



United Nations Development Programme

Royal Government of Bhutan

Review of GEF Project: Bhutan Sustainable Rural Biomass Energy Project (SRBE) (PIMS No: 4181)

Mid-Term Review Report

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SYNOPSIS

Title of UNDP supported GEF financed project: Bhutan Sustainable Rural Biomass Energy (SRBE)

UNDP Project ID: 4181

GEF Project ID: 3844

Mid Term Review time frame: October 2012 to October 2014

Date of Mid Term Review report: November 27, 2014

Region and Countries included in the project: South Asia region, Bhutan

GEF Focal Area Objective: CC-4; Promoting sustainable energy production from biomass

Implementing partner and other strategic partners: Department of Renewable Energy, Ministry of Economic Affairs, Department of Forest and Park Services, Ministry of Agriculture and Forests, Royal Government of Bhutan

Mid Term Review team members: Mr. Sandeep Tandon, International Consultant; Mr. Yeshey Penjor, National Consultant.

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ABBREVIATIONS

ADB	Asian Development Bank
APR	Annual Progress Report
BERIS	Bhutan Energy Resource Information System
BET	Biomass Energy Technology
BT FEC	Bhutan Trust Fund for Environmental Conservation
BAoWE	Bhutan Association of Women Entrepreneurs
CBO	Community Based Organisation
CFMG	Community Forestry Management Group
CO ₂	Carbon dioxide
CSO	Civil Society Organization
DAHE	Department of Adult and Higher Education
DRE	Department of Renewable Energy
DT	Dzongkhag Tshogde (District Development Committee)
EE	Energy Efficiency
EOP	End of Project
GEF	Global Environment Facility
GHG	Greenhouse Gas
GNHC	Gross National Happiness Commission
GT	Gewog Tshogde (Block Development Committee)
IPCC	Inter Governmental Panel on Climate Change
M&E	Monitoring and Evaluation
MoAF	Ministry of Agriculture and Forests
MoEA	Ministry of Economic Affairs
MOIT	Ministry of Industries and Trade
NEX	Nationally Executed Project
NGO	Non-governmental Organization
NRDCL	National Resource Development Corporation Limited
Nu	Ngultrum (Bhutanese currency)
PAC	Project Appraisal Committee
PB	Project Board
PEI	Poverty Environment Initiative
PIMS	Project Implementation Management System
PIR	Project Information Report
PMU	Project Management Unit
REAP	Rural Economic Advancement Programme
RGoB	Royal Government of Bhutan
RTA	Regional Technical Advisor
SDC	Swiss Agency for Development and Cooperation
SFED	Social Forestry and Extension Division
SRBE	Sustainable Rural Biomass Energy
TOR	Terms of Reference
UNFCCC	United Nations Framework Convention on Climate Change
UNDAF	United Nations Development Assistance Framework
UNDP	United Nations Development Programme
UNDP-CO	UNDP Country Office
USD	United States Dollar
VTI	Vocational Training Institute

EXECUTIVE SUMMARY

Project Information Table

Project Title:	Bhutan Sustainable Rural Biomass Energy			
GEF Project ID:	3844		<i>at endorsement (Million US\$)</i>	<i>at midterm review (Million US\$)</i>
UNDP Project ID:	4181	GEF financing:	1,703,000	1,703,000
Country:	Bhutan	UNDP:	200,000	200,000
Region:	South Asia	BTFC:	300,000	300,000
		PEI:	50,000	30,000
Focal Area:	Climate Change	RGoB:	510,000	510,000
FA Objectives, (OP/SP):	CC-4; Promoting sustainable energy production from biomass	Total co-financing (SDC, ADB, and private sector):	1,466,700	1,466,700
Executing Agency:	UNDP	Total Project Cost:	4,229,700	4,229,700
Other Partners involved:	SDC, ADB	ProDoc Signature: (date project began)	28 August 2012	
		(Operational) Closing Date:	31 st December 2015	31st December 2015

Project Description

The Sustainable Rural Biomass Energy (SRBE) Project is a three-year programme contributing to the reduction of greenhouse emissions through the sustainable production and utilization of biomass. The project aims to create awareness and demand for efficient cook stoves through its demonstrations in rural households and also demonstration of biomass energy technologies (BET) in private industries. This will be achieved through mainstreaming sustainable biomass energy in policy formulation and building capacities in the management of community forests and production and utilization of biomass energy technologies using wood as fuel.

SRBE Project is relevant for Bhutan since it is one of the countries with high per capita domestic fuel wood consumption of about 1.17 tonnes per person per year. With 70 percent of the population living in rural areas, and fuel wood is the main source of energy for cooking and heating. There is thus, constant demand of fuel wood from the forests of Bhutan. The inefficient fuel wood consumption has been contributing to high rate of deforestation and forest degradation, high levels of indoor air pollution and greenhouse gas (GHG) emissions.

SRBE Project is supported by the Global Environment Facility (GEF), the Royal Government of Bhutan (RGoB), the United Nations Development Programme (UNDP) and other funding partners. The Project is designed to integrate a top-down approach of providing support through policy measures and incentives in demonstration and deployment of energy efficiency technologies, and a bottom-up approach of creating demand for the sustainable development and utilization of stoves and biomass energy technologies (BETs) using wood as fuel. The SRBE Project has following Goals and Objectives:

Project Goal: Achieve reduction of GHG emissions from rural households, select industries through sustainable biomass production, utilization, and promotion of efficient energy technologies.

Project Objective: Removal of barriers to sustainable utilization of available biomass resources in the country; and application of biomass energy technologies that can support the economic and social development in the country's rural sector.

The Project has been designed with three components that are expected to generate outcomes that will help to realize the Project Objective. Moreover, the Project is expected to deliver certain outputs that will help to:

- Mainstream sustainable biomass energy production, conversion and utilization
- Support innovative practices and market mechanisms for local sustainable biomass energy technology development and promotion
- Build capacity of stakeholder and knowledge management

The main problem in Bhutan regarding biomass is the unsustainable utilization of biomass resources. This is mainly due to the (a) inadequate policies and institutional set up; (b) use of inefficient biomass technologies and their applications; and (c) inadequate local knowledge and expertise to produce and utilize modern and efficient biomass systems.

Project Progress Summary

SRBE experienced delay in its start-up in January 2013 and implementation was slow until September 2013. The project start-up coincided with the 2nd parliamentary elections during which the Election Commission of Bhutan banned public meetings and gatherings all over the country. The project implementation was designed to start with workshops, awareness raising and training components, but since this was in conflict with the order of the Election Commission, the project had to wait for the elections to be over in July. Thereafter, three months of peak monsoon period coupled with farming season delayed the field work as beneficiaries could not participate in the consultation process. Monsoon season also restricts the movement of vehicles in the hills and to the villages which are away from main road.

The Project Management Unit (PMU) utilized this time in changing the original design of the cook stove which was provided by an Austrian expert. The modification was successful in retaining efficiency levels while reducing the metal components which helped to reduce the cost of cook stove by nearly 75% of the original design, which is a positive outcome since it allows the project to extend the benefit to a large number of rural households. In addition, the PMU also utilized the time in preparation of the tender documents and carrying out the procurement of goods and services. Although the procurement started at the right time but it took a significant amount of project's time and several rounds to complete due to poor response in the initial rounds. This is another factor that slowed down progress of the project.

The project also faced delays in the selection of Community Based Organization (CBO) as its decision to engage Royal Society for Protection of Nature (RSPN), as suggested in the ProDoc, was turned down by the Ministry of Finance (MoF). The project was advised to follow the standard procurement procedures to appoint a CBO as an implementing agency. Finally, after months of delays, Bhutan Association of Women Entrepreneurs (BAoWE) was selected to implement the project in three

Dzongkhags, namely Zhemgang, Tsirang and Dagana and Tarayana Foundation in Sarpang Dzongkhag. In rest of the 16 Dzongkhags, Non-Formal and Continuing Education Division (NFCED), of the Department of Adult and Higher Education (DAHE), Ministry of Education (MoE) has been selected by the Project Board to implement the project with the help of the Non-Formal Education (NFE) Instructors who are posted in the rural communities.

After September 2013, the Project experienced steady progress and by mid-2014 it had gained momentum to complete the activities of the Project on time. The project will require paying close attention to procure metallic parts of cook stoves for all 20 Dzongkhags and installation before the onset of monsoon in 2015. At the time of MTR, the pilot phase activity is covering only two Dzongkhags. DRE has already awarded contract for supply of metallic parts for 10 Dzongkhags, while procurement of metallic parts for remaining 8 Dzongkhags is being carried out by UNDP CO. However, DRE and the project implementing agency expressed confidence of completing the project activities by the end of project.

A list of key activities with dates and events since the signing of ProDoc is presented below:

- Project operations commenced in August 2012 with the signing of Project Document;
- Inception meeting for the Project Board Members was held in October 2012;
- Assistant Programme Officer was recruited in December 2012, and plans for community forest at eight locations in four Dzongkhags were finalized in discussion with Community Forest Management Groups;
- A local consultant was engaged in the first quarter of 2013 to re-design the cook stove and reduce its metallic parts without affecting the efficiency. The prototype was completed in end April 2013
- Project Manager for SRBE project was appointed in April 2013;
- A workshop was organized in Thimphu on 28th August 2013 on “Energy Efficient Biomass Energy Technologies and Gender roles” which was attended by 32 participants. The participants provided recommendations for implementing stoves, briquetting and gasification projects;
- Trashigang Dzongkhag pilot project which was supposed to install around 1247 stoves by March 2013 faced issues of non-delivery of critical metallic parts from the fabricator and only 169 stoves were installed in the scheduled time period in the pilot;
- Frequent shifting of project officials from different agencies significantly affected the project progress. Four different officials from different agencies including DAHE either resigned or moved to other agencies creating institutional memory loss, gaps in transfer of knowledge and proper handing over of responsibilities.
- The 3rd Project Board Meeting decided not to proceed with the Biomass gasification technology for industrial use and divert the funds towards briquetting project mainly to utilize the sawdust in private sawmills and improved cook stoves programme.
- A Thimphu based agency M/s Athang ICTech was selected for development of project website (www.bioenergy.gov.bt) and data base
- Asian Institute of Technology is engaged by the project to assess the efficiency of cook stoves.

