UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

SUSTAINABLE DEVELOPMENT GOALS

Project Implementation Report

(1 July 2021 – 30 June 2022)

Project Title:	**Organic Waste Streams for Industrial Renewable Energy Applications in India**
GEF ID:	5087
UNIDO ID:	120095
GEF Replenishment Cycle:	GEF-5
Country(ies):	INDIA
Region:	SA - Southeast Asia
GEF Focal Area:	Climate Change Mitigation (CCM)
Integrated Approach Pilot (IAP) Programs[1]:	Not Applicable
Stand-alone / Child Project:	Stand Alone
Implementing Department/Division:	ENE / ESI
Co-Implementing Agency:	Not Applicable
Executing Agency(ies):	United Nations Industrial Development Organization (UNIDO)
Project Type:	Full-Sized Project (FSP)
Project Duration:	60 months (At Start)
Extension(s):	1 (30 months)
GEF Project Financing:	US$ 3,333,000
Agency Fee:	US$ 316,635
Co-financing Amount:	US$ 18,215,000
Date of CEO Endorsement/Approval:	2/25/2015
UNIDO Approval Date:	3/18/2015
Actual Implementation Start:	4/30/2015
Cumulative disbursement as of 30 June 2022:	US$ 2,664,326
Mid-term Review (MTR) Date:	11/11/2019
Original Project Completion Date:	4/30/2020
Project Completion Date as reported in FY21:	12/31/2022
Current SAP Completion Date:	12/31/2022
Expected Project Completion Date:	12/31/2023

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

Expected Terminal Evaluation (TE) Date:	11/1/2023
Expected Financial Closure Date:	6/30/2024
UNIDO Project Manager[2]:	René VAN BERKEL

I. Brief description of project and status overview

Project Objective

The overall objective of the project is to increase the use of industrial, commercial and/or municipal organic waste streams for industrial scale bio-methanation for renewable energy (RE) applications in Small and Medium Enterprises (SMEs) to achieve renewable energy, environment and climate targets. The project, therefore, promotes the application of innovative and adaptive technology and business models in the target SME sectors to reduce their dependency on fossil fuels, whilst also managing organic wastes in environmentally sound manners. The project contributes to the GEF Climate Change Strategic Objective 3: Promote investment in renewable energy technologies. The project sets out to transform the market by using organic wastes for SME industrial energy applications in India by facilitating investment in organic waste to industrial energy projects, through technology and market demonstration, development of appropriate financial support mechanisms/instruments, development of technical specifications, capacity building and by strengthening the policy and regulatory environment. Industries in India, many of which are energy intensive and generate large quantity of organic waste from their processes can benefit from implementation of bio-methanation (production of biogas).

Project Core Indicators	Expected at Endorsement/Approval stage
Cumulative direct reduction of GHG over the period 2015-2035 (20 years)	228,000 tCO_{2eq}
Energy generated annually from biogas through projects installed over the period 2015- 2035	16.310 MWh
Installed power generation capacity	3.7 MW_{eq}

Baseline

The National Master Plan (NMP) for development of waste-to-energy in India was developed in 2002 by the Ministry of New and Renewable Energy (MNRE) under the UNDP-GEF bio-methanation project. This identified 14 organic waste generating industries which had a high potential for renewable energy generation at the time estimated to total 1,997 MWe by 2017. The analysis showed that bio-methanation could be technically and commercially viable in food processing, pulp and paper, breweries, distilleries, tanneries, cattle, poultry and cassava sectors.

The NMP provided the baseline project since it provided the ground work for the organic waste to energy (OWTE) developments in India. In line with the NMP, MNRE had undertaken a number of programmes in the area of recovery of energy from urban and industrial wastes, including incentive schemes to trigger and accelerate the deployment of biogas projects. The baseline government support programme (energy from urban, industrial and agricultural wastes/residues during 12th Plan period, 2012-2017 included incentive schemes for industrial waste bio-energy generation (up to 20% capital grant with an upper cap or 40% in sewage treatment plants) which did contribute to expanded biogas only projects, subject to a number of eligibility criteria, conditions and caps. The programme was implemented through state nodal agencies and was applicable to developers to set-up waste to energy projects on the basis of Build, Own and Operate (BOO), Build, Own, Operate and Transfer (BOOT), Build, Operate and Transfer (BOT) and Build, Operate, Lease and Transfer (BOLT)

The major success of MNRE programmes had been in power generation predominantly by large-scale

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industries. As for smaller-scale projects, there had been three national programmes supporting biogas and waste to energy from MNRE. These programmes primarily targeted small scale biogas (family or community size and <250kW). There had been limited uptake by SMEs which, due to their small- scale nature, typically required further technical support for the introduction of innovative technologies.

As part of the PPG phase the 14 sectors of the NMP were further studied to select priority SME sectors with the most promising potential for the use of organic waste streams for bio-methanation. This resulted in four prioritised sectors where, despite large potential, the existing organic waste resource remained largely unexploited for energy conversion. These four sectors were poultry, sugar, fruit and vegetable and cattle sectors.

The stakeholders' consultations during the PPG identified several key barriers including: limited awareness about the biogas waste to energy technologies and its potential benefits; limited demonstration projects providing practical evidence of feasibility in these four industrial sectors; seasonal availability of wastes; lack of innovations and application of (international) best techniques; inadequate and poor experience in design and construction of biogas projects among biogas technology and project developers; capital intensive nature (high establishment costs); high Operation and Maintenance (O&M) cost of biogas technology; limited availability of equity and loans; lack of funding support from financial institutions due to low return on investments and high perceived risk and limited knowledge about biogas business models.

