

Terminal Evaluation Review form, GEF Evaluation Office, APR 2013

1. Project Data

Summary project data			
GEF project ID		1558	
GEF Agency project ID		523361	
GEF Replenishment Phase		GEF-2	
Lead GEF Agency (include all for joint projects)		World Bank (IFC)	
Project name		Obtaining Biofuels and Non-wood Cellulose Fiber from Agricultural Residues/Waste	
Country/Countries		Peru	
Region		LAC	
Focal area		Climate Change	
Operational Program or Strategic Priorities/Objectives		6- Promoting adoption of renewable energy by removing barriers/	
Executing agencies involved		National Environment Fund of Peru (FONAM)	
NGOs/CBOs involvement		No involvement	
Private sector involvement		Lead executing agency; one of the beneficiaries;	
CEO Endorsement (FSP) /Approval date (MSP)		06/03/2002	
Effectiveness date / project start		07/01/2004	
Expected date of project completion (at start)		07/01/2007	
Actual date of project completion		12/31/2008	
Project Financing			
		At Endorsement (US \$M)	At Completion (US \$M)
Project Preparation Grant	GEF funding	0.024	
	Co-financing	0.009	
GEF Project Grant		0.97	
Co-financing	IA/EA own		
	Government		
	Other*	13.29	
Total GEF funding		0.99	0.77
Total Co-financing		13.29	0.20
Total project funding (GEF grant(s) + co-financing)		14.28	1.05
Terminal evaluation/review information			
TE completion date		01/30/2009	
TE submission date		2/6/2009	
Author of TE		Maria del Rosario Rojas	
TER completion date		11/25/2013	
TER prepared by		Nelly Bourlion	
TER peer review by (if GEF EO review)		Joshua Schneck	

*Includes contributions mobilized for the project from other multilateral agencies, bilateral development, cooperation agencies, NGOs, the private sector, and beneficiaries.

2. Summary of Project Ratings

Criteria	Final PIR	IA Terminal Evaluation	IA Evaluation Office Review	GEF EO Review
Project Outcomes	MS	U		U
Sustainability of Outcomes	L	U		U
M&E Design	N/A	N/A		S
M&E Implementation	N/A	N/A		UA
Quality of Implementation	MS	S		MS
Quality of Execution	N/A	N/A		UA
Quality of the Terminal Evaluation Report				MU

3. Project Objectives

3.1 Global Environmental Objectives of the project:

The Global Environmental Objective is to reduce GHG emissions of electricity generation activities. To do so, the project will increase the production and use of sugarcane trash and other agricultural and forestry residues in national energy generation.

Many sugar cane mills complement their fuel requirements for electricity and steam generation with oil. In Peru, the sugar cane industry's average consumption of oil per ton of sugar produced was 40 gallons in 1999, equivalent to 24 million gallons of residual oil. This volume of fossil fuel can be replaced entirely by biofuels, including sugar cane foliage and pith. Currently, foliage is burnt in the fields, creating emissions of GHG. This project would eliminate the burning of foliage in the fields, thus increasing sugar content/production by 5% for the same cane amount, and providing biomass for use in paper or energy/steam sector at the mill.

3.2 Development Objectives of the project:

Satisfying the increasing domestic and industrial demand for energy is a priority for any development strategy in Peru. The country has emphasized the importance of diversification, using the most efficient technologies and a wide variety of fuels, to assure the lowest possible cost for energy supply and improved energy security. This project will contribute to these objectives by substituting fossil fuels with biofuels for industrial heat and power generation.

The project goals are to:

- (1) Remove existing barriers for a successful pilot introduction and transfer of a technology that harvests, transports and pre-treats sugarcane trash to be used for co-generation of steam and electricity in one of the pre-selected sugar mills;
- (2) Remove existing financial barriers of the technology package that will be bought by the pre-selected sugar mill after the anticipated successful pilot project; and
- (3) Assist in removing/reducing technical, legislative, institutional/organizational, economic, information and financial barriers related to the replication of the pilot project.