Mid-Term Project Ratings and Achievement Summary

These are provided in Table A in the following page.

Table A: Summary Review of Project¹

Measure	MTR Rating	Achievement Description
Progress Towards Results	Objective: Removal of barriers to sustainable utilization of biomass resources and application of BET Achievement Rating: 4 (Moderately Satisfactory)	Project progress had been slow until third quarter of 2013 after which progress picked up. The re-designing of cook stoves with fewer metallic part lead to reduction in its cost, the new design is owned by DRE; training and awareness raising workshops on Biomass Energy Technologies were completed in 2013. Order for supplies of cook stoves in 10 districts is being implemented, and procurement of cook stove parts for 8 districts is underway Post project implementation data from the field will be required to assess the amount of GHG reduction achieved at EOP and assign an achievement rating to the project.
	Outcome 1: Implementation of strengthened support policies and framework for sustainable practices in production and use biomass resources. Achievement Rating: 4 (Moderately Satisfactory)	<ul style="list-style-type: none"> Developed biomass information system M/s Bhutan Statistical Services and Environmental Consultancy conducted a baseline survey on assessment of fuel-wood consumption and baseline health study in Bhutan. Plantation of about 178,400 saplings by Community Managed Forest Groups carried out in seven districts. Review of policies related to biomass energy in progress
	Outcome 2: Implementation of BET applications Achievement Rating: 3 (Moderately Unsatisfactory)	<ul style="list-style-type: none"> Memorandum of Understanding (MoU) was signed between DRE and DAHE in July 2013 to implement pilot project in Trashigang; two MOU was signed between DRE and DAHE to implement project in other 15 districts; BAoWE selected for implementation in 3 districts while Tarayana Foundation selected for implementation in one district by the Project Board Procurement and delivery of metallic parts expected to be complete by the 1st quarter of 2015 Feasibility studies conducted on biomass gasification concluded project to be not feasible both technically and economically, while biomass briquetting is feasible technically and economically Completion of the installation of 13522 improved cook stoves and demonstration of BET in two industries is important for improving the achievement rating of this outcome and overall project.
	Outcome 3: Improved knowledge, awareness and capacity of policy makers, financiers and end users on BET Achievement Rating: 4 (Moderately satisfactory)	<ul style="list-style-type: none"> National Consultant developed construction manual for stoves (Cook stoves and fodder stoves) in English and national language The Project Management Unit developed Operational & Maintenance Guidelines and Brochures for improved stoves in English & National Language. Distribution of manuals completed for NFE Instructors of Trashigang Dzongkhag Design and printing of energy efficient fuel wood stoves' brochures completed 334 NFE instructors (121 male and 213 female), and 28 technicians (16 male and 12 female) of CBO received training on installation of improved cook stoves 878 CFMG members (557 male and 321 female) trained on sustainable wood energy by SFED out of 50 targeted Two Foresters were trained as ToT on sustainable wood energy in China out of 100 targeted
Project Implementation & Adaptive Management	Achievement Rating : 4 (Moderately Satisfactory)	<ul style="list-style-type: none"> Adaptive management carried out by the project The engagement of NGO/CBO and fabricators took longer than expected due to lack of response to government 's procurement notices Cost escalation of material and services led to revision of some of the project targets
Sustainability	Achievement Rating : 3 (Moderately Likely)	<ul style="list-style-type: none"> The demonstration of improved BET in the private sector industries are yet to be carried out to show its effectiveness and draw the industries' attention to adopt it; The participation of private sector in SRBE has been much below anticipated level due to limitation in access to (bank) finance which is required to fulfil the contractual obligation. The continuation of Government's restriction on offering loan from financial institutions to private business entities creates uncertainty about the fabricators and private industry's ability to respond to future demands Efforts are required to secure finance from government and development agencies to continue deployment of improved cook stoves in rural households especially in the hilly areas. The DRE is in discussion with Norwegian Government to roll out the improved stoves under its Energy plus programme by 2016. Exact number of stoves to be rolled out will be decided during the next Joint Coordination Group meeting

¹ The Project outputs are rated on the following scale: 6: Highly satisfactory (no shortcomings), 5: Satisfactory (minor shortcomings), 4: Moderately satisfactory, 3: Moderately unsatisfactory (significant shortcoming), 2: Unsatisfactory (major problems); and 1: Highly unsatisfactory (severe shortcomings)

Conclusions

- Project progress has been slow during the first three quarters of 2013 during which the work was initiated by the PMU on re-designing the cook stoves which lead to significant reduction in its cost, conducting training and awareness raising workshops on Implementing Sawdust Briquetting Technology, and Energy Efficient Biomass Technology and Gender roles implementation, and holding Project Inception workshop;
- Project has picked up steady progress since October 2013 and has gained momentum by first half of 2014. During the past 12-months (October 2013 to September 2014) the project has taken important steps towards the ultimate goal, starting with a Baseline study on Fuel Wood consumption to provide the latest per capita fuel wood consumption figure, and feasibility studies on gasification of sawdust and sawdust briquetting;
- Plantation activity by SFED has been highly satisfactory achieving 100% target of the project with more than 878 CFMG members out of targeted 50 were trained on sustainable wood energy. However, only 2 officials against requirement of training 100 officials have been achieved failing seriously in fulfilling Outcome 3. The project target in the Project Planning Matrix may need to be revised in line with the available resources to complete the training of forestry officials on community forestry;
- The dissemination of improved stoves in two districts is in progress and two Memorandums of Understanding have been signed between DRE and Department of Adult and Higher Education for implementing improved cook stoves in 16 districts. Two community Based Organizations have been selected for implementation in the remaining four districts;
- The low rate of expenditure in the 21 months is a concern as the balance remaining has to be expended in remaining 14 months of the project, which requires meticulous planning and coordination among all stakeholders and timely delivery of metallic parts of the improved cook stoves in 18 districts;
- The modality of implementation of biomass briquettes needs to be finalized fairly soon allowing time for the procurement process, followed by pilot demonstrations in selected private industries by second quarter of 2015. This will help to consolidate the technical and economic viability of a BET in industrial sector;
- DAHE faces human resource constraint which the project needs to address urgently since close coordination and timely delivery of fabricated cook stove parts in 16 districts are critical to the timely completion of the project;
- Project will need to address the issue of poor response by private sector participants to its various procurement notices. Lack of access to bank finance is a major factor holding the private sector since they may not possess sufficient finances which are required to fulfil required obligations;
- The GEF-UNDP SRBE Project is covering approximately 16% of the rural households with improved cook stoves. For the potential demand from remaining households and sustainability of the activity, DRE and GNHC will need to prepare plan using the experiences gained by the SRBE Project implementers namely, DAHE, BAoWE and Tarayana foundation;

- A mechanism is required to be put in place for the Project Management Unit to learn about the issues faced by technicians and NFE Instructors at the time of installation and operation of cook stoves, and find solutions in a time bound manner to prevent failures in the field.
- Completion of installation of improved cook stoves in the all the target households and also demonstration of advance BET in industries. These are important targets for the project and will help the project to make progress, achieve better outcomes and EOP targets.
- The project has been included by UNDP CO in the Gender Mainstreaming Initiative under which it set 3 goals for the Gender Action Plan. These goals are:
 - At least one women in every cook stove owning household trained in basic O&M of ICS
 - Improved health of women and children by use of the ICS
 - Both men and women will participate actively in the fuel wood plantation and management.

The present progress of the project up to the time of conducting MTR, the third goal of the mentioned above has been met. The remaining two goals will be achieve by EOP.

Recommendations

Recommendation 1: Strengthen DAHE with at least one human resource to share the increased volume of work and help with coordination and management of cook stove deliveries across 10 districts for remainder of the project. This recommendation is based on the review of the arrangements put in place by the project and its implementing partner, DAHE, for training, awareness building, roll-out and installation of cook stoves in 15 districts across the country. Currently, DAHE has only one person in the head quarter in Thimphu, who besides the regular work has an additional responsibility of tracking the progress of SRBE activities. Starting in October 2014 for the next three quarters approximately 12,000 cook stoves will be delivered in rural households, there is a need to closely coordinate the supply of metallic parts for the cook stoves at district and block level, and keep the NFE instructors informed about it so that the installation work can be carried out with minimum delays. It is critical that the project makes immediate arrangement for providing at least one (if possible two) dedicated human resources till end of project (EOP) to strengthen the functioning of DAHE. This will help in implementation as the project reaches an important stage and the presence of these human resources will help to mitigate delays due to lack of coordination.

Recommendation 2: Communication with the District Officials about the SRBE project; its implementing and supporting agencies; end users and the overall benefits will help in securing feedback from Dzongkhag for scale up. The project has been carrying out awareness and capacity building support about the biomass energy technologies including improved cook-stoves and its installation. Several workshops and field trainings have been carried out in about 7-8 districts and written communications provided to district administration. Though this is an ongoing work, the review team would like to emphasize the importance of keeping district and block level district administration officials apprised of the field activities namely, cook stove installations and community forestry plantations, as the project activities are implemented in their respective districts. The Gup and district administration have an important role while providing feedback about the effectiveness of the programme to the national ministries and the feedback is important input for scaling up and sustaining the efforts after EOP.