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]	**FY22**	**FY21**
Global Environmental Objectives **(GEOs)** / Development Objectives **(DOs)** Rating	*Satisfactory (S)*	Moderately Satisfactory (MS)
The four innovative demonstration projects currently being constructed with technical and financial support of the project have a cumulative capacity of 5.3 MW. Once all four operate at full capacity the annual energy generation may approach double the project's target.		
Implementation Progress **(IP)** Rating	*Moderately Satisfactory (MS)*	Moderately Unsatisfactory (MU)
After the unfortunate delays in operationalization of the Project's financial support mechanism for innovative demonstration projects during 2019-2021, four demonstration projects have now been selected and approved and their construction had started at the end of the current reporting period.		
Overall **Risk** Rating	*Moderate Risk (M)*	Moderate Risk (M)

[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

The project demonstrates a diversity of innovative bio-methanation technologies for mixed feedstocks, which carry limited techno-economic performance risks which are expected to be resolvable during start up and commissioning with the technical expertise already mobilized by the project.

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 – Enhanced use of organic waste streams for industrial RE applications in target SME sectors through a strategic roadmap.				
Outcome 1: Enhanced use of organic waste streams for industrial RE applications in target SME sectors through a strategic roadmap.				
Output 1.1.1: An updated and tailored roadmap for increased use of waste-to-energy practices in the target SME sectors	• NMP for organic waste to energy	• NMP not updated since 2002	• New NMP to 2027 published	The inventory of organic wastes from the four identified industrial sectors in the project namely cattle farming, sugar, poultry and fruit food vegetable processing and five additional sectors: sugar, pulp and paper; slaughterhouses; urban waste and urban sewerage at state and district level across India is completed. The GIS based tool enabling geographical mapping of the organic waste generation and its potential energy generation launched during the webinar conducted on the world biofuel day 10 August 2021 Several initiatives, schemes launched by the other ministries such as Ministry of Oil, Petroleum and Natural Gas (MoPNG), Ministry of Housing and Urban Affairs (MoHUA), Ministry of Chemicals and Fertilizers (MoCF) are also supporting the applications of biogas technology and therefore sharing of achievements and innovative technologies is pursued as well as their involvement in the development of the National Master Plan (NMP) and Strategic Action Plan (SAP) along with the Ministry of New and Renewable Energy (MNRE). The work is in progress on supporting the MNRE OWtE initiatives. PSC (at its 2nd meeting) decided that certificate of authenticity is not required.
	• Specific Revised strategic action plan/road map for organic waste to energy for SMEs	• No clear strategies for SMEs	• Clear action plan for organic waste to energy for SMEs	
	• Certificate of authenticity from government for support programmes	• No certificate issued prior to subsidy allocation	• Certificate of authenticity for support programmes prepared	
Component 2 – Demonstration of the most relevant financially feasible technologies in selected sectors				
Outcome 2.1: Demonstrated technical and financial viability of projects in the range of 0.25 – 2 MW (or equivalent thermal energy)				
Output 2.1.1: Techno-financial and strategic assessment of most suitable business models	Number of assessments of business and technology models available	No assessments of appropriate models carried out	2-3 models assessed appropriate for the four priority sectors	The ToR for the techno financial and strategic assessment of most suitable business model is developed. The targeted models will be developed during the remaining project duration
Output 2.1.2: A 'Consolidation Matrix' on appropriate financial models and schemes suitable for	Matrix on appropriate financial models	No matrix available to assist in selecting appropriate financial model	Matrix developed	The agreement between UNIDO and IREDA was finalized in July 2021 which appointed IREDA as the Fund Manager for the project's interest subvention scheme.

SME financing for innovative technology financing in SMEs	Due diligence guidelines for organic waste to energy projects	No due diligence guidelines developed	Due diligence guidelines for the different Technologies developed	This financial support scheme to demonstrate the innovations in biogas technology and business models was launched during webinar held on the 2021 world biofuel day (10 August 2021). The development of due diligence guidelines for organic waste to energy projects is underway. Expert Advisory Group (EAG) has been established.
	Establishment of a Technical Advice Committee to advise on technical merits of projects	No Technical Advice Committee in existence	Technical Advice Committee established made up of 5 experts	
Output 2.1.3: Detailed technology packages with specifications for identified technologies for target sectors (food processing, poultry, cattle and sugar-press mud) and applications (thermal, power, bio-CNG) and applications (e.g. thermal, power, bio-CNG)	Number of technology packages developed for the priority sectors	No technology packages or guidelines developed for SMEs in priority sectors	4 Technology packages and guidelines (one per sector)	This activity has started and gathering inputs from outputs 2.1.4 – which is presently under the implementation.
	Guides on developing markets for by-products	No guides for market development of by-products	Guides developed for market development for bio-CNG and organic fertiliser	
	Standardised financial and technical parameters for reporting in DPRs	No standardised parameters for feasibilities and DPRs	Standardised financial and technical parameters for reporting in DPRs	
Output 2.1.4: 2-4 innovative organic waste to energy projects installed and operating in selected SME sectors	Number of organic waste to energy projects implemented with support from GEF Number of innovative technologies Number of co-digestion systems	 No innovative systems installed No systems designed as co-digestion	2-4 additional projects implemented with direct support from GEF. 2-4 innovative technologies included 1-2 co-digestion systems installed	The financial support package was launched on 10 August 2021. Total 46 applications were received before the deadline of 31 August 2021 to demonstrate innovations in bio-methanation technology and business models. The Expert Appraisal Group (EAG) submitted the final assessment of the applications on 12 November 2021. The four projects were selected in the Project Executive Committee (PEC) meeting held on 1 December 2021 based on the scores awarded by the EAG in order of merit. The total installed capacity of 4 selected projects is 5.3 MW equivalent and will be demonstrating innovations such as Solid-State Anaerobic Digestion (SSAD) or dry digestion technology using thermophilic process, new biogas upgradation systems including microbial desulphurisation and Medium Pressure Swing Adsorption (MPSA), a combination of Pressure Swing Adsorption (PSA) and Membrane Filtration technologies, new feedstock handling system used for layered storage of press mud and paddy straw and so on The selected projects are presently under construction.
	Installed capacity of new organic waste to energy projects (MW)	0 installed	Installed capacity of more than 3.7 MW	
	Performance monitoring, evaluation reports and case studies on each GEF supported project	No dissemination material on organic waste to energy for SMEs	2-4 case studies	
Component 3 – Scale up of technologies in organic waste to energy applications in industry				
Outcome 3.1: Sustainable replication model for effective scaling up of different technologies across target industries				
Output 3.1.1: Development of database and tools to identify and help SMEs to invest in innovative biogas projects	A master database of potential SMEs/ Industries for bio-methanation technology adoption Standardised long-term feedstock supply agreement	No national database of potential for SMEs and biogas Informal/non-standardised Feedstock supply agreements	Master database developed for 4 priority sectors Standardised long term feedstock supply agreement developed	The waste resource mapping at the district level across India for the original four and additional five priority sectors has been completed and published. The information is directly accessible to project developoers through online district-level GIS map accessible through https://bio-energy.isid4india.org/ The development of standardized long-term feedstock supply agreement is in progress.
Output 3.1.2: Specific financing mechanism established to reduce risk for investing in innovative	Financing facility established Quantity (USD) of	No financing facility available for organic waste for energy for SMEs	A financing facility established	There are still insufficient learnings (from project and/or otherwise) to guide establishment of post project financing facility. Targets can potentially still be achieved

