1. Project Data

Summary project data			
GEF project ID		4194	
GEF Agency project ID		P120702	
GEF Replenishment Phase		GEF-4	
Lead GEF Agency (include all for joint projects)		World Bank	
Project name		Biogas Generation from Animal Manure – Pilot Project	
Country/Countries		Moldova	
Region		ECA	
Focal area		Climate Change	
Operational Program or Strategic Priorities/Objectives		OP6 - promoting adoption of renewable energy	
Executing agencies involved		Ministry of Environment; and CEPIU	
NGOs/CBOs involvement		None involved	
Private sector involvement		None involved	
CEO Endorsement (FSP) /Approval date (MSP)		November 23, 2010	
Effectiveness date / project start		July 6, 2011	
Expected date of project completion (at start)		November 2013	
Actual date of project completion		June 30, 2015	
Project Financing			
		At Endorsement (US $M)	**At Completion (US $M)**
Project Preparation Grant	GEF funding	0	0
	Co-financing	0	0
GEF Project Grant		0.98	0.98
Co-financing	IA own	1.58	0
	Government	0.03	0.07
	Other multi- /bi-laterals	0.91	0
	Private sector	0	0
	NGOs/CSOs	0	0
Total GEF funding		0.98	0.98
Total Co-financing		2.51	0.07
Total project funding (GEF grant(s) + co-financing)		3.49	1.05
Terminal evaluation/review information			
TE completion date		May 26, 2016	
Author of TE		Daniel Gerber	
TER completion date		March 28, 2018	
TER prepared by		Spandana Battula	
TER peer review by (if GEF IEO review)		Molly Watts Sohn	

2. Summary of Project Ratings

Criteria	Final PIR	IA Terminal Evaluation	IA Evaluation Office Review	GEF IEO Review
Project Outcomes	MS	MS	-	MS
Sustainability of Outcomes		ML	-	MU
M&E Design		UA	-	MS
M&E Implementation		UA	-	UA
Quality of Implementation		MS	-	MS
Quality of Execution		MS	-	MS
Quality of the Terminal Evaluation Report		-	-	MU

3. Project Objectives

3.1 Global Environmental Objectives of the project:

The project's Global Environment Objective is to "contribute to the reduction of GHG emissions through the adoption of on-grid renewable energy supplies" (MSP pg 2). As per the project, the environmental benefits "will assist in developing one type of renewable energy source, biogas, as well as regulations to allow smaller private electricity producers to sell excess energy produced from renewable resources into the grid" (MSP pg 9).

3.2 Development Objectives of the project:

The Development Objective of the project is to "promote the transfer of a new environmentally sustainable renewable energy technology through piloting the use of animal manure for biogas-based heating and electricity production at the farm level" (MSP pg 2). The project aims to achieve its objectives through three main components, and they are:

Component 1: Enabling legislative and policy environment;

Component 2: Technical assistance, capacity building and awareness raising on sound animal waste management, and animal manure-based biodigester and electricity generation technologies; and

Component 3: Biodigester Investment Grants.

3.3 Were there any **changes** in the Global Environmental Objectives, Development Objectives, or other activities during implementation?

There were no changes to objectives or activities during implementation.

4. GEF IEO assessment of Outcomes and Sustainability
Please refer to the GEF Terminal Evaluation Review Guidelines for detail on the criteria for ratings.

Relevance can receive either a Satisfactory or Unsatisfactory rating. For Effectiveness and Cost efficiency, a six point rating scale is used (Highly Satisfactory to Highly Unsatisfactory), or Unable to Assess. Sustainability ratings are assessed on a four-point scale: Likely=no or negligible risk; Moderately Likely=low risk; Moderately Unlikely=substantial risks; Unlikely=high risk. In assessing a Sustainability rating please note if, and to what degree, sustainability of project outcomes is threatened by financial, sociopolitical, institutional/governance, or environmental factors.

Please justify ratings in the space below each box.