Recommendation 3: Expedite the implementation of briquetting project with private sector saw mills to gain experience, build capacity and arrive at a better understanding of the market for briquettes. The SRBE has two main components for demonstration and deployment of BET. While the work on improved cook stoves has lately picked up and reaching satisfactory level, the interaction with the industries is yet to take place. In order for the project to achieve the EOP target of BET use, the project needs to expeditiously decide the way forward with the private sector, which faces constraints on account of restrictions imposed by RGoB and the banks. Therefore, project need to decide the modality of supporting the pilot demonstration of biomass briquetting to gain experience of technology and business models which are easy to replicate. It is important that the briquetting project is immediately taken up for implementation so that the experience gained of about 1 year, can be documented before EOP.

Recommendation 4: A qualitative and quantitative study in the 3rd quarter of 2015 to capture the benefits and the impact of improved cook stove. This recommendation is based on the information gathered by MTR reviewers from the field visit and interactions with rural household on the advantages of using improved cook stove over conventional cook stove and rice cookers.

These cook stoves are in use for about a month, however it has already provided some tangible benefits in terms of reduced time required in cooking, relatively less fuel wood consumption and improved air quality inside the house. Once the roll out of the target number of cook-stoves is complete and households have gained a few months of experience of using the improved cook-stove, a post implementation study will help to capture the benefits both in qualitative and quantitative terms which will provide the necessary evidence for sustaining the efforts and extending the benefits to the other rural households. The post implementation study will also serve to monitor and evaluate the impact of the project in containing the rapid increase of biomass across country, and providing benefits to women and children.

Recommendation 5: UNDP to work with DRE and GNHC to make budgetary provision in the annual plans for 2016, 2017 and 2018 to support improved cook stoves installations in the hilly regions and to low income rural households by the end of current plan period. The project's current focus is on the implementing various activities and achieve completion by EOP. There are multiple benefits to the rural families from using improved cook stoves, especially women benefit from improved health and more time for alternate economic activities, and thus it has the potential to support the RGoB's efforts on reducing the poverty level in the country. The SRBE is expected to benefit about 16% of the rural population and the MTR team is of the view that the benefits of improved cook stove needs to be shared with the remaining low income rural population. A great deal of effort have been spent to build the capacity of intermediary government agencies, CBO and NGO, therefore, RGoB should take advantage of this development by making budgetary provision in the annual plan of the current five-year plan which will allow the work to be continued. The sustainability of the project is moderately likely as the DRE is holding discussions with Norwegian government to support the programme. It is recommended that UNDP holds dialogue with DRE and GNHC and assist the concerned ministry in arriving at a decision to continue the work throughout the country until the end of current plan period.

Recommendation 6: Use standard methodologies of IPCC and UNFCCC to estimate GHG reduction from forestry. This recommendation is being provided for the project to work with SFED to factor in the contribution of the project in reducing greenhouse gas emissions from as a result of direct intervention made due to community forestry plantations. Studies have showed a high rate of CO₂ absorption by the plants during the first 10 years. Due to the combined effect of the community forestry for carbon sequestration and efficiency improvement, the overall post-project GHG reduction benefit from SRBE is envisaged to be better than originally estimated during the project design. The suggested reference materials are (a) IPCC's 'The Good Practice Guidance for Land-Use and Land Use Change and Forestry'², and (b) UNFCCC's CDM 'Methodology on Afforestation and reforestation of lands except wetlands' (AR-ACM0003)³.

² Report is available on http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf_files/GPG_LULUCF_FULL.pdf

³ Methodology is available on <https://cdm.unfccc.int/methodologies/DB/C9QS5G3CS8FW04MYXXDFOQDPXWM4OE>

1. INTRODUCTION

This report summarizes the findings of the Mid-Term Review (MTR) Mission for the UNDP-GEF project entitled “Sustainable Rural Biomass Energy” (herein referred to as the “Project” or SRBE) implemented by the United Nations Development Programme (UNDP) with financing support provided by the Global Environment Facility (GEF). The Midterm Review Mission for SRBE was conducted at Thimphu between October 5-15, 2014 and included site visit to Zhemgang. The timeframe of this report is January 2013 to October 2014.

1.1 Purpose of Mid-Term Review and Objectives

The purpose of the mid-term review (MTR) for the Project was to evaluate the progress towards attainment of global environmental objectives, project objectives and outcomes, capture lessons learned and suggest recommendations on major improvements. The MTR serves as an agent of change and plays a critical role in supporting accountability. As such, the MTR serves to:

- Strengthen the adaptive management and monitoring functions of the Project;
- Enhance the likelihood of achievement of Project and GEF objectives through analyzing project strengths and weaknesses and suggesting measures for improvement;
- Enhance organizational and development learning;
- Enable informed decision-making;
- Identify and validate proposed changes to the ProDoc to ensure achievement of all project objectives; and
- Assess whether it is possible to achieve the objectives in the given timeframe, taking into consideration the speed, at which the Project is proceeding.

In accordance with UNDP/GEF monitoring and Review (M&E) policies and procedures, all projects with long implementation periods (e.g. over 3 or 4 years) are strongly encouraged to conduct MTRs. In addition to providing an independent in-depth review of implementation progress, the MTR is intended to be responsive to GEF Council decisions on transparency and better access to information during implementation. Key issues to be addressed by this MTR include:

- Project progress to date;
- The achievability of project targets given the current outcomes, availability of resources and personnel;
- The necessity of resetting targets and resources; and
- Sustainability of project’s achievements, lessons learned for scale up.

The SRBE project document (ProDoc) provides details on the various efforts by the Royal Government of Bhutan (RGoB) to:

- Analyze and assess the use of fuel wood in households in rural areas across the country ;
- Study the pattern of fuel wood usage in private industries, and
- Arrive at technology solutions to reduce the amount of biomass energy utilization

1.2 Midterm Review Methodology and Scope

The scope of the MTR covers the entire UNDP-GEF project and its components as well as the co-financed components of the project. The MTR will assess Project implementation taking into account the status of Project activities, outputs and the resource disbursements made up to October 2014. The MTR will also report on the progress against objective, each outcome, output, activity (including sub-activities) and impact indicators listed in the ProDoc. In addition, the progress against the objective and outcomes will be assessed as to how these will be achieved within the project duration (31 December 2015) or with a project extension. This MTR will evaluate 21 months of the project progress and achievements. The MTR report will conclude with recommendations, as appropriate, for the key stakeholders of the project. The MTR will be approached using the criteria of **relevance, effectiveness, efficiency and, sustainability**, as defined and explained in the UNDP guidance for conducting mid-term review of UNDP-supported, GEF-financed Projects.

Table 1: Summary of Efforts of the Midterm Review Team

Review Tier	Key Actions
Macro level	<ul style="list-style-type: none"> Review of project documents Review relevant policies and programs/guidelines Review progress reports Courtesy calls, meetings and interview with policy makers Meetings and interviews with project staffs Interviews with national level key stakeholders
Programmatic	<ul style="list-style-type: none"> Review targets in Project Planning Matrix (Log frame) and project accomplishments Find out capacity gaps and resource needed to meet the targets Ask for recommendations of the organizational managers to move the project in other locations – what needs to be done to generate demand from people for energy efficient cook-stoves?
Micro level	<ul style="list-style-type: none"> Meetings and interviews with stakeholders, program partners, and building sector professionals –on their satisfaction, benefits of participating in SRBE project and interacting with project team Ask opinion of the beneficiaries and government officials whether the SRBE project linkages are working and are relevant and timely. If not what improvements could be done

1.3 Structure of the Mid-Term Review Report

This Review report is presented as follows:

- An overview of project implementation from the commencement of operation in January 2013;
- Review of project results based on project design and execution; and
- Conclusions, recommendations and lessons learned that can increase the probabilities of success.

This MTR is being prepared according to GEF M&E policy available from:

<http://thegef.org/MonitoringandReview/MEPoliciesProcedures/mepoliciesprocedures.html>

as well as the UNDP-GEF “Guidance for Conducting Mid-Term Reviews of UNDP-Supported, GEF-Financed Projects” dated June 2014.

2. PROJECT BACKGROUND AND DESCRIPTION

2.1 Project Developmental Context

Bhutan has one of the highest per capita consumption of fuel wood in the world, at 1.17 tonnes per person. Fuel wood is the main source of energy for cooking and heating in the rural areas of Bhutan, where about 70% of the population lives. Total wood energy consumption is estimated at more than 66% of the total energy use in the country. About 92% of the consumed energy is used to meet cooking demand, 6% for space heating demand and about 2% for lighting [Bhutan Energy Data Directory, 2005]. While there is adequate availability and easy supply of biomass, its utilization at present is inefficient, particularly due to widespread use of inefficient traditional wood stoves and furnaces. The inefficient fuel wood consumption is contributing to deforestation, indoor air pollution and greenhouse gas (GHG) emissions. This trend also poses a slowly increasing threat to the forest of Bhutan against the constitutionally mandated requirement for the country to maintain a minimum forest cover of 60% for all time.

The present energy supply in Bhutan is primarily based on hydro-power. Fuel wood is the main source of primary energy for Bhutan, and it represents the largest slice of energy consumption. The country supplied 724,183 tonnes of fuel wood (231,871 tonnes of oil equivalent (TOE)) during 2005, which accounted for 57.7% of the total primary energy supply. In addition to fuel wood, other biomass fuels that were used in small quantities including briquettes made from sawdust (204 tonnes or 65 TOE). The main source of primary energy consumed in Bhutan continues to be fuel wood which is mainly used in the residential sector for cooking and to a certain extent for space heating.