biogas projects and sources of funds secured to ensure a healthy project pipeline	funding identified	No dedicated funding for organic waste to energy	10 MUSD identified as partial risk guarantee	
Output 3.1.3: Framework for Service Support Networks in different sectors/clusters set up	No. of service support networks	No service support networks dedicated to organic waste streams	More than 10 service support networks established	Activity has not started yet, needs input from outcome 2.1.
Output 3.1.4: Quality standards, performance guidelines, and a standardization framework for innovative biogas projects in SMEs in place	Needs assessment and roadmap for quality infrastructure for bio-methanation plants in SMEs (both for technology and for the outputs from technology)	No assessment or roadmap for the quality infrastructure for bio-methanation	Needs assessment and roadmap for quality infrastructure for technology components Needs assessment and roadmap for quality infrastructure for biogas products	Activity has not started yet, development of contracts can partially be done in parallel with pilots, but finalized only with sufficient learnings from outcome 2.1. This output can be partially achieved in the remaining project period, but not tested.
Component 4 – Capacity building of public and private sector stakeholders				
Outcome 4.1: Enhanced capacity of key players in target industries, promotion of knowledge and information sharing and dissemination of best practices				
Output 4.1.1: Enhanced awareness and knowledge in key players in target 30 – 50 SMEs, 20 – 30 banks/FIs, technical institutions, manufacturers and other service providers in each of the selected states.	No. of training sessions targeted at financial institutes	None	Nine training sessions	4th PSAC meeting instructed UNIDO to freeze capacity building activities under project and channelize additional project funding to technology demonstrations. The discussions with MNRE are underway to finalize the amount of additional project funding support to the demonstration projects, whilst maintaining originally agreed project outputs.
	No. of trained bank staff	Zero	450	
	No. of training sessions targeted at SME sectors 20% of female participation in training sessions	0 0	9	
	No. of trained SMEs	0	450	
	Established facilitation service for target clusters	No facilitation service in existence	>9 facilitation events	
Output 4.1.2: Knowledge products developed that are targeted at anaerobic digestion in industrial sector, including those to facilitate technology transfer.	Knowledge platform establishment	None	Knowledge platform establishment	GIS based organic waste inventory with energy generation potential estimation tool launched 10 August 2021 during the webinar and presented before 220+ participants who joined this virtually. The reports of organic waste mapping assessment are available on the microsite under www.isid4india.org. Further knowledge and awareness documents will successively be added online on the same portal.
	Number of users of platform	None	200	
	Organic waste stream web portal established Number of users of website per year	None 0	1 1000	
Output 4.1.3: Capacity building mechanism for O&M, technical and service roles is established at state level to develop and retain skilled workforce for innovative biogas applications	No. of training sessions targeted at O&M	None	Nine	The 4th PSAC meeting instructed UNIDO to freeze capacity building activities under project and channelize additional project funding to technology demonstrations.
	No. trained O&M personnel	0	200	

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	Lack of government commitment to support the project.	M	L	The project objectives and activities are in line with national policies and objectives. The project has achieved and is maintaining active involvement of representatives from concerned ministries to ensure their full support throughout the project and beyond	The ministry has signed the project agreement and annual work plans have been submitted and approved in successive project steering committees. The Project Executive Committee (PEC) meetings have been timely held.	☐
2	Lack of interest from industries to take up WTE projects	M	M	Development of detailed activity plans in close cooperation with in-country project partners, stakeholders and developers. A thorough stakeholder consultation process conducted during the project preparation phase identified industries with interest to develop and invest in WTE	SATAT scheme launched by Ministry of Petroleum and Natural Gas to promote Bio-CNG as fuel for transportation in 2018 has spurred interest in industries. A call for Expression of Interest (EoI) to demonstrate innovations in the industrial organic waste-to-energy biomethanation projects was launched in February 2021 and it received good number of responses (45 nos.) The panel discussion on 'Innovations in biomethanation technology and business models – Key potential accelerator of waste-to-energy sector growth in India' was held in the webinar conducted on 10 August 2021.	☐
3	Lack of interest from technology providers	M	L	Technology advisors expressed their interest in the project during the PPG Throughout the project, there has been regular and continued contact with manufacturers which should lead to their interest and participation.	Technology providers are keen to participate in UNIDO's project (please see the summary of Brainstorming Session held on 31 May 2016), as also further confirmed by industry contributions to development of innovation criteria The project developers were invited to present their success stories in the webinar held on 10 August 2021 and to promote their biogas technology and business solutions.	☐
4	Unsuccessful demonstration at selected sites Lack of capacity to operate and maintain biogas plants	L	L	Suitable sites have been selected through careful analysis of target sectors and plants to ensure success of demonstration projects including: - Identification of proven and innovative technologies - Quality audit of equipment - Implementation guidance by experts - Training to the operating personnel in the industry	The four selected demonstration projects were comprehensively assessed and vetted on relevant techno-economic and innovation parameters specified in the project document by the Expert Appraisal Group (EAG). The Project Management Unit (PMU) of UNIDO is closely monitoring the progress of those four projects through periodic site visits and updating the PEC and EAG.	☐
5	WTE technologies do not succeed;	L	L	There is limited technical risk since technologies are widely used in several other countries. Detailed assessment of suitable sites for technologies has been carried out and training from technology importers will be provided.	WTE technologies are utilised in India and already proven successful. Further technological improvements to be demonstrated through the project to improve efficiency and operability of bio-methanation further improve feasibility of bio-methanation.	☐