Removing the barriers for sustainable heat and power production would also facilitate future commercialization of other biofuels such as cotton stalks, rice husks and straw.

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

In March 2004, the Implementing Agency was changed, from UNDP to IFC, and the project structure had to be changed. IFC brought new partnerships to this project, including Volvo (one of the world's largest producers of truck and buses), WSM (a Swedish start-up developing the equipment), and Monder SAC (a small company in Peru). The

After the transfer to IFC, the project's 2 stages would promote the use of a new technology developed by WSM of Sweden for the transport and processing of biomass from sugar plantations to the mill. The technology, tested and modified in Europe and then pilot tested in Peru, focused on increasing the biomass harvestable and usable in a sugar plantation. The harvesting and processing technology module was to be mounted on trucks. Additionally, a prototype (a truck with a harvesting module) was to be developed and tested, and then shipped to Peru for the demonstration. Therefore, in the second phase of the project, the GEF grant would have been used to conduct the TA activities with respect to propagating energy crop cultivation in Peru, as well as training of workers on the new technology. The phase of testing in Peru did not happen because of an accident explained below in this TER.

4. GEF EO 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
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The expected outcome of the project is one where utilisation of biofuels (sugarcane trash) as a commercial fuel for heat – as well as for combined heat and power generation - has become financially self-sustainable and commercially competitive in the Peruvian energy market, thus replacing fossil fuels and reducing greenhouse gas emissions. According to the PD, this market transformation is closely related to various national priorities with both local and global benefits. The project promotes the energy sector policy goals as formulated by the Ministry of Energy and Mines. Peru's energy goals are to satisfy the growing energy demand while maintaining the energy prices low, improving the energy security by diversifying the supply, promoting competition and private sector's participation in power generation and improving the environmental performance of the sector. The National Council for the Environment (CONAM) chairs the National Committee for Climate Change and is responsible for drafting the first National Communication to the Parties of UNFCCC. Among the activities undertaken to prepare the national strategy for climate change, preliminary studies on mitigation options have been carried out. Among the options increased use of renewable energy and substituting cleaner fuels for diesel and residual oil in heat and power generation are given high priority.

This project is designed to remove barriers to the increased commercial use of biofuels and is in line with the climate change mitigation elements that will be included in the country's national communication to the UNFCCC. Furthermore Peru is a UNDP programme country and has ratified the UNFCCC on 7 June 1993. The activities realized in this project are in line with the GEF operational programme number 6: "Promoting the adoption of renewable energy by removing barriers and reducing the implementation costs".

4.2 Effectiveness	Rating: Unsatisfactory
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The effectiveness of the project is rated as unsatisfactory. While the pre-trials of the prototype technology were a success, the prototype did not reach Peru, and was not tested on the ground, thus no impacts were achieved in Peru.

Project success was predicated on the development of a successful truck-mounted prototype of the "green sugarcane harvesting" equipment, and its trial operations in a selected Peruvian sugar mill. This did not occur due to the equipment's destruction in a fire in the Spanish factory. However, the project still had some significant successes, as enumerated below:

- (1) After the project was stalled at the UNDP, it was successfully transferred to IFC, and restructured with a new risk sharing structure which involved active risk taking and leadership by AB Volvo.
- (2) New partnership arrangements were agreed to by donor (GEF), IFC, and partners.
- (3) Prototype design and testing was undertaken at a very professional level using Volvo team, equipment, and relationships.
- (4) Successful pre-trials were conducted in Spain, where the equipment performed well, mounted on specially equipped Volvo truck.
- (5) AB Volvo continues to express a desire to work with IFC and many high level contacts, including at the level of IFC EVP were made in connection with the said project.

According to the TE, despite these successes, the equipment destruction in Spain in a fire, and an adverse market, has prompted AB Volvo to exit the project. With no new finances in sight for the development of a new prototype, the project is now being closed.

4.3 Efficiency	Rating: Moderately Satisfactory
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The efficiency of the project is rated as Moderately Satisfactory because, while the project was implemented with minimal IFC resources, the project successfully developed a prototype. Circumstances outside of the stakeholders' control (fire and economic downturn) intervened in producing less than appropriate results.