The assessment of household incomes reveals that about 40% of the respondent households live below the national poverty line of 13,152 Nu/year (Approx. 290 USD/year). Their vulnerability due to poverty, food shortages and small land holdings limit their disposable incomes which make it difficult for them to purchase stoves that cost much more than the amount they pay for the stoves they currently use. Ordinary mud and stone stoves using fuel wood without chimneys are the most commonly used cook stoves. For fodder stoves, the most common stove used is the ordinary mud and stone stove usually constructed in sheds outside the main house. Villagers in southern Bhutan use the three-stone open stoves. For heating, the most widely used stoves are the ordinary mud and stone cook stoves. *Bukharis* (locally-made heaters made of metal and using wood as fuel) are also common in high altitude and in mid-altitude regions. Electrification does not totally substitute or reduce use of fuel wood by communities connected to the grid. Statistics have shown that substantial quantities of fuel wood are used in cooking, fodder and heating stoves, and fuel wood use increases with increase in altitude in all types of stoves.

To address the above problem, the Sustainable Rural Biomass Energy (SRBE) Project with the support of the Global Environment Facility (GEF), the Royal Government of Bhutan (RGoB), the United Nations Development Programme (UNDP) is focusing on the promotion and use of biomass energy resources for the provision of energy services in rural areas.

The Project is expected to result in a reduction of annual biomass/fuel wood consumption in Bhutan through the gradual utilization of biomass-based energy systems and efficient use of biomass for cooking in households. The project will facilitate the widespread application of biomass-based energy systems in the country, particularly for economic and social uses in the

country's rural areas. The reduction of GHG emissions in the country through the use of more efficient fuel wood technologies and sustainable biomass energy generation is expected to provide economic, environmental and social benefits to rural communities, due to reduced time involved in cooking, reduced exposure to harmful pollutants and reduced health incidences, and availability of time especially for women to devote to other productive uses and income generating activities.

2.2 Problems to be Addressed by the Project

Though the constitution requires 60% of the total geographical area to remain under forest cover, Bhutan faces the problem of unsustainable utilization of biomass resources. This situation is caused mainly due to a) inadequate policies and weak institutional set up; b) use of traditional inefficient cook stoves; and c) low level of local knowledge and capability to produce and utilize modern and efficient biomass systems.

The unrestricted utilization of biomass resources leads to very high consumption of fuel wood in Bhutan making the country being one of the highest consumers of fuel wood per capita, and contributing to increased depletion of the country's forest trees. In order to attain a sustainable utilization of biomass resources, the long-term solution consists of approaching the problem through policy measures, enhancement of local capability on all aspects of biomass energy technology (BET) applications and the use of market mechanisms to implement efficient BET applications.

Some of the main barriers to sustainable biomass energy development and utilization are:

- Absence of a coherent and comprehensive renewable energy policy
- Absence of incentives from the government that would facilitate the acceleration of the development and wider scale application of sustainable biomass energy resources
- No comprehensive information on renewable energy resources and utilization options in the country
- Lack of enterprises that supply biomass energy system equipment and services
- Lack of technical expertise and financial resources for appropriate assessments and packaging of BET applications for productive and social uses
- Low level of awareness and capacity on sustainable biomass energy technologies
- Lack of examples of efficient technologies that are successfully operating in the country

2.3 Project Description and Strategy

The goal of the project is to reduce the amount of GHG emissions in the rural household and industrial sectors of Bhutan by utilizing the country's biomass energy resources in a more efficient and sustainable manner. The project's objective is to help remove the barriers to sustainable utilization of available biomass resources in the country and enhance the application of biomass energy technologies that can support economic and social development in the country's rural sector.

The proposed project is consistent with Bhutan's policies reflected in the 10th and 11th Five Year Plan, National Poverty Reduction Strategy Program, Renewable Energy Master Plan and the draft Renewable Energy Policy. These policies include: (1) linking new and renewable energy to sustainable development policies and to actions consistent with relevant international agreements; and, (2) attracting investments supporting national development objectives. It is also in line with the agreed strategic area of support under the current United Nations Development Assistance Framework (UNDAF) from 2008-2012 for Bhutan, namely: (1) Capacity of relevant agencies and communities to implement Renewable Energy Program improved; and, (2) Effective and affordable renewable/alternative energy technologies for remote Geogs (a group of villages) supported.

The project, while achieving global environmental benefits in terms of CO₂ emission reductions, will also contribute to the objectives of the country's 10th Five Year Plan (2008-2013), the National Poverty Reduction Strategy Program, the Renewable Energy Master Plan and the draft Renewable Energy Policy. The project will support the improvement of the living conditions of people in the rural areas allowing them to contribute more productively to the economy, and also contribute to environmental protection. The proposed project will facilitate the adoption of modern and sustainable practices in biomass-based energy production, conversion and use of energy to support rural development and livelihoods in Bhutan. It will ensure that biomass energy use does not contribute to deforestation, reduced soil fertility nor increased GHG emissions beyond the project boundaries.

The project is designed to integrate a top-down approach of providing support through policy measures and incentives, and a bottom-top approach of promoting market mechanisms to create demand for the sustainable development and utilization of stoves and biomass energy technologies (BETs) using wood as fuel. The production of sustainable biomass resources in community forest plantations is also being promoted. To enhance the effectiveness of these approaches and to create an enabling environment among the stakeholders and participants in the project, capacity building and training activities is being carried out among the different levels of participants and in the different stages of the project execution.

Based on the above strategic considerations, the project is focusing on three major components:

- Mainstreaming sustainable biomass energy production, conversion and utilization
- Supporting innovative practices and market mechanisms for local sustainable biomass energy technology development and promotion
- Capacity building and knowledge management

2.4 Project Implementation Arrangements

The SRBE project is being implemented by UNDP and executed by the Department of Renewable Energy (Ministry of Economic Affairs) and Social Forestry and Extension Division (SFED) of Ministry of Agriculture and Forests under guidelines for nationally implemented modality (NIM).

Under this arrangement, UNDP assumes the overall management of the project under the direction of the NPD from DRE. The day-to-day management of the project has been carried out by a Project Management Unit (PMU) under the overall guidance of the Project Steering Committee (PSC) consisting of DRE, Social Forestry and Extension Division, Non-Formal

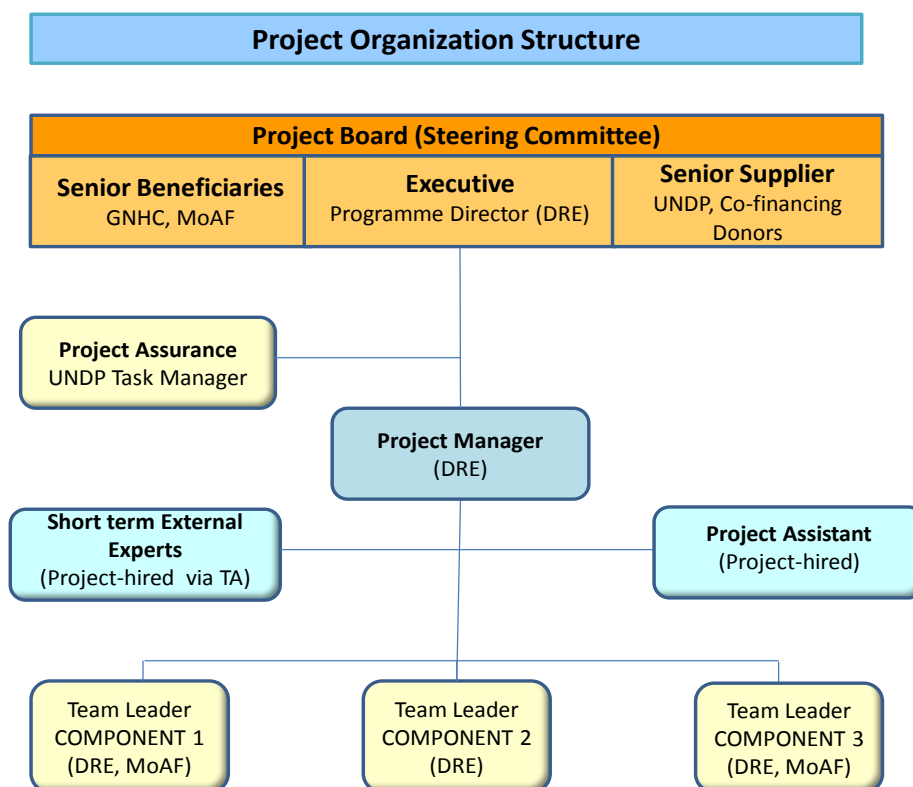
Education Division, UNDP. The PMU is established within the premises of DRE, MoEA and reports to the DRE, the executing agency and the PSC. The Project organogram is provided on Figure 1.

2.5 Project Timing and Milestones

The project document was signed on 28th August 2012 with the Project commencement date being 1st January 2013, the Project duration is 3 years with the terminal date of 31st December 2015. While there were no milestones as defined in the ProDoc or in the AWP, holding a project inception meeting in October 2012 could be considered a first milestone followed by hiring of Assistant Project Manager of the PMU as a second milestone and the signing of contract with a local consultant to re-design the cook stoves as a third milestone.