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

6	Lack of collaboration by key agencies	M	L	A central co-ordination committee was foreseen to be established to facilitate project implementation. Members will include representatives of MoA, MoF, NDRC and MoE.	Continuous stakeholder engagement was undertaken, through PSC and its Expert Advisory Group.	☐
7	Failure to achieve project outcomes and objectives after successful delivery of outputs.	M	M	By making market players fully aware of the economic potential of biogas technologies and by equipping them with the capacity and tools to realize and capture the benefits of such potential, the project will generate a self- reinforcing market. In addition, the financial mechanisms that will be put in place will create a positive context that is expected to ensure the attainment of the project outcomes and their sustainability.	The understanding among the stakeholders seems to be good as they fully understand the multiple advantages of waste-to-energy initiatives, including waste management, renewable energy generation and nutrient recovery	☐
8	Lack of technical capacity	L	M	Strengthening and expansion of technical capability through training facility foreseen to be established in component 3. Training activities will be closely monitored and supported under M&E plan. Linkage to experts and specialized institutions for training and support will be established and coordinated.	The project team is professionally well qualified. MNRE and PSC have requested the project to de-prioritize capacity building interventions under the project, in view of augmenting technical and financial support for innovative demonstration projects.	☐
9	Changes in the availability of the waste from industry	M	L	Market and demand analysis. Continuous policy dialogue with the Government on the improvement of the sector development during the project implementation.	Analysis of waste streams and experiences from existing projects undertaken. Project developed waste inventory at district level covering nine major organic waste streams. Anaerobic digestion of multiple feedstocks is being extensively promoted in the demonstration projects that are currently being constructed and installed	☐
10	Industries' lack of resources to repay loans	L	L	Stringent selection of borrowers through assessment and due diligence of each borrower's historic and future financial management capacity.	The innovative bio-methanation demonstration projects were selected on the basis of provisional or final project loan sanction letter issued by the respective banks only after the comprehensive techno-financial due diligence and compliance of the statutory approvals by these respective banks.	☐
11	Lack of co-finance	L	L	Demonstration projects only selected on evidence of co-finance of the project	The call for Expression of Interest launched in February 2021 to invite the demonstration of innovative organic waste to energy bio-methanation projects enabled the project developers to liaison with banks to secure the project loans to apply for the financial support scheme.	☐
12	Lack of interest among banks and FIs for large scale uptake.	H	L	Banking sector was closely involved during the PPG phase and has shown their support of the project and technologies. Letters of commitment to invest have been provided by three banks.	The Letter of Recommendations (LoR) were issued to the potential projects selected under the financial support scheme to facilitate project loan approvals from the proponent's preferred bank.	☐
13	In case any possible social and environmental safeguards issues occurred.	M	M	Carry out Environmental Impact Assessments as part of preparation of the technology interventions, including sanitary management of organic waste, ways to address potential odour problems caused by the biochemical process to covert waste to energy, etc.; Annual environment and safeguards M&E reports will be provided, which will follow up with necessary actions	The demo projects are still under installation and commissioning stage and yet to start commercial operation to experience such issues.	☐
14	The technology or renewable resource is affected by climate change	L	L	Changing patterns in temperature and rainfall may affect the availability of the renewable resource; due to the different sectors in different parts of the country, and the target of applying co-digestion, the risk is deemed low; Biogas	The selected demonstration projects are resilient to the potential climate changes in near futures and are including the necessary design and engineering measures to tackle the temperature	☐

				technology is very little impacted by climate change	variations during the peak winter (and potentially summer) seasons.	
15	Onset of the COVID19 pandemic	H	M	Successive waves of the pandemic had adversely impacted project implementation at multiple levels during 2020-22, as (1) health and humanitarian crisis impacts firm's and government's capability to take on and complete project activities; (2) movement restrictions were preventing field work; (3) economic crisis did dent companies' working capital and balance sheets which deteriorated credit ratings	Mitigation measures rely largely on virtual operation of the project and its interactions with project stakeholders which have had lower efficiency	☒

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.

The implementation risks had been mainly associated with the severe impact of the second and third COVID waves in India during the reporting period on the regular operations of project stakeholders. The project team worked extensively using all possible instruments for virtual communication and coordination among the stakeholders to finalize and launch the project's financial support scheme (on 10 August 2021) and subsequent receipt and detailed assessment of the project applications by the Expert Appraisal Group (EAG) (in November 2021), enabling selection of demonstration projects in December 2021 and completion of the financial closure of the selected four demonstration projects by March 2022.

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

The second highly disruptive wave of COVID-19 pandemic hit the country in March 2021 and started to decline from June 2021. The magnitude of spread and severity of the pandemic was so high that the overall public and industrial situation in the country recovered close to the normalcy only from October 2021. Following the emergence of Omicron, India experienced a rapid yet less devastating third wave during January – March 2022. The techno-financial due diligence of the selected demonstration projects by their respective banks was substantially delayed which also subsequently delayed their onsite construction and the installation and commissioning work. The unpredictable heavy spells of monsoon rains may further delay completion of construction of the demonstration projects.

The lack of manpower on site due to the significant reverse migration of skilled and unskilled labour happened within the country during lock down periods and still remains a challenge to recover from the delays and timely complete the demonstration projects.

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

Upon CEO endorsement, the actual on the ground project execution commenced with two- and half-year delay to resolve the fund management requirements of the Government of India and subsequent conclusion of the execution agreement for the project between UNIDO and MNRE. In view of this and the recommendations from the project Mid Term Review (MTR) the first extension from 01 May 2020 to 31 Dec 2022 was endorsed and implemented.