According to the TE, during Phase 1, GEF funds were levered better than anticipated, with the participation of AB Volvo. However, the big expectation of leverage would have come from Phase 2,

when the prototype after successful testing in Perus would enter into the large-scale production phase. But this did not happen.

The project was delayed and then stopped because of the fire accident and the destruction of the equipment.

No other information is provided by the TE on the efficiency of the project.

4.4 Sustainability	Rating: Unlikely
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Sustainability of the results of the project is rated as unlikely. The project was on hold for 2 years before being closed, and half of the objectives were not achieved.

During project design, sustainability was rated as likely for 2 reasons. Since the payback period of investments for these technologies is around 1-2 years, the investors would sufficient incentives to remain involved. Secondly, long-term sustainability would be enhanced through policy changing activities, human and institutional capacity building, financing accessibility for similar projects, increasing awareness, dissemination of information and increasing project development capacity to create a pipeline of similar projects.

However, according to the last PIRs, due to lack of funding, this particular prototype would be unlikely to reach commercialization. There is merit in the exercise undertaken, and this can inform other Technology Commercialization projects. The project generated significant interest in Peru. University, sugar mills and local sponsor continue to be very interested in the green technology. However, with the dissolution of the project, there will most likely be very little follow-up.

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 structure for Phase1 was of a contingent grant, proceeds from which would be used to structure Phase 2 activities. According to the Terminal Evaluator, this was an appropriate approach, given the significant co-financing (in funds and other resources) that went into this from the partners. However, the delays and disruptions of the project did not allow co-financing to actually materialize.

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 timeline was significantly delayed. The project was on hold for nearly 2 years. Delays occurred in making a successful prototype since original design needed re-work. Moreover, there was a fire that destroyed all the equipment (the fire was determined not to be from the equipment being tested). This accident resulted in a significant setback to the project, and delays. No information in the TE or other documents is available on what was the cause of the accident. Moreover, the TE states that the project team was too thinly staffed at IFC side. There was no assistance in structuring, or in putting in place the appropriate insurance pieces for equipment, and “in retrospect, with guidance from Insurance and other Departments such risks should have been insured” (TE pg.2). The result of the test, however were positive, and if the partners regroup in the future the product still has value. The technology tests in Spain were successful but the destruction of the equipment has meant that the project could not move forward unless partners put in additional financing. Therefore, only one part of the project was successful; the prototype equipment was developed and successfully tested, but the trials and sales in Peru which were a key part of the structure never occurred.

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:

Country ownership is not mentioned in the Terminal Evaluation.

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
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At entry, the implementation of the project was to be closely monitored in accordance with UNDP established monitoring procedures by UNDP Peru. Subsequently the project got transferred to IFC, and there is no mention in the TE and PIRs if the M&E system at entry was modified or not. The PD, written when UNDP was still the IA, says that the project would be annually subject to tripartite reviews by representatives of the Executing Agency, the Government and of UNDP. The programme manager of the project would draft and submit to each review meeting a Project Performance Evaluation Report (PPER). A final report on the project would be submitted for the consideration of the final review meeting. The project would be evaluated when its implementation is half way through and possibly at the end of the project. A separate line for M&E was included in the project’s budget. Based on the M&E design elements noted above, this criteria is rated as Satisfactory.

6.2 M&E Implementation	Rating: Unable to Assess
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M&E implementation is not analyzed in the TE. The only information available about the M&E implementation is that PIRs were submitted as well as a TE. Project supervision by IFC took place. However, no other details are given and nothing is mention on the quality of the M&E implementation. It is therefore not possible to assess the M&E implementation.