2.6 Main Stakeholders

The main Project stakeholders include: United Nations Development Programme (UNDP), Department of Renewable Energy (DRE), Ministry of Economic Affairs (MoEA), Gross National Happiness Commission (GNHC), Non-Formal Education Division (NFED), Department of Adult Higher Education (DAHE), Ministry of Education (MoE), Bhutan Trust Fund for Environment Conservation (BT FEC), Social Forestry and Extension Division (SFED), Department of Forests & Park Services (DoFPS), Ministry of Agriculture and Forests (MoAF), Bhutan Association of Women Entrepreneurs (BAoWE), Tarayana Foundation and all twenty Dzongkhags.

Figure 1: Project Management Organogram

- UNDP is the primary funding agency on behalf of Global Environment Facility (GEF) and also through the country office Poverty Environment Initiative (PEI). The PEI contribution is supplemented by the Joint Sector Programme (JSP).
- GNHC is the main executing agency on behalf of the Royal Government of Bhutan.
- DRE is the project coordinating agency on behalf of the Government and the executing agency, GNHC.
- NFCED, DAHE, MoE is the implementing agency in 16 Dzongkhags involving Non-Formal Education Instructors as the focal project officials in the field.
- SFED, DoFPS is the implementing agency for forest plantation component of the project for biomass sustainability plantation and capacity building of CFMGs.
- BAoWE a Civil Society Organization for promotion of national women capacity is the implementing agency on pilot phase in Zhemgang Dzongkhag. BAoWE also has been assigned with the project implementation task in Tsirang and Dagana Dzongkhags.
- Tarayana Foudnation, another CSO has been selected to implement the project in Sarpang Dzongkhag.
- BTFEC is a co-financer for the project as designed in the prodoc.
- Swiss Development Cooperation (SDC) and Asian Development Bank are engaged as a co-financier of the project, financing parallel projects to achieve similar goals.
- All twenty Dzongkhags, are the project beneficiary.

3. KEY FINDINGS

3.1 Project Strategy

3.1.1 Project Design

To meet the objective of the project to reduce the pressure on local forest due to inefficient consumption of fuel-wood, reduce the rate of deforestation and improve the air indoor air quality and an overall reduction in the GHG emissions through a wide spread use of use biomass energy technologies, the project was designed to promote market based mechanisms to create demand for efficient technologies using fuel wood and support from the government in the form of incentives and policy measures. The barriers identified that contribute to unsustainable utilization of biomass resources are (i) inadequate policies and weak institutional setup; (ii) use of inefficient biomass energy technologies; and (iii) low level of knowledge and expertise or capabilities required produces and make use of modern and efficient biomass systems. The unsustainable use of biomass resources lead to very high consumption of fuel wood, leading to depletion of country's forest trees and biodiversity, and high GHG emissions.

The project further identified policy gaps such as absence of a coherent renewable energy policy; lack of enterprises to supply biomass energy systems and services; low level of awareness and capacity on sustainable biomass energy technologies, and absence of working models of efficient technologies operating in the country. As such, the project design also sought to use GEF resources to provide support for demonstrating modern biomass energy technologies and establish market mechanisms to disseminate efficient cook stoves and mainstream biomass energy through knowledge management, institutional policies and regulation, and creating an environment for investment by private sector. The funds from GEF were designed to provide incremental cost needed to create policy regime and market mechanisms to support the widespread application of BET, and build on the earlier GEF Small Grants Programme in Bhutan that targeted educational and religious institutions.

Through its all round approach, the project design seeks to enhance the impact leading to reduction of GHG emissions from the improved production and efficient use of biomass throughout the country which will be achieved through awareness creation, training, building the capacity of governmental and non-governmental organizations and private sector participation. Furthermore, the project's focus on introduction of improved biomass energy technologies and dissemination of improved cook stoves was rationalized by a number of factors including: (i) energy supply situation and heavy dependence on fuel wood in spite of impressive electrification; (ii) growth in the energy demand and biomass supply potential; (iii) dependence on conventional cook stoves by a high percentage of rural population with low level of household income; (iv) air quality issues in the household leading to high prevalence of respiratory disorder among women and children; and (v) reduced wastage of biomass residue in private industries especially sawmills, from alternate BET which convert the residue into feedstock for use in space heating and alternative to fuel wood.

As such, the framework of the project design is appropriate for barrier removal including:

- Implementation of strengthened support policies and regulatory frameworks and institutional capacity for adoption of sustainable practices for use of biomass resources;

- Implementation of BET applications from improved confidence in the feasibility, performance and environmental benefits through demonstration projects and increased private sector participation; and
- Improved knowledge, awareness and capacities of policy makers, financiers, suppliers and end-users on the benefits of biomass energy technologies.

The project also sought to achieve its objectives through the involvement of relevant government agencies and utilities at the national, and district levels, non-formal training channels and community based organizations. In addition, the project has numerous indicators and outputs including a roadmap for the promotions of sustainable production and utilization of biomass using community forest wood supplies as well as biomass residue feedstock from private industries, a wide range of knowledge products, learning platforms for sharing lessons learned and best practices that can lead to broader scale replication and demonstration of BET in industries and promotion of improved cook stoves among the low income rural households.

Significant risks identified in the ProDoc include:

- Lack of availability of skilled personnel in the field;
- Lack of acceptance of technology solutions introduced by the project
- Lack of interest and cooperation of the financing institutions to support BET application for rural development

Following are the comments with regards to the relevance of two Project outputs:

- Output 2.2 deals with financial incentives such as smart subsidies to enable market mechanism. Though this may have been relevant during the design phases of the project in 2008 to 2011, while the financial incentive may be required for spreading the BET, the output as designed with indicator is no longer workable in the 2014 business environment, and as such, this component is no longer required. This partly stems from the experience of the project team who experienced difficulties in getting the private sector response to the procurement to participate in the project implementation and gain experience. Around 2012 Bhutan faced foreign exchange crisis and as one of the precautionary measures, the RGoB restricted the private sector from obtaining finances from bank in the form of loans. With the existence of such restriction in the financial sector, the project will not be in a position to offer financial incentives beyond sharing the cost of pilot demonstration of BETs.;
- Output 3.3 deals with training of micro-entrepreneurs on different aspects of BET to stimulate the market with service/technology solution providers however experience elsewhere indicate that such arrangement works when the conditions are favourable with the availability of finance (or micro-finance), sufficient unmet demand in the market and ability of the end users to partly pay for the product. Since, there are other significant gaps and barriers that currently exists and are being addressed by the project, building the capacity of the micro-entrepreneurs to offer BET solution is well thought out and important for project's sustainability, however, among the current set of barriers this ranks low and therefore for the limited time and resources available this output becomes redundant unless other barriers have been removed and most importantly the issue of access to finance by the private sector is resolved by the RGoB independent of the project. As such, the SRBE project has produced knowledge products, created awareness and training among the end use however the key tasks for sustainability of the project needs to be identified and worked upon.

In conclusion, the project design is ambitious considering a 3-year implementation timeframe and design considerations to stimulate markets and private sector to respond to demands. To achieve the outcomes and deliver the outputs under a NIM execution modality, the project is required to be implemented in a focused and efficient manner. The ProDoc does acknowledge the knowledge and experiences of other countries in Asian region including Cambodia, Thailand and India where the experience with biomass technologies and community forestry will be used on the project to accelerate the awareness creation, knowledge and framing of policies.

There was almost no experience and knowledge of efficient BET with the relevant stakeholders from the central government to district administration level, Community Based Organization and private sector players. The non-availability of finance has dampened the prospects for the private sector to benefit from projects that aim at opening new markets and providing business opportunity. This lack of support to private sector has placed further risks on the project achieving some of the intended outcomes within 3-year period. The somewhat ambitious nature of this project has placed significant pressure on the executing agency to efficiently deliver ambitious project plans and targets. This would have required the PMU and the project's implementation partners to be sufficiently staffed with well-qualified and good managerial support.

One of the main stakeholders and beneficiary of this project are women and children. The project design has given sufficient emphasis for inclusion of women in certain outputs. As such, there were no significant gender concerns considered on the design of this project

3.1.2 Results Framework

The results framework for SRBE is included in Table 1. The Project Planning Matrix (PPM) was designed in 2010-11, with 3 components with 44 indicators. While this project is in line with the recently designed project with three-outcomes which responds to the broad barriers that SRBE is trying to overcome. However, PPM has overall 44 indicators to track and report progress, which is considered too high. Given the large number of indicators, a general overview of the PPM indicators is provided:

While there is rationale to the indicators provided in the PPM towards the achievement of an outcome, the number of indicators is excessive with most outputs burdened with more than one indicator. Moreover, there are few indicators that have become redundant due to reasons outside the control of the project, which can be removed from the PPM. A description of redundant indicators is provided below:

- “Fiscal incentives such as smart subsidies to enable market mechanisms introduced” from Output 2.2. Due to the financial restrictions imposed by the RGoB and absence of lending by the banks to the private sector, it is highly unlikely that the project will be able to influence markets in the remaining time and the financial resources available to it.;
- “Implemented and operational BET Full Scale model on biomass gasification for electricity services and thermal applications” from Output 2.5. As the Project Board has suggested dropping the demonstration of this technology as it is economically unviable, it is suggested that Output 2.5 be revised and the corresponding indicator on biomass gasification should be dropped;
- “Project developers and micro-entrepreneurs trained on different aspects of BETs” from Output 3.3. The project has faced severe challenge in getting the attention of private sector players and fabricators to respond to the tenders. Unless the market has a steady

demand for improved cook stoves and other BET, it is unlikely the entrepreneurs will come forward and invest their resources. In the current circumstances, it is suggested that this particular output along with the indicator should also be dropped.

In conclusion, the PPM needs to be consolidated to be more user-friendly and help in monitoring the project's progress. Suggestions on indicators are also included in the Table 1 against the outputs, where ever required. These suggestions could be used as a basis for further discussion and decision on having a revised PPM during the next PSC meeting.