The first nationwide lockdown was imposed by the central government on 25 March 2020 after the first COVID19 wave hit the country and thereafter series of lockdowns were imposed by the central and different state governments from time to time as measures to control the rapid spread of the pandemic. Hence, the major duration of the first extension till December 2022 severely impacted the project implementation and delayed its many activities.

The financial support scheme of the project to demonstrate innovations in the biogas technology and its business models was launched amidst pandemic on 10 August 2021. The projects selected under the scheme could completed their financial closure by March 2022 and are presently under construction. At the end of the reporting period, it was foreseen that only two out of four innovative demonstration projects may commence the commercial operation by December 2022 and the remaining two during 2nd quarter of 2023.

The project activities related to the technical advisory services capacity building, knowledge dissemination and project management are delayed due to the instruction of the 4th PSAC to freeze capacity building activities under project and channelize additional project funding to technology demonstrations.

A further one year zero cost project extension up to 31 December 2023 appears desirable to properly complete the demonstration projects, and monitor and disseminate their achievements and lessons learned, to enable achievement and sustainability of project results. An extension proposal will be presented before the upcoming Project Steering-cum-Advisory Committee (PSAC) meeting for approval. On the basis of approval from the PSAC a formal requisition letter of the project extension will be submitted to the GEF through the Ministry of Environment Forest and Climate Change (MOEFCC) who is the GEF Focal Point in India.

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

Lessons learnt

- Neither UNIDO nor MNRE were prepared for new rules in routing foreign funds through the mechanism known as the CAAA for all externally aided projects at the starting phase. An exemption was sought for this rule, given that the project was already under implementation prior to the rule being put in place. The process for granting of the exemption caused a delay of 2.5 years, upon which contract and cooperation modalities got in place and functioning which paved the way for severlal GEF UNIDO projects in India.
- It will not be possible to achieve major deliverables (as per project results framework) within the given timeframe. By December 2022, only the two smaller of the four innovative demonstration projects will have started to operate. All activities that substantively rely on outcomes from the innovative demonstration projects will therefore not be possible to complete within given time period.
- For OWtE CO2 eq calculation is especially challenging. The impact on CO2 eq of by-products (e.g. reduction by replacing 'chemical fertilizers') may not be taken fully into account. The full cycle of selected waste stream to energy including all by-products has to be monitored and evaluated. It is also needed to account for different end uses of the produced biogas.
- A full cycle for the pilot plant to test feasibility and to understand plant performance is needed. Therefore a 5-years project may by design already be inadequate to develop appropriate knowledge products to take innovation forward, as the development of knowledge products may need to undertake some research based upon the outcomes of the project, prior to publishing the products, and this may only be possible with at least one full year of the pilot projects running, if not more.
- Different business models (location, input material management and use/sales of product and by-products) have to be selected to showcase functionality in different scenarios and enable to develop appropriate roadmap and knowledge documents. Therefore, pilot projects will need to be selected carefully, taking into account these factors, as well as understanding project risks and ensuring that risks are addressed.
- Technologies for bio-methanation are available and proven in the country, but there is a lack in management of input materials and the plants itself, as well as standardizing and market development for the by-products which are critical for techno-economic feasibility. Hence, the focus of such project must reflect innovations in both upstream and downstream marketing, along with the reflection of these factors in project documentation and knowledge products.
- Existing scheme (given price for CBG) did not seem to be attractive for plant owners and developers. The price per kg is rather low and only granted for a 3 years period, therefore FIs were hesitant with loans and industries do not have a sustainable baseline to calculate their business models.
- Legal framework is not in favour of OWtE, e.g. feed in tariff in grid at state level is not regulated. Existing rules for testing, labelling and promoting digestate as fertilizers are not rated to be supportive. There is also a need for a supportive environment for cleaner energy sources – such as OWtE, over oil

-based fuels. It needs a strong entrepreneur (managerial skills, financial background, strong network) to start a project without subsidies and legal support.

- Only if all potential by products can be marketed successfully OWtE projects become viable. In some cases, the gas may even be the by-product. It will therefore, also be important to review these aspects in the project and to consider them as a part of planned knowledge products.
- Legal framework for all by-products is needed. The project has its focus on organic wastes, but if mixed waste is used, different legal regime may come into play, and will also require to be considered. Given that is unlikely that any of the OWtE pilot projects will sustain completely on a single type of waste, this may be a concern to address within this project. Furthermore, as other waste streams come into play, there may be additional stakeholders that may need to be included. All these aspects will need to be identified in the next few months as pilot projects are selected.
- Selection of location is key to success, including sufficient feedstock-mix, space, buyer of products and by-products as incoming waste and also product are very sensitive to transport cost and logistic. Availability of local labour forces is important.
- Technology has to be designed to fit all these parameters, and also consider local climatic conditions. Envisaged roadmap and knowledge documents should support these aspects of the project and pilot projects
- The Exposure cum Study Tour (in 2019) was well received by and encouraged the participants. It was seen as a helpful learning, even though the visited plants operated in first instance for environmentally sound management of wastes, with biogas generation as a complementary benefit.