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
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According to the TE, IFC played a pivotal role in bringing together 3 players - local sponsor, technology provider, and deep pocketed replicator. This is a model that management was seeking to replicate in the development of a product designated, "Technology Commercialization." This project and its lessons could inform the development of that product. However, according to the Terminal Evaluation the project was too thinly staffed at IFC side, with one Team Leader handling this and over 10 other projects. There was no assistance in structuring, or in putting in place the appropriate insurance pieces for equipment "In retrospect, with guidance from Insurance and other Depts. such risks should have been insured". (TE pg 2)

7.2 Quality of Project Execution	Rating: Unable to Assess
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No rating on project execution is provided in the Terminal Evaluation, and there is insufficient information in the TE and PIRs to provide one in this terminal evaluation review. According to the TE, "While the Team Leader took pains to involve the team in Peru, on both the TA and investment side, this was difficult since the project activities were mostly outside Peru". However, the Team Leader undertook introductions to the local team, and had them participate in partner trips even when Team Leader did not join in. The Team Leader worked with the appropriate investment team members in DC to find out more information on appropriate whetting of partners, selecting a sugarmill, as well as exploring business development opportunities.

8. Lessons and recommendations

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

The following are key lessons learned:

- Developing a green field project using an advanced technology in a developing country is very challenging, and must be undertaken only after careful thought is given to the hurdles and resource allocation. Any structure you put together is likely to deviate from reality, and the Task Manager has to build in contingencies and flexibility into the plan.
- While the presence of strong players is essential in undertaking an enterprise of some size, Task Managers should also be wary of the demands this is likely to place on the other players in the team, and also should be ready to think innovatively and dynamically about the project structures.
- There is a definite need for follow-on initiatives to successful projects if the true benefits of the "demonstration" are to be realized.
- Having a strong team, or contact person in the country where the project is located is not only good, but necessary.
- Financial risk sharing and linkages to performance milestones are necessary and good.

8.2 Briefly describe the recommendations given in the terminal evaluation.

More focus on developing a Knowledge Product would be useful, since the exercise of partnering, prototype building, and testing is something that would be useful for other Technology Commercialization project

There should be more assistance in structuring, or in putting in place the appropriate insurance pieces for equipment. A more robust team is needed, similar to what is available on the investment side of IFC.

Clients (Monder, WSM, and Volvo) were all very satisfied with IFC role and performance. However, partnering between a large corporation like Volvo and two small financially weak entities was a challenge. For the future, such partnering should be done with more manpower and funding for "hand-holding" at a more formal level.

Recommend that the Practice Area Lead continue to pursue partnering opportunities with all partners, and also develop a Knowledge Management product around the lessons learned.

SBI at the time was not structured or staffed to take on projects of this nature, therefore, projects should be run by a team with diverse members lead by the TL, in a manner similar to investment projects, and management should be prepared for long development cycles and a significant failure rate for projects dealing with technology commercialization.

9. 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 EO 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?	Outcomes and impacts are described, even though the project was not successful and most of the outcomes were not achieved. However, there is a lack of details and evidence for everything reported. For example, there is almost nothing on relevance or efficiency of the project.	MU
To what extent is the report internally consistent, the evidence presented complete and convincing, and ratings well substantiated?	The report is consistent, however the evidence presented is not complete. More details should be given, and more explanations on what happened to the project should be given. There is no information on the quality of execution for example, and very little information on the quality of implementation. The TE lacks ratings for M&E systems, as well as for quality of execution.	MU
To what extent does the report properly assess project sustainability and/or project exit strategy?	Sustainability is almost not assessed; most of the information was found in the Project Document. The TE does not develop enough sustainability or project exit strategy.	MU
To what extent are the lessons learned supported by the evidence presented and are they comprehensive?	The lessons learned are very well documented, and supported by the evidence.	S
Does the report include the actual project costs (total and per activity) and actual co-financing used?	The project costs are included but not detailed per activity, and co-financing did not actually materialize in this project. There is no costs efficiency, and no financial analysis realized.	MU
Assess the quality of the report's evaluation of project M&E systems:	M&E systems are not mentioned in the TE.	HU
Overall TE Rating		MU

$$\text{TE Rating} = (.3*(3+3)) + (.1*(3+5+3+1)) = 3 = \text{MU}$$

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