with a full scholarship for her undergraduate and graduate degrees. Since graduating, she has been involved in and contributed to various science-related works, including education though teaching undergraduate students on science subjects and related research activities, climate change and sustainable development. She is currently an official at the Scientific Research Department at Cambodia's Ministry of Education, Youth and Sports.

She participated in a biogas training series organized by the project. Pisey developed her keen interest in renewable energy technologies during her school years in relation to waste management through the utilization of bio-digesters and she continues to be involved in various training and workshops. She has continued to be actively involved with UNIDO-supported training programmes on commercial biogas technologies and proactively puts that knowledge into practice. She has successfully led various environment and development-related projects, including a bio-digester demonstration project for farmers, engaging students and academia in climate change-related research, and a knowledge-sharing workshop on climate change for university students. She keeps promoting biogas technologies through disseminating information to her students and community and through research and development work.

Full story can be viewed here:

https://www.unido.org/stories/teachers-journey-promoting-renewable-energy-related-research-and-development

XI. GEO LOCATION INFORMATION

The Location Name, Latitude and Longitude are required fields insofar as an Agency chooses to enter a project location under the set format. The Geo Name ID is required in instances where the location is not exact, such as in the case of a city, as opposed to the exact site of a physical infrastructure. The Location & Activity Description fields are optional. Project longitude and latitude must follow the Decimal Degrees WGS84 format and Agencies are encouraged to use at least four decimal points for greater accuracy. Users may add as many locations as appropriate.

Web mapping applications such as OpenStreetMap or GeoNames use this format. Consider using a conversion tool as needed, such as: https://coordinates-converter.com
Please see the Geocoding User Guide by clicking here

Location Name	Latitude	Longitude	Geo Name ID	Location and Activity Description
Tonle Basak, Phnom Penh, Cambodia	*13.355229*	*103.854662*		*M's Pig Farm, installation of a 640 kW biogas power plant.*

EXPLANATORY NOTE

1. **Timing & duration:** Each report covers a twelve-month period, i.e. 1 July 2022 – 30 June 2023.

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 all 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 achieve most of its major global environmental objectives, and yields satisfactory global environmental benefits, with only minor shortcomings.
Moderately Satisfactory (MS)	Project is expected to achieve most of its major relevant 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 some of its major global environmental objectives with major shortcomings or is expected to achieve only some of its major global environmental objectives.
Unsatisfactory (U)	Project is expected not to achieve most 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, any of its major global environmental objectives with no worthwhile benefits.

Implementation Progress (IP)	
Highly Satisfactory (HS)	Implementation of all 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 most 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 some components is in substantial compliance with the original/formally revised plan with some components requiring remedial action.
Moderately Unsatisfactory (MU)	Implementation of some components is not in substantial compliance with the original/formally revised plan with most components requiring remedial action.
Unsatisfactory (U)	Implementation of most components in not in substantial compliance with the original/formally revised plan.
Highly Unsatisfactory (HU)	Implementation of none of the components is in substantial compliance with the original/formally revised plan.

Risk ratings	
Risk ratings will access 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.