Best practices

- Creation of multiple local pilot projects focusing on the business case to prove viability and functionality, as OWtE projects are complex, specific to their mix of feedstocks and final products, and can hence not easily standardized.
- Approach to quality standards to create performance guidelines and a standardization framework for biogas projects. This is key to bring more plants on stream and market their biogas and other products.
- Project has shown flexibility and ability to adapt to actual situation and changing policies. Production and marketing of by-products is given a stronger focus now.
- Existing biogas plant in Kheda has control over major logistics processes from raw material; waste, to delivery of gas to industries. It owns trailers, used by the farmers to procure cattle dung, and tankers, also belonging to the plant, are used to transport liquid waste from industries. This plant also has ensured enough space is available to produce fertilizer, which is dried on a sealed concrete floor to ensure that it does not mix with the soil. Finally, the plant uses its own caskets to transport CBG to industry clients and also owns the gas pressure control units at their client's sites, where they supply their gas to industries. Existing biogas plant in Kheda has assessed its full material flows, is designed for and is now utilizing the full (closed) loop. It an almost perfect 'closed loop' or 'Circular economy' example. They are presently experiment on how to utilize the CO_2 that is generated from the plant, to close the 'loop' completely. Furthermore, the owner of the plant and his consultant, decided to undertake the development of the plant without funding support from the project, even though technical support had been extended by UNIDO experts.
- Close cooperation with MNRE has been developed, and IREDA has been appointed to manage the project's funding support for the innovative demonstration projects. This joint understanding project relevance between MNRE, IREDA and UNIDO is enabling project progress and result.
- GEF project is to contribute up to an existing funding scheme from MNRE by subsidising part of the loan for selected pilots, to foster 'Innovation'. This practice increases the impact and also allows to compare the outcome; if time for monitoring is given. This is also fully in line with GEF strategies.
- Definition of innovation has been well thought through and developed. It is giving a specific focus on 'management of raw material' including:
  - modification of properties of organic waste to optimize overall biogas generation process and digestate quality
  - New models of waste collection, transportation and storage facilitating optimized and sustainable supply of multiple wastes, including seasonal wastes

Local supply of cleaned Biogas and new developments in production of organic fertilizers using digestate

Recommendations

- The Project Result Framework and Workplan should be reviewed and adapted to the actual situation especially focusing on the timeframe for project work.

  Action Taken: The detailed workplan was updated and presented before the 4th Project Steering-cum-Advisory Committee (PSAC) meeting held on 29 January 2020.

  - Specific effort is needed to speed up with the pilot projects; programme to invite potential project developers to be started quickly. If projects cannot start by mid 2020, even the extension for 2,5 years will not be sufficient.
    Action Taken: The UNIDO project team, supported by PRS, worked extensively to address successive concerns of IREDA in finalizing the contract to appoint it as the fund manager for the project's financial support scheme and finally obtained IREDA approval in June 2021, so that contract was finally signed on 29 July 2021 (draft had been issued to IREDA in April 2020). The financial support scheme was launched soon after on 10 August 2021.
  - Some new objectives (including Indicators and means of verification) should be added (e.g. tons of fertilizers produced/capacity established and respective regulations for fertilizer in place)

    Action Taken: In view of this relevant information included in the application of project financial support scheme launched for the demonstration of innovations.
  - Review stakeholder map to enable creation of an inducive environment for OWtE projects. The learnings so far showcase, that additional stakeholders have to be included. An illustration of this is the applicable regulations in the project - some regulations are at state level, and therefore the state nodal agencies from selected states will be needed.

    Action Taken: Following the regulations imposed by the central and state governments during the COVID19 pandemic, different stakeholders including the representatives of the State Nodal Agencies participated in the webinar conducted on the world biofuel day 10 August 2021.
  - Allocate sufficient time and resources to select and monitor pilot projects.

    Action Taken: Expert Appraisal Group (EAG) was selected to conduct the competitive assessment of the project applications received for the pilot demonstration. Virtual interaction between the EAG members and applicants was organised before the final evaluation. The UNIDO PMU is regularly monitoring the construction of the selected pilot projects
  - Implement an efficient project management system in line with given indicators to ensure efficient project execution as timeliness of outcomes from different components is core to project success.
- Demonstrate and publish feasible OWtE projects that will foster uptake of these business models. As the project will add its funds to existing scheme from MRNE to bring more innovation to the ground, the outcome has to be carefully monitored
  - Crosscheck if extra support from GEF project enhances performance, compared to 'standard projects' –

Action Taken: Pilot demonstration projects are under construction hence performance data are not yet available.

- Test the business model (full cycle) to understand operation costs and sales of products. As waste streams as well as sales of products and by-products have a seasonal dependency, a full year of M&V will be needed.

  Action Taken: Pilot demonstration projects are yet to complete.
- Prepare a specific knowledge document for FIs on selection criteria and finance guidelines for not specialized banks to enable them to enhance their loan programmes.

  Action Taken: A guideline document to conduct the techno financial due diligence of waste to energy bio-methanation projects is under consideration.
- Specific focus given to Gender Mainstreaming. PMU is advised to check the project documents and act accordingly.

  Action Taken: The project document is being followed.

- Explore/develop an accounting system for cradle to cradle GHG reduction for OWtE, suitable for
  - fossil/non fossil fuel based system
  - different OWtE approaches and technologies
  - different products and by-products

  Action Taken: The accounting system for cradle to cradle GHG reduction for OWtE is planned.
- Ensure monitoring and validation protocol are an integral part to pilot projects (funding contract). In order to do this, there is a need to define and monitor all project relevant indicators, starting with waste management (including logistics), to plant operation and different products and the chain of actions and processes, such as marketing, sales and logistics.
  - This will enable harvesting of results to be included in knowledge products

  Action Taken: Pilot demonstration projects are yet to complete.
- Involved project stakeholders should plan PSC meeting soon to come up with a joint decision how to modify the project to achieve project deliverable
  - UNIDO – MNRE to prepare 2 versions of workplan (ext./non ext.) to be agreed upon by stakeholders in upcoming PSC
  - Request for no-cost project extension of 2.5 years
  - Adapt workplan according to new timeline including harvesting results and dissemination of learning
  - Discuss whether to include additional stakeholders to create an attractive business environment for OWtE
  - Ensure continuity with involved experts

  Action Taken: The workplan with the project extension up to December 2022 was reviewed with MNRE and presented in the 4th PSAC meeting for approval. The members accepted the proposal and granted the no-cost project extension. The beginning of COVID19 pandemic in March 2020 and continued its progression in different waves until February 2022 severely impacted the adaption of the new workplan

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

MNRE is proactive in the project execution to ensure that the activities on organic waste to energy are properly aligned with the other MNRE activities on Renewable Energy, including its "Energy from urban, industrial and agricultural waste program". MNRE convenes and chairs the Project Advisory and Steering Committee (PSAC) and Project Executive Committee (PEC). Successive PEC meetings monitored the project progress and provided timely support to expediate the project execution, for example in regard to: the selection of projects for the demonstration of innovations under the project financial support scheme; constitution of the Expert Appraisal Group (EAG); and selection of the projects on the basis of recommendations from the EAG.