4.1 **Relevance**	Rating: Satisfactory

The project is relevant to GEF-4 climate change focal area, and its strategic goal in promoting the use of renewable energy for the provision of rural energy services and supporting new low-GHG emitting energy technologies. It is aligned to Strategic Program 3 to promote market approaches to the supply of, and demand for renewable electricity in grid-based systems. The project is also relevant to Moldova's priority in gaining energy security by developing alternative energy production away from fossil fuels. It is consistent with Moldova's Law on Renewable Energy, which establishes the goal of using renewable sources to address around 20% of energy needs by 2020. Moldova's National Development Strategy also includes programs and measures supporting the efficient use of natural resources and preserving the quality of the environment through energy efficiency, promotion of renewable energy and cleaner production (MSP pgs 5-6; TE pg 5).

4.2 **Effectiveness**	Rating: Moderately Satisfactory

The TE rated the overall achievement of outcomes as Moderately Satisfactory, and the TER agrees with the rating. The project had three components to create an enabling policy environment, improve technical assistance and capacity building, and install bio-digesters. During implementation, the project concluded that Moldova already had in place adequate renewable energy friendly laws and policies, and permits for licensing of bio-digesters were not required. For its second component, the project was successful in creating awareness and building capacity through workshops and trainings on sustainable manure management practices. However, in order to install the bio-digesters the project did not have enough borrowing capacity to proceed with the construction. On this aspect, the TE notes that "the team should be commended for reacting proactively to the difficulties presented by the inability of the biodigester investors to secure the necessary funds, by focusing on the financing of designs with companies that had better access to credit and would install larger systems with better economies of scale" (TE pg 14). Although the project objectives were too ambitious, the TER gives a Moderately Satisfactory rating because of the successful knowledge sharing activities. Below is a detailed analysis as per the components:

<u>Component 1: Enabling legislative and policy environment</u>:

Under this component the project intended to get certification and licensing of biodigesters, and secure cooperation with Moldova's energy regulator to develop relevant legislation provisions for allowing

smaller electricity producers to sell surplus electricity into the national grid. As per the TE, "upon review of the regulatory framework it was concluded that, no special license is needed to put a bio-digester into operation in Moldova", however, each planned site for biodigester had to obtain a construction permit based on the technical project. In relation to support for national energy regulator, the project found that there was adequate legislation "which allows sale of electricity generated from renewable resources into the grid, including the electricity generated through biogas production, as well as imperative legal provisions, which in certain conditions, could legally force the energy distribution companies to buy such energy from renewable sources" (TE pg 9).

Component 2: Technical assistance, capacity building and awareness raising on sound animal waste management, and animal manure-based biodigester and electricity generation technologies:

The project aimed to promote sound animal manure management practices, and mainstreaming the use of biodigester technologies by training farmers in sound manure management practices, training local engineers in the installation and operation of biodigesters for scaling up the generation of biogas and electricity after the project closes, and creating broader awareness-raising in the livestock production community through a series of seminars and demonstration activities. To achieve these outputs, the project trained farmers, local administration representatives, specialists, and rural entrepreneurs. A workshop was conducted for engineers on biogas generation and manure management and practical part took place at the biogas station from Firladeni village, Hincesti district. The project also developed training manuals and handouts in sustainable manure management practices, biogas generation from animal manure for generation of biogas, and installation, operation and maintenance of bio-digesters. It also disseminated brochures on similar topics to farmers all over the country, and the rest to the Technical University of Moldova (Power and Electrical Energy Faculty), Ministry of Environment, Ministry of Agriculture and Food Industry, interested people and decision makers. The project also worked with farmers and households to improve manure management practices. By 2014, Agrochemical soil tests which determine the appropriate use of the fertilizer remained at a low level of use, the total volume of manure collected and stored was almost 3.4 million cubic meters. "In total, an estimated 11,400 households and farms (63.4% of the total number of trainees) have applied one or more improved agricultural or manure management practice" (TE pg 10). However, in relation to manufacturing of bio-digester components, the TE states "while certain parts of the bio-digester installations (such as construction of fermenter and pre-treatment and post-treatment basins, pipes, electric control panel, electricity/water/heating systems and others) can be manufactured in Moldova, no such manufacturing has yet begun due to weak demand." (TE pg 11). The project also conducted a feasibility study for biogas investment, but the output to scale up generation of biogas and electricity did not occur.