3.2 Progress towards Results

By and large, the challenge of removing barriers to sustainable utilization of biomass and the use of biomass energy technologies is linked to the need for a functional institutional arrangement that allows DRE to frame policies and regulations based on studies and lessons learned during implementation of SRBE. Project resources have been utilized to setup these arrangements with the appropriate government agencies and CBO. Challenges have been encountered with the fact that the engagement of private sector players and CBO for providing goods and services took much longer than anticipated as most of the CBOs operating in Bhutan normally do not participate in the government's procurement process, and the private players initially did not evince interest in the procurement. Further the hilly terrain of the country and location of villages further add to the implementation challenges. Lastly, the capacity of CBO to engage with the district administrations vary considerably when compared with government owned organization such as DAHE. The time lag between project design and implementation was high consequently the project team was not fully prepared for the changed conditions that affected the work.

- The project followed the design recommendation to engage Royal Society for Protection of Nature as the main CBO to work in the villages across all 20 districts. However, this was not accepted by Ministry of Finance which advised the project to follow the procurement process laid down by the government. The decision was conveyed to project after a gap of several months leading to inordinate delay in finding an alternate.
- The project utilized the locally available expertise for re-design of the cook stove with three configurations – three pots, two pots and fodder stove, which helped to reduce the cost of a cook stove by 75%. The new designs are available with the DRE which provide opportunities for future collaborative studies and design improvements to either improve the efficiency and reduce the costs of BET;

With the objective of the project being to operationalize BET in households and with private industries, the challenge for the PMU was to have these institutional arrangements strengthened in 20 districts with the weather constraints, limited accessibility to villagers during three months of monsoon season and limited time for engaging with villagers during the harvesting period, leaving 6 months for field work, a daunting task. Under the direction of MoEA, DRE and the Project Board, the PMU have undertaken steps to engage DAHE (under Ministry of Education) to reach out 16 districts out of 20 with the help of NFE instructors and district administration to select the beneficiary households.

Project resources are also being used to augment the capacity of NFE instructors to ensure compliance of design and quality to ensure high degree of satisfaction among the families using

improved cook stoves, and community forestry plantations which has been taken up in seven districts bringing 111.47 hectares under plantation in which 178,300 saplings have been planted and will be monitored by DoFPS. The project has conducted awareness building trainings and workshops on BET choices and engaged a large percentage of women thereby ensuring that the benefits of improved biomass energy technologies are understood and quickly adopted.

Project progress, however has been hampered by few unforeseen factors including:

- The scheduled starting date for the project was January 2013. However it coincided with parliamentary election till July 2013. Since the project included subsidy component and consultation of beneficiary societies, the project risked politicization by imminent political parties. The project implementation had to start with awareness and training components. The Election Commission of Bhutan (ECB) notified that no public gathering of any kind should be organized by any agency during the election campaigning and voting period. Therefore, the Project Management Unit had to defer some of the activities until end of July 2013;
- From July till September was peak monsoon coupled with farming season. Rains restricted the participation of beneficiary villagers as many villages are away from the main connecting road and being in the hills those are reachable on foot. Confusion and changes in selection of the project implementing agency from Royal Society for Protection of Nature (RSPN) to Bhutan Association of Women Entrepreneurs (BAoWE) from the Ministry of Finance also contributed to delay of the project implementation;
- Further, for Trashigang Dzongkhag pilot project which was supposed to install around 1247 stoves and end the activity by March 2013 ran into issue with the supplier for not fulfilling the contractual obligations and as a result only 169 stoves could be installed in the scheduled time period;
- Frequent change of project officials from different agencies also significantly disturbed the project progress. Four different officials have either resigned or moved to other agencies creating institutional memory loss and gap in transfer of knowledge and responsibilities;
- Private sector does not have access to bank finance due to restrictions imposed by RGoB to limit the outflow of foreign exchange. This greatly limits the private sector player's ability to venture into new areas and explore business opportunities and markets. This severely restricts the project's sustainability without government's financial support to continue the work for couple of years, especially as the project greatly benefits the grass root population.

The project has managed to overcome some of the above challenges and after September 2013 it started to make steady progress. UNDP has come forward to support the program implementation by conducting the procurement on behalf of the project unit. The process is underway and is expected to complete within February 2015. By the time of MTR mission the key stakeholders expressed confidence about the project being able to achieve the goal by end of December 2015, the scheduled end of project.

3.2.1 Progress towards Outcomes Analysis

In general, project progress has been moderately satisfactory to date with some of the indicators on the PPM not likely to be achieved. This can be seen on Table 1 with the colour-codes. The main issues regarding progress are summarized below:

- Much of the progress has been affected by two major factors. Firstly, start of the project coincided with the 2nd Parliamentary elections for which the Election Commission has issued guidelines which prohibited the project from initiating certain activities such as holding stakeholder consultations in villages, since the project had a subsidy component and it is part of the Ministry of Economic Affairs. Secondly, excessive time of the project and project team was spent on procurement of goods and services due to poor response of CBO and the private sector players.
- The assumptions during project design with regard to the local markets, participation of private sector were ambitious and lacked the required study on the financial sector's preparedness to offer financing to private industries especially private sawmills during the programme design. Project's few outputs are linked to extending the financial incentives but in the absence of background on country's financial sector and the risks involved, these outputs are ambitious in the current situation. These outputs are not included among project risk matrix even though these are important for project's sustainability ;
- The project Outputs 2.2, 2.3, 2.5 and 3.3 are meant to stimulate local market through a combination of market demand and financial incentives for local entrepreneurs to offer biomass energy technologies, however, this requires an analysis of the existing market conditions for the operation of private players and barriers faced. Since access to finance is a major issue faced by the private sector on account of the foreign exchange crisis faced by the RGoB, and restriction imposed by the banks are expected to be in place for some time, any progress on the above mentioned four output is highly unlikely. As such, the MTR reviewers are of the opinion that the project should focus on gaining confidence of the rural households from the use of improved cook stoves and work with select private sawmills to demonstrate the technical and economic viability of briquette production, which can be promoted as a fuel for use especially in the urban areas. The experience gained from these two major areas can be utilized for developing policies and addresses to a large extent the problems with regard to the use of biomass and directly responds to the Output 1.1;
- As a contribution to Output 1.2 (Established Biomass Energy Resource Information System (BERIS) for facilitating systematic collection, analysis and dissemination), the work has been awarded to a Thimphu based IT firm for development of website and database, and website www.bhutanbioenergy.gov.bt has been launched that provides information about the BET;
- For Output 1.3 and 1.4, the capacity building support has been provided to 28 CBO Focal persons (16 male and 12 female) and DAHE's 180 NFE Instructors (74 male and 106 female) who in turn have provided awareness creation training on BETs; a large team of local persons (878 CFMG members; 557 male and 321 female) received training on community forestry and about 178,400 saplings have been planted in 111.47 hectare area in 6 Dzongkhags. The actions of the respective agencies involved in these activities have helped to achieve the EOP targets;
- Under Output 2.1, the menu of appropriate and efficient BET is yet to be developed that would cater to a variety of stakeholders ranging from rural households, income generating enterprises and private industries that utilize biomass;
- For Output 2.3, the project has to carefully review the relevance of this particularly output especially since the cook stoves for income generating enterprises have to be designed and prototypes tested for efficacy, prices determined before cost sharing mechanisms can be developed and applied;
- For Output 2.4, work on the procurement and supply is underway and it is expected that given the weather constraints, the installation of 13,522 cook stoves will be completed by December 2015;

- For Output 3.2 and 3.5, the work is expected to be implemented in later half of 2015 as it would require BERIS to be fully operational and update with information from the field. The specialized training of trainers on community forestry has to be planned based on the financial resources available to the project;
- For Output 3.6, the site visits to successfully operational BET applications in Thailand and Vietnam have been completed while the international symposium on RE technologies will be held in 2015. The work on solution exchanges for the local entrepreneurs is likely to be taken up at a later stage;

Table 2 included below in this section presents the progress of various project indicators and is colour coded as prescribed by UNDP-GEF MTR reporting criteria.

Table 2: Progress towards Results Matrix (Achievement of outcomes against End-of-project Targets)

Project Strategy	Indicator	Baseline Level	Level in 1 st PIR)	End-of-project Target	Midterm Level & Assessment	Achievement Rating ⁴	Justification for Rating
Goal: Reduction of GHG emissions in rural households and industrial sectors	Quantity of GHG emissions mitigated annually by EOP (tCO ₂ e)	0		107,600	0	MS	The activities of project under the 3 components are progress and will contribute to reduction in GHG emission. But the EOP targets needs to be revised in line with the revised number of cook stoves that will be supplied to households. Due to the absence of GHG data the midterm level and assessment figure is nil.
	Total quantity of GHG emissions mitigated by EOP (tCO ₂ e)			196,700	0	MS	The distribution of 570 cook stoves is completed. The remaining are in various stages of procurement and distribution, which is expected to start from late October 2014. The indicator is meant to capture EOP progress and impacts. At the time of MTR there is insufficient information available to estimate the GHG mitigated.
Objective: Removal of barriers to sustainable utilization of available biomass resources in the country and application of biomass energy technologies that can support economic and social development in rural sector to reduce GHG emissions	Reduction of fuel wood consumption for energy use in households and industries by EOP, tonnes.	0		183,200	0	MS	The EOP targets needs to be revised in line with the revised number of cook stoves that will be supplied to households and the pilots in Private industries
	Number of enterprises supplying clean and efficient biomass energy systems and services by EOP	0		3	2	MS	The EOP target needs to be revised to 2 due to change in priorities and circumstances for private businesses