MNRE also supported the involvement and consultation of industry partners for which successive roundtable consultation and innovation consultation were organised (in 2016 and 2019), as well as through the international study tour cum training for government and industry partners in Europe in 2019.

The project has selected four innovative demonstration projects based on organic waste-to-energy bio-methanation under its financial support scheme to demonstrate one or more innovations from the identified six innovation areas. The innovations relate to: feedstock management and pre-processing; plant design and equipment; biogas scrubbing and upgrading; biogas/bio CNG utilization; digestate value addition (valuable by-products); and advanced biochemical processes. These demonstration projects will promote biogas generation, by product recovery and utilization as well as waste feedstock diversification. A biogas project financial support mechanism, based on interest subvention, has been designed and operationalized to support demonstrations in these innovation areas.

The project has developed the GIS based inventory tool of organic waste streams. This provides district level estimates of available urban and industrial organic wastes and their energy generation potential across India, covering nine major organic waste streams (including four identified during PPG and five additional sectors selected by PSAC). The GIS tool enables SME's and project developers to set up new waste to energy projects at appropriate locations ensuring a reliable supply of organic wastes as feedstocks, regular uptake of the energy produced and its by products such as organic fertilisers. It may facilitate the rapid growth of bio-methanation in waste-to-energy sector in the country.

IREDA has been appointed as the Fund Manager under the financial support scheme of the project to review the financial performance of the demonstration projects and disburse the applicable loan interest subvention funds.

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.).

Feedback of national counterparts has been taking place in the main through the PSAC, which (as per the above in section V.2) has provided strong direction to the project execution with regard to scope and detail of waste mapping, appointment of fund manager and further support for technology demonstrations, at the expense of minimizing further awareness, training and knowledge activities. Moreover, through separately convened roundtable and innovation, industry and technology stakeholders have convened to provide expert inputs for clarification of innovation areas eligible for financial support through the project.

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

5087_Minutes of the 3rd PEC meeting

5087_UNIDO-IREDA Contract

5087_Webinar agenda and proceedings

5087_UNIDO OWtE project financial support scheme

5087_Detailed report of assessment of applications by the EAG members

5087_Minutes of the 4th PEC meeting

5087_Letters of Recommendation (LoR) issued to the four selected projects

5087_Minutes of the 5th PEC Minutes

5087_ Inception Report of IREDA

5087_First site visit to Fetahgarh Sahib, Punjab and Yamunanagar, Haryana

5087_Second site visit to the four selected demonstration projects

5087_Report - Identification of Organic Waste

5087_Report - Identification of Potential States for Energy Generation Using Organic Waste

5087_Report - Primary Survey for Collection of Data

5087_Report - Characterization of organic Waste Samples from Potential Sectors in Selected States

5087_Report - District Wise Assessment of Waste Availability and Energy Generation Potential in Four Priority Sectors Across India

5087_Report - District Wise Assessment of Waste Availability and Energy Generation Potential for Five Selected Sectors Across India

5087_Report - GIS Based Inventory Tool of Organic Waste Streams

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),.

The project endorsement document states several gender related activities (e.g., involvement of gender expert to monitor the gender-specific dimension) and gender strategies. Some documents include gender figures (female participation in events and training), these numbers are yet not monitored and only one specific target is given in PRF. The typical industrial sector is characterized by very low female labour force participation and during project meetings only three women have been met. Participation from gender focal points from respective ministries and specific gender-related activities (e.g., selecting industries with women entrepreneurs on priority base) is not visible yet.

The project will focus more on gender mainstreaming, and where possible, identify more activities where gender can be addressed as a part of project activities.

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.

The project has so far generated technical reports of successive stages of the organic waste inventory and mapping in India, particularly:

1. Report - Identification of Organic Waste Streams in India
2. Report - Identification of Potential States for Energy Generation using Organic Waste from Sugar, Poultry, Cattle farm and Fruit, Food and Vegetable Processing Industries
3. Report – Primary survey for collection of data on availability, utilization pattern and price for selected categories of industrial organic waste in the selected states
4. Report – Collection and characterization of various samples of industrial organic wastes across the selected states.
5. Report - District Wise Assessment of Waste Availability and Energy Generation Potential in four sectors sugar, poultry, cattle farm and fruit, food and vegetable processing industry across India
6. Report - District Wise Assessment of Waste Availability and Energy Generation Potential for Five Selected Sectors Across India
7. Report - GIS Based Inventory Tool of Organic Waste Streams

These and further waste survey data are being made accessible to project developers, industries and financiers through online inventory tool, accessible through: https://bio-energy.isid4india.org/.

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

An online GIS based and searchable knowledge tool has been created that shows available volumes of nine key organic waste streams at district level across India along with estimated energy generation potential. The GIS tool has been launched on 10 August 2021 and is accessible through: https://bio-energy.isid4india.org/.

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.

Progress

The start of the actual on the ground execution of the project incurred two years delay to resolve the fund management requirements of the Government of India and subsequent conclusion of the execution agreement for the project between UNIDO and MNRE (execution entity).

Since then, MNRE has taken an active lead in the project execution. Upon refinement and confirmation of project planning, a knowledge partner had been competitively selected and contracted to conduct the surveying and mapping of organic waste generation in India and estimate its bio-methanation energy generation potential. The findings have been integrated into a web based organic waste resource map for India, covering nine key organic waste streams across all districts of India. With inputs from technology experts and industry partners a set of innovation areas has been defined that will be promoted through the project's technology demonstration activities. Moreover, a project specific financial support mechanism was developed in close cooperation with the assigned fund manager. The four projects have been selected through the competitive evaluation under the project financial support scheme to demonstrate.