Component 3: Biodigester Investment Grants:

Under this component, the project wanted to fund pilot biodigesters/co-generation systems on two livestock cattle farms. For this, two farms in Singerei and the other in Calarasi were selected as the potential demonstration sites. The technical designs were prepared but due to lack of borrowing capacity prevented the construction. The project identified four more sites and prepared technical documents, but the installation of bio-digesters were pending by the end of the project (TE pg 11).

4.3 **Efficiency**	Rating: Moderately Satisfactory

The project was moderately efficient in terms of financing and time. The TE states that although the grant amount was less than US$1 million for a pilot project to advance knowledge awareness and promote the potential of biogas/co-generation installations on livestock farms, the funds were used in a very efficient manner. “For instance, a much greater number of individuals were trained under the project than estimated at project preparation within the allocated funds. The support to technical design appears to have been quite efficient as well” (TE pg 12). Also the project reallocated the grants for technical design project due to the financial crisis and falling financial capacity of the potential project beneficiaries. It is also to be noted that the project piloted a new approach that involved a significant learning curve. In terms of time efficiency, the project experienced a six-month delay initially related to the transfer of the project implementation responsibilities to the then newly created Consolidated Environmental Project Implementation Unit (CEPIU) (TE pg 6). Considering the few shortcomings but successful allocation of funding, the TER gives a Moderately Satisfactory rating to project’s efficiency.

4.4 **Sustainability**	Rating: Moderately Unlikely

The TER gives a Moderately Unlikely rating to sustainability as the socio-political, institutional framework and environmental risks to sustainability are low. However, the financial resources are lacking and there have been no commitments to continue funding. Although the TE did not describe the factors to sustainability, it gave a Moderate rating to overall risks to outcome.

Financial resources: The financial risk to sustainability seems high as during the implementation the project had shortage of funds. Many activities such as installing the bio-digesters could not be completed because of lack of financial capacity. In relation to continuation of the benefits, the project stakeholders have not committed any financial support. Thus, the financial sustainability is Unlikely.

Socio-political: The government and local farmers provided support to implementation of the project, and the project was well aligned to Moldova’s policies on renewable energy. Even the Ministry of Environment provided support on executing the project. Thus, there seems to be no apparent social or political risks to sustainability.

Institutional framework and governance: In terms of institutional framework, Moldova already has adequate legislation in force which allows sale of electricity generated from renewable resources into the grid. In addition, the project also held a workshop for decisions makers and the relevant government agencies from Ministry of Environment, National Agency for Energy Regulation, Energy Efficiency Agency and other relevant bodies. These awareness events could help in strengthening governance.

Environment: The TE does not mention any negative environmental impacts to sustainability.

5. Processes and factors affecting attainment of project outcomes

5.1 Co-financing. To what extent was the reported co-financing essential to the achievement of GEF objectives? If there was a difference in the level of expected co-financing and actual co-financing, then what were the reasons for it? Did the extent of materialization of co-financing affect project's outcomes and/or sustainability? If so, in what ways and through what causal linkages?

The actual co-financing amount of US$ 67,700 was much lower than the original co-financing of US$ 2,513,000 as the project did not receive the promised funding from the implementing agency and bilateral agency. The shortage of financing adversely affected the project's achievement of targets, for example, the bio-digesters could not be installed due to financial unfeasibility.

5.2 Project extensions and/or delays. If there were delays in project implementation and completion, then what were the reasons for it? Did the delay affect the project's outcomes and/or sustainability? If so, in what ways and through what causal linkages?

The project suffered a six-month delay initially because of the transfer of the project implementation responsibilities to the then newly created, and this led to extension of closing date for more than a year.

5.3 Country ownership. Assess the extent to which country ownership has affected project outcomes and sustainability? Describe the ways in which it affected outcomes and sustainability, highlighting the causal links:

The project received considerable support from the government of Moldova in the form of executing support and financial assistance. The project also had adequate support from the local farmers who participated in project activities.