⁴ Six point Progress Towards Results Rating Scale: HS, S, MS, MU, U, HU (refer Appendix B for detailed description)

Project Strategy	Indicator	Baseline Level	Level in 1 st PIR)	End-of-project Target	Midterm Level & Assessment	Achievement Rating ⁴	Justification for Rating
	Number of households and industries benefiting from the energy-efficient furnaces/stoves & other BET applications & services by EOP.	0		13,522	570	MU	The EOP target has been revised to 13,522 as per the decision of 2 nd PB meeting
Outcome 1: Implementation of strengthened support policies and regulatory frameworks and institutional capacity for adoption of sustainable practices production, conversion and use of biomass resources in Bhutan	Integrated RE Policy that includes sustainable biomass energy production and utilization completed by beginning of Year 2, date.	0	□ Month 13	1	0 □ Official announcement	U	The policy is yet to be prepared.
	Number of community-based fuel wood plantations being utilized by communities & households for use in BET applications by EOP.	0		50	50	HS	Activity completed in the first year of the project.
Output 1.1: Developed and implemented Roadmap for the promotion of sustainable biomass production and utilization, using both community-based woodlots and non-fuel wood energy resources	Existence of policies and standards on the provision and use of fuel wood for energy purposes put in place by end of Year 2, month.	1 draft RE policy		Month 25	0	MU	Consultancy for review of existing policies has been awarded in October 2014. The report is expected by December 2014
	Existence and implementation of the Roadmap for the promotion & implementation of sustainable biomass production & utilization by end of Year 1.	0		1 roadmap	0	U	Roadmap preparation has not yet started.
Output 1.2: Established Biomass Energy Resource Information System (BERIS) for facilitating systematic collection, analysis and dissemination	Number of relevant agencies and institutions involved in production and use of BETs and are linked with each other via a working mechanism for coordination by EOP.	0		5	4	MU	DAHE, DRE, BAoWE and Tarayana Foundation are working together on cook stove distribution; engagement of private industries is yet to take place.
	Existence of Biomass Energy Resource Information System (BERIS), which contains and disseminates information on biomass resources within Year 1, month.	0		Month 9	1	S	Preparation of database framework is complete and it will be launched with the web site. At the time of MTR, the web site is under development and is expected to be operational by December 2014.
Output 1.3: Modalities and details of participation of community-based organizations and grassroots institutions finalized and agreed	Number of representatives from community-based organizations & grassroots institutions trained and actively involved in promoting and disseminating BETs by EOP.	0		20	19	S	19 focal persons trained in 16 Dzongkhags for awareness creation and promoting BET

Project Strategy	Indicator	Baseline Level	Level in 1 st PIR)	End-of-project Target	Midterm Level & Assessment	Achievement Rating ⁴	Justification for Rating
Output 1.4: Earmarked areas for sustainable forest wood energy production	Existence of an action plan & implementation procedures for allocation, utilization and management of fuel wood plantation within Year 1, month.	0		1	1	S	Completed
	Number of earmarked areas & supporting measures for fuel wood plantation activities from beginning of Year 2.	0		50	111.47H	HS	Completed
	Participation of women in CFMG Committees.	1 woman: 4 men		20% increase in no. of women	36.5% women trained	HS	Total 878 CFMG members trained (557 male and 321 female)
Component 2: Supporting Innovative Practices and market mechanism for local sustainable biomass energy technology development and promotion							
Outcome 2: Implementation of BET applications due to improved confidence in their feasibility, performance, environmental and economic benefits through demonstration projects, market mechanisms and increased private sector participation	<ul style="list-style-type: none"> Degree of satisfaction by end-users of BETs & furnaces/stoves implemented, % Fuel wood saved through efficient stoves by EOP, tonnes Quantity of sawdust utilized and prevented from decaying through BET applications by EOP, tonnes Number of operating Full-Scale Model BETs that show good viability, improved performance, & environmental & economic benefits by EOP. 	0		80	0	MU	Achievement rating is based on the findings from the field visit of the reviewers during which the interaction were carried with households in Trashigang dzonkhag. At the time of MTR 570 cook stoves have been installed and a survey to capture the satisfaction level of end-user has not been conducted.
		0		183,214	0		
		0		921	0		
		0		A least 3	1		
Output 2.1: Menu of appropriate & efficient technologies made available	Availability of technology fact sheets and menu of appropriate & efficient BETs within Year 1, month.	0		1	1	S	Completed
Output 2.2: Fiscal incentives such as smart subsidies to enable market mechanisms introduced	<ul style="list-style-type: none"> Existence of comparative assessments of financing schemes for BET applications and BE-supported projects by Month 7, date. 	0		1	1	MU	Cost of metallic part of cook stoves subsidised by the Project; 30% subsidy for heating stoves. Financial support to industries yet to be finalized.
	<ul style="list-style-type: none"> Financing support and incentives provided to end-users of BET applications & services starting from Year 2, month. 	0		1	0		

Project Strategy	Indicator	Baseline Level	Level in 1 st PIR)	End-of-project Target	Midterm Level & Assessment	Achievement Rating ⁴	Justification for Rating
Output 2.3: Operational locally produced energy efficient industrial stoves for income generating local enterprises and efficient BETs supported	<ul style="list-style-type: none"> Cost sharing & market delivery mechanisms put in place and starting to be utilized by communities & industries within Year 1, month. Number of partnerships established by EOP. 	0		1	0	MU	Contracts awarded to 2 fabricators for supply of cook stove metal parts, and to BAoWE and Tarayana Foundation for training. MoU with DAHE for training. Cost sharing by the project is defined. No market delivery mechanisms are in place
Output 2.4: Locally produced 20,000 energy-efficient stoves in rural households and community-based institutions for space heating and cooking needs implemented and promoted for replication	<ul style="list-style-type: none"> Number of furnaces/stoves installed & being used on a daily basis by households in targeted areas by EOP. Number of men/women trained and participating as technicians in the construction and installation of stoves. 	0		20,000	570	MU	Order for 5100 stove has been placed and procurement of 5,499 stoves is being carried out by UNDP CO. EOP target needs to be changed to 13,522
Output 2.5: Implemented and operational BET Full Scale Models on: [1] Wood briquetting/ pelleting technology for the production of bioenergy fuels and [2] Biomass gasification for electricity services and thermal applications	<ul style="list-style-type: none"> Existence & operating performance of BET Full-Scale Models in different districts & industries by EOP. Number of wood briquetting plants that are operational by EOP. Number of biomass gasification for electricity services & thermal applications that are operational by EOP. Number of enterprises that locally produces stoves by EOP. 	0		3	0	MU	The PB has decided to drop the gasification project as it is economically unviable. The pilot demonstration of briquetting plants in private sawmills needs to be expedited to gain the experience.
Component 3: Capacity building and knowledge management							
Outcome 3: Improved knowledge, awareness and capacities of policy makers, financiers, suppliers and end-users on benefits and market opportunities for modern biomass energy technologies	<ul style="list-style-type: none"> Number of participants trained in different aspects of biomass energy such as policy, financing, technology & market mechanisms by EOP. Number of relevant stakeholders whose skills and knowledge have been increased in assessing, implementing & operating BETs by EOP. 	0		200	68	MS	First stakeholder workshop on energy efficient biomass energy technologies and gender roles was organized in August 2013 with 31 participants. Second workshop was held in June 2014 on sawdust briquetting technology with 37 participants

Project Strategy	Indicator	Baseline Level	Level in 1 st PIR)	End-of-project Target	Midterm Level & Assessment	Achievement Rating ⁴	Justification for Rating
Output 3.1: Established and operational Knowledge and Learning Platform for Bhutan from where documented project lessons and best practices are disseminated	<ul style="list-style-type: none"> Knowledge & Learning Platform for Bhutan existing within DRE and operational within Year 1, month. Number of workshops and seminars conducted on BETs and biomass resources each year. Number, quality & frequency of information packages prepared and disseminated each year. 	0		1	1	MS	<ul style="list-style-type: none"> A project website and database is completed. Two workshops were conducted since the project start, on BET and biomass resource utilization. Brochure on efficient cook stove and information packages on cook stoves, construction and O&M guidelines prepared and disseminated once.
Output 3.2: Rural development planners trained on integrated rural energy planning and biomass resource assessment	Number of participants trained on integrated rural energy planning and biomass resource assessment by EOP.	0		40	16	MU	Sensitization of Dzondags and Gup by DAHE
Output 3.3: Project developers and micro-entrepreneurs trained on different aspects of BETs	<ul style="list-style-type: none"> Number of agencies, project developers and micro-entrepreneurs trained on different aspects of BET applications & services by EOP. Number of micro-entrepreneurs involved in start-ups & BET production by EOP. 	0		25	40	MS	Workshops were held in 2013 and 2014 on efficient cook stoves and BET were attended by fabricators, saw millers, government, and NGO representative
Output 3.4: Communities and institutions trained on the installation and maintenance of biomass gasifiers, biodigesters and energy-efficient cook stoves/ furnaces	<ul style="list-style-type: none"> Number of representatives of communities and institutions trained on the installation, operation and maintenance of biomass gasifiers, biodigesters, and energy-efficient furnaces/stoves by EOP 	0		50	334 NFEIs, 28 BAoWE officials in 17 Dzongkhags	S	EOP target achieved. Out of total trained persons 225 are women.
Output 3.5: Completed specialized Training of 100 Trainers on community forestry and sustainable forest wood energy	<ul style="list-style-type: none"> Number of trainers trained on community forestry & sustainable forest wood energy by EOP. Number of trainings carried out by the trainers that received specialized training on community forestry & sustainable forest wood energy by EOP. 	0		100	2	MS	Two government officials participated in study tour to China. No further training and visits are planned as the budget for this output has been fully utilized.
		0		50	878		

Project Strategy	Indicator	Baseline Level	Level in 1 st PIR)	End-of-project Target	Midterm Level & Assessment	Achievement Rating ⁴	Justification for Rating
Output 3.6: Completed site visits to successfully operated BET applications and dialogues with policy makers, regulators, technology developers, entrepreneurs and financiers	• Number of participants to site visits to successfully operated BET applications in India, Thailand or Cambodia as well as to full scale demonstration sites in Bhutan by EOP.	0		10	5	MU	Visits carried out to Thailand and Cambodia in May 2014.
	• Number of participants to International symposia in Bhutan to meet counterparts from countries with more developed RE Policies by EOP.	0		50			Study tour of NFE instructors planned in December 2014.
	• Number of solutions exchange supported solutions to issues raised by Bhutanese entrepreneurs/experts	0		5			Other two activities under 3.6 are yet to be taken up.