Challenges

Project execution has incurred unfortunate and successive extensive delays, firstly, at project start (for signature of execution agreements) and, secondly, with launch of the financial support package (due to

delayed contracting of the PSAC assigned fund manager). Despite the project execution negatively impacted by the COVID-19 pandemic the project financial support scheme was launched and the pilot demonstration projects were selected on basis of innovations incorporated and techno-economic viability. The two smaller demonstration projects are expected to be operational by December 2022, with the other two larger demonstrations expected on line in 2nd quarter of 2022. It will therefore not be achievable to complete monitoring and evaluation of demonstration projects and incorporation of their achievements and learings in knowledge products by the end of the current project completion date (31 December 2022).

Outcomes

The project has created a first for India detailed organic waste inventory with bio-energy generation potential at the level of districts, covering nine large scale industrial and urban organic waste streams (poultry, cattle dung, fruit & vegetables, sugar, slaughterhouse, distilleries, paper, municipal solid waste and municipal sewerage) – which has been converted in an interactive and searchable web-based tool. The project has clearly articulated innovation areas to improve technology, efficiency and biogas and by-product yields for organic waste to energy projects. The project's financial support mechanism was launched and the pilot projects are selected to demonstrate the innovations.

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.

☐	Results Framework	Preparation of National Master Plan (NMP) and strategic action plans and continued capacity building, training and awareness have been de-prioritized by MNRE (as endorsed by PSAC), in favor of further technical and financial support to innovative demonstration projects
☐	Components and Cost	N/A
☐	Institutional and Implementation Arrangements	N/a
☐	Financial Management	N/a
☐	Implementation Schedule	A 2.5 year no cost extension was granted in 2020, to accommodate for delayed start of project activities as a result of need to clarify the fund management procedures with the Government of India
☐	Executing Entity	N/a
☐	Executing Entity Category	N/a
☐	Minor Project Objective Change	N/a
☐	Safeguards	N/a
☐	Risk Analysis	N/a
☐	Increase of GEF Project Financing Up to 5%	N/a
☐	Co-Financing	N/a

[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%.

☐	Location of Project Activities	Locations for the innovative demonstration projects followed the call for applications for project's financial support.
☐	Others	n/a

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

The project expenditures up to 30 June 2022 amounted to USD 26,64,326.48 with a remaining available funds of USD 6,68,673.52, amounting to 80% implementation.

The breakdown by project input or budget line is indicated in table below. Contractual services amount up to USD1.910.135,47 and hence account for 71.7% of project expenditures. This includes the fund management contract with IREDA, valued at USD 1,700,000.

Budget Line		Total Budget	Obligation	Payments	Expenditure	Funds Available
1100	Staff & Intern Consultants	130,730.97	0.00	15,721.13	15,721.13	115,009.84
1500	Local travel	65,147.45	1,620.88	14,802.14	16,423.02	48,724.43
1600	Staff Travel	6,000.00	0.00	671.19	671.19	5,328.81
1700	Nat.Consult./Staff	669,920.38	17,908.06	524,046.71	5,41,954.77	127,965.61
2100	Contractual Services	2,222,703.13	1,360,074.15	550,061.32	1,910,135.47	312,567.66
3000	Train/Fellowship/Study tours	29,759.09	4,064.63	10,088.13	14,152.76	15,606.33
4300	Premises	162,242.69	446.86	133,068.90	133,515.76	28,726.93
4500	Equipment	11,176.92	-0.01	7,748.04	7,748.03	3,428.89
5100	Other Direct Costs	35,319.37	2,357.34	21,647.01	24,004.35	11,315.02
		3,333,000.00	1,386,471.91	1,277,854.57	2,664,326.48	668,673.52

Project expenditure by project output is included in following table. Component 2 accounts for 87% of current expenditure, largely as a result of the inclusion of the USD 1.7 million financial assistance fund for demonstration projects.

Component	Project WBS (*)	Total Budget	Obligation	Payments	Expenditure	Funds Available
1. Policy & Strategy	120095-1-01-01	129,074.00	-0.01	20,261.02	20,261.01	108,812.99
2. Technology Demonstration	120095-1-01-02	2,388,419.55	1,374,520.85	930,879.47	2,305,400.32	83,019.23
3. Scale Up	120095-1-01-03	309,898.00	4,673.20	25,774.33	30,447.53	279,450.47
4. Capacity Building	120095-1-01-04	285,377.00	7,277.88	114,053.32	121,331.20	164,045.80
Project Management	120095-1-51-01	160,231.25	-0.01	159,458.94	159,458.93	772.32
Independent Evaluation	120095-1-53-01	60,000.20	0.00	27,427.49	27,427.49	32,572.71
		3,333,000.00	1,386,471.91	1,277,854.57	2,664,326.48	668,673.52

(*) as recorded in SAP at the end of reporting period, deviating from budget presented for CEO endorsement

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.

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	2022				Not Applicable				Not Applicable				GEF Grant Budget Available (US$)
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Component 1 – Policy and strategy													
Outcome 1:													
Output 1.1:	108,812.99												108,812.99
Component 2 – Technology demonstration													
Outcome 2:													
Output 2.1:	83,019.23												83,019.23
Component 3 – Policy and strategy													
Outcome 3:													
Output 3.1:	279,450.47												279,450.47
Component 2 – Technology demonstration													
Outcome 4:													
Output 4.1:	164,045.80												164,045.80
Management, Monitoring and Evaluation													
Project management	772.32												772.32
Independent evaluation	32,572.71												32,572.71
Project total	**668,673.52**												**668,673.52**

X. Synergies

1. **Synergies** achieved:

The project is being run by national team in India with UNIDO Representative as Project Manager. It is coordinated in a coherent way with other projects implemented in India by UNIDO. Specifically, synergies with Promoting Market Transformation for Energy Efficiency in Micro, Small & Medium Enterprises project and Sustainable cities, integrated approach pilot in India are observed (knowledge exchange, technology transfer).

3. Stories to be shared (Optional)

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 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.