6. Assessment of project's Monitoring and Evaluation system

Ratings are assessed on a six point scale: Highly Satisfactory=no shortcomings in this M&E component; Satisfactory=minor shortcomings in this M&E component; Moderately Satisfactory=moderate shortcomings in this M&E component; Moderately Unsatisfactory=significant shortcomings in this M&E component; Unsatisfactory=major shortcomings in this M&E component; Highly Unsatisfactory=there were no project M&E systems.

Please justify ratings in the space below each box.

6.1 **M&E Design at entry**	Rating: Satisfactory

The project document provided a M&E plan with monitoring at start-up and implementation of the project activities, start-up and implementation of the project activities, and contractual arrangements for pilot farms. The M&E design also had provision for utilization of GEF's climate tracking tool and a results framework with indicators and outcomes. As per the MSP proposal, project funds have been allocated for the purposes of an independent assessment of project results and impact. The independent evaluation will be carried out shortly before the project closing date and the evaluation's conclusions will feed into the Implementation Completion Memorandum" (MSP pg 17).

6.2 **M&E Implementation**	Rating: Unable to assess

The TE does not provide an evaluation of the M&E implementation but states that the CEPIU ensured monitoring and evaluation of project activities. The project has submitted Grant and Monitoring Reports from 2012-2014, however the TER is unable to assess the quality of M&E implementation due to lack of information.

7. Assessment of project implementation and execution

Quality of Implementation includes the quality of project design, as well as the quality of supervision and assistance provided by implementing agency(s) to execution agencies throughout project implementation. Quality of Execution covers the effectiveness of the executing agency(s) in performing its roles and responsibilities. In both instances, the focus is upon factors that are largely within the control of the respective implementing and executing agency(s). A six point rating scale is used (Highly Satisfactory to Highly Unsatisfactory), or Unable to Assess.

Please justify ratings in the space below each box.

7.1 **Quality of Project Implementation**	Rating: Moderately Satisfactory

The World Bank acted as the implementing agency for the project. The Bank supervised regularly with significant emphasis on financial management and procurement, but the project could have benefited from more technical support staff. The TE says that supervision suffered from "an unrealistically small supervision budget which meant that supervision really could only be performed whenever the team was already in the region in order to share travel costs and expenditures" (TE pg 16). In terms of grant approval, the project preparation was done with significant consultations to help minimize the risks, however the biggest shortcoming was that the project design was too ambitious for the amount of funds granted from the GEF. Thus, the TER gives a Moderately Satisfactory rating to project implementation.

7.2 **Quality of Project Execution**	Rating: Moderately Satisfactory

Initially the project was to be executed by the Carbon Finance Unit of the Ministry of Environment but due to unavailability of support the responsibility of project execution fell to the Consolidated Environmental Project Implementation Unit (CEPIU). This delayed the project implementation for six months. The TE states that the agency "successfully completed most project activities and demonstrated a lot of diligence in trying to get grant objectives achieved and activities delivered" (TE pg 16). However the project should have used "less sophisticated and less expensive technology so that overall costs of such facilities could have been brought down and adoption of this technology could have been more widespread" (TE pg 16).

8. Assessment of Project Impacts

Note - In instances where information on any impact related topic is not provided in the terminal evaluations, the reviewer should indicate in the relevant sections below that this is indeed the case and identify the information gaps. When providing information on topics related to impact, please cite the page number of the terminal evaluation from where the information is sourced.

8.1 Environmental Change. Describe the changes in environmental stress and environmental status that occurred by the end of the project. Include both quantitative and qualitative changes documented, sources of information for these changes, and how project activities contributed to or hindered these changes. Also include how contextual factors have contributed to or hindered these changes.

The TE notes that the agrochemical soil tests determined that appropriate use of the fertilizer were at a low level of use and organic fertilizers were used on a total of 19,800 ha of agricultural land. Also 2,742 households and farms, and 240 communities collected and stored almost 3.4 million cubic meters of manure.

8.2 Socioeconomic change. Describe any changes in human well-being (income, education, health, community relationships, etc.) that occurred by the end of the project. Include both quantitative and qualitative changes documented, sources of information for these changes, and how project activities contributed to or hindered these changes. Also include how contextual factors have contributed to or hindered these changes.

The TE does not mention any socioeconomic changes.

8.3 Capacity and governance changes. Describe notable changes in capacities and governance that can lead to large-scale action (both mass and legislative) bringing about positive environmental change. "Capacities" include awareness, knowledge, skills, infrastructure, and environmental monitoring systems, among others. "Governance" refers to decision-making processes, structures and systems, including access to and use of information, and thus would include laws, administrative bodies, trust-building and conflict resolution processes, information-sharing systems, etc. Indicate how project activities contributed to/ hindered these changes, as well as how contextual factors have influenced these changes.

a) Capacities: As per the TE, 10% of beneficiaries were trained on improving manure management practices, which led to an estimated 11,400 households and farms applying one or more improved agricultural or manure management practice.

b) Governance: There is not impact on governance.

8.4 Unintended impacts. Describe any impacts not targeted by the project, whether positive or negative, affecting either ecological or social aspects. Indicate the factors that contributed to these unintended impacts occurring.

The TE mentions that due to awareness raising on bio-digesters and manure management, "the project created enough interest that several companies are now taking steps to become manure based energy producers" (TE pg 14).

8.5 Adoption of GEF initiatives at scale. Identify any initiatives (e.g. technologies, approaches, financing instruments, implementing bodies, legal frameworks, information systems) that have been mainstreamed, replicated and/or scaled up by government and other stakeholders by project end. Include the extent to which this broader adoption has taken place, e.g. if plans and resources have been established but no actual adoption has taken place, or if market change and large-scale environmental benefits have begun to occur. Indicate how project activities and other contextual factors contributed to these taking place. If broader adoption has not taken place as expected, indicate which factors (both project-related and contextual) have hindered this from happening.

There have been no adoption of GEF initiatives at scale.

9. Lessons and recommendations

9.1 Briefly describe the key lessons, good practices, or approaches mentioned in the terminal evaluation report that could have application for other GEF projects.

The key lessons learnt are (TE pg 16):

1) "A grant of this nature providing substantial assistance in TA to public and private stakeholders helps with raising awareness and possibly realization of the opportunities as well as the limitations in the transfer of this new technology;
2) Grant financing dependent on another grant for financing investments presents considerable implementation risks since the failure of approval of one grant make the other grant considerably more challenging; and
3) The smaller actors in the private sector are not able to bear the risk of introducing a new technology if it implies significant up front investments".

9.2 Briefly describe the recommendations given in the terminal evaluation.

The TE does not provide any recommendations.

10. Quality of the Terminal Evaluation Report

A six point rating scale is used for each sub-criteria and overall rating of the terminal evaluation report (Highly Satisfactory to Highly Unsatisfactory)

Criteria	GEF IEO comments	Rating
To what extent does the report contain an assessment of relevant outcomes and impacts of the project and the achievement of the objectives?	The report was elaborative in its assessment of outcomes, but did not describe the impacts through the project.	**MS**
To what extent is the report internally consistent, the evidence presented complete and convincing, and ratings well substantiated?	The report is consistent and convincing in giving rating according to the evidence presented.	**S**
To what extent does the report properly assess project sustainability and/or project exit strategy?	The report did not provide an assessment of sustainability and exit strategy.	**U**
To what extent are the lessons learned supported by the evidence presented and are they comprehensive?	The lessons learnt are inadequate without evidence presented, and there are no recommendations given.	**U**
Does the report include the actual project costs (total and per activity) and actual co-financing used?	The report includes co-financing amount but there are actual project costs listed.	**MU**
Assess the quality of the report's evaluation of project M&E systems:	The TE did not provide an assessment of M&E design and implementation.	**U**
Overall TE Rating		**MU**

11. Note any additional sources of information used in the preparation of the terminal evaluation report (excluding PIRs, TEs, and PADs).

No other sources were used in preparation of the TER.