Indicator Assessment Key

Green= Achieved	Yellow= On target to be achieved	Red= Not on target to be achieved
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In summary, the PPM has 44 indicators creating challenges in tracking the progress of all the activities for maintaining all round progress. Some of the indicators are related to policies and market mechanism which are unlikely to be operational by EOP due to reasons beyond the control of the project. A close review of the PPM and recent PIR reveals that progress is reported on most indicators on the PPM while a few have marginal relevance to the project outputs. Given the importance of the PPM in the effective and efficient management of any project, the current PPM needs minor adjustments with a reduced number of indicators that are relevant and reflective of project progress.

3.2.2 Remaining Barriers to Achieving the Project Objective

This includes:

- With 14 months remaining to complete the project, there is a need to focus the available resources towards the projects outputs where the progress has been insufficient. This will help the project to achieve the EOP targets as well as overall project outcomes and goals;
- Notwithstanding project efforts till MTR, there is a clear lack of capacity in DAHE for implementing the cook stoves in 16 dzonkhags and the delivery capacity of the local fabricators need a close monitoring to ensure timely delivery of good quality components in all the 19 districts.;
- Need for BET demonstration in private industries (mostly sawmills) which generate biomass waste which can be put to productive use elsewhere and help to reduce the continued dependence on fuel wood. The demonstration of technology and its economic viability need to be supported by the project so that sufficient experience is gained to document and share the BET options by EOP; and
- The project will also need to shift its attention towards conducting a study that will lead to development of design and prototypes of energy efficient industrial stoves for income generating local enterprises. The prototype will also require field testing before the project offers it as BET. Since the biomass is used for cooking by many institutions, development of an efficient stove will greatly benefit this particular group of stakeholders, and will complete the basic offering by the project to three major categories of consumers, namely the rural households, industries and income generating enterprises such as eateries and restaurants.

3.3 Project Implementation and Adaptive Management

3.3.1 Management Arrangements

The management arrangements for this project were in flux between 2012 and 2013, and stabilized by mid-2013. Although the project board met in 2012 and started the preparatory work towards the last quarter of 2012, the hiring of project staff was in the later part of 2nd quarter of 2013. The PM has technical support from a number of Assistant Project Managers (APMs) who cover specific components and disciplines of the project. The PMU reports to the Project Board (PB) comprising of DRE, MoEA, DAHE, MoAF, UNDP and GNHC. The PSC have already met four times since 2012⁵ to provide oversight of the project.

⁵ Once in 2012 and 2013, twice in 2014

Since the project start, four key staff either left the project or moved on to another project. This created institutional memory loss and slowed the project progress considerably until new staff and project manager was hired. The multifarious interaction with a number of stakeholders of the project brought the concept of sharing the work by engaging government departments and private NGO for creating awareness, training and capacity building of rural households.

Due to long delays in getting the original project activities started, the PMU needed to adaptively change the planned activities to achieve the objectives set by the project. In this regard, much of what has been accomplished on the project, notably in 2014, has been a result of adaptive management which has helped the project to achieve progress. Examples of adaptive management include:

- Redesign of cook stoves through a local consultant which used local materials in construction and helped to reduce the metallic components which brought down the cost significantly. The cost effective solution helped the project to provide support for supply cook stove which benefits 16% of the rural population;
- Decision to drop gasification technology demonstration in the private industry and re-allocate resources for briquetting technology pilot;
- Decision to engage DAHE to support project implementation in 16 districts, when the project's choice of RSPN was turned down by the RGoB;

The overall effectiveness of the current project management arrangements since mid-2014 has been satisfactory. Support from UNDP for project assurance activities and recent decision to extend the support to the project unit with the procurement of cook stoves is expected to help in expediting the overall progress. The PPM is another area where UNDP can provide more assistance including the streamlining of indicators that would assist the PMU in more effective use of their time to monitor activities. This would include the removal of indicators that are redundant in the PPM as well as those that are difficult to achieve any notable progress due to factors beyond the control of project.

3.3.2 Work Planning

The project start-up was affected by issues related to Election Commission which delayed the awareness creation work that involved holding awareness and consultation sessions with the villagers. However, Project Manager for SRBE project was appointed in April 2013 and the PMU awarded the work of redesigning the cook stoves to a local consultant which helped to reduce the cost by 75%.

In 2013, much of the project resources were devoted to carrying out awareness creation and procurement of goods and services which took abnormally long time in the selection due to non-responsiveness of the private sector and NGO/CBO operating in Bhutan.

The project follows 18 months work plans to stay focused and implement result based activities. A scrutiny of the work plan revealed that the outputs and indicators as listed in the PPM are although included in it however, many indicators where there is insufficient progress are not a part of the work plan. This matter will need to be addressed as the project has many indicators with marginal progress, and greater attention and resource allocation will be required to improve the progress which will ultimately improve the overall progress of the project. There are few activities and project outputs which are not relevant due to external factors that are beyond the control of

the project. The PMU will need to carefully review these and propose changes to pare-down the PPM after re-allocating the budget to other outputs.

In summary, the poor progress of the project is partly attributable to the external constraints that project faced as the start coincided with the national election and the project had to follow the guidance issued by the Election Commission, and due to the frequent changes of the key project staff which led to institutional memory loss and reduced the pace and affected the work planning. The project progress has picked up in 2014 which needs to be maintained and closely tracked with the PPM for the project to reach the goals set by EOP.

3.3.3 Finance and Co-Finance

The slow progress of the Project is reflected in the slow rate of expenditure during its initial 12 months during where only 21% of overall USD 1.9 million was expended. The expenditure rate has increased considerably during 2014 however the exceptional amount of time taken in finalization of contracts with the local fabricators has affected the financial progress which stands at 27%. The project has followed an open procurement process for selection of consultants and fabricators. At times, due to high cost offered by the bidders the project had to re-invite the offers which helped to bring the cost within the available budget. The interventions made by the project are cost-effective.

For the activities that have been funded by the project to date, the financial management of project funds has been satisfactory. Moreover, the project has appropriate financial controls which include regular reporting which has allowed the PMU and the PB to make informed budgetary decisions. Various interventions supported with project resources consisted mostly of workshops, studies and feasibility studies that have been carried out. The excess funds from some of the activities that have been found to be unviable have been reallocated for utilization to provide demonstration and capacity building in private industries on the use of briquettes. Project expenditures to date on SRBE by components are shown on Table 3.

Based on the findings of this MTR, the rate of expenditure of the second outcome needs to be increased as there are substantial amount of unspent funds. Also, as mentioned in the section 3.1.2, some of the indicators in the Project Planning Matrix (results framework) need to be revised by the PMU and the PSC. This is necessary to maintain budgetary support for activities that are likely to result in tangible achievements and measureable results.

In addition to the support of GEF, the project has received co-financing contributions from different donors. Both ADB and SDC/Helvetas have provided support for parallel activities. For instance ADB is providing grant and loan for construction of 2,800 family biogas units under its Rural Renewable Energy Development project, and Helvetas is supporting 550 community forestry activities under its Participatory Forest Management project. There is currently no information on the private sector contribution as their engagement with project is yet to materialize.

The project has been unable to leverage co-financing from private sector as the decision to implement the briquetting project is pending with an expert committee which would decide the amount of viability gap funding to be provided by the RGoB. Further, there are restrictions faced by the private sector to access bank finance, therefore their ability to offer co-financing will be severely restricted. During the mission a meeting with BTFEC could not be held due to non-

availability of concerned officials. While the project expenditures are discussed and tracked in the Project Board meetings, same is not the case for the co-financing. An updated project co-financing table is presented under Table 4.

Table 3: Project Budget and Expenditures from January 2013 to October 2014 (in USD)

Outcome	2013	2014	2015	Total Disbursed	Total Planned for Project	Total Remaining
Outcome 1: Strengthening of institutional capacities	35,905	57,770	-	93,675	197,340	103,665
Outcome 2: Implementation of BET applications	40,673	274,871	-	315,544	1,145,510	829,966
Outcome 3: Improved Knowledge and Awareness for modern BET	9,186	22,266	-	31,452	339,150	307,698
Project Management, M & E	42,656	26,558	-	69,214	221,000	151,786
Total (Actual)	128,420	381,465	-	509,885	1,903,000	1,393,115
Total (Cumulative Actual)	128,420	509,885	509,885			
Annual Planned Disbursement	624,010	814,913	464,077			
% Expended of Planned Disbursement	21%	47%	0%	Overall disbursement ->		27%

Table 4: Details of Project Co-Financing

Partner Agency	Co-Financing Amount		Activities to date
	Target (USD)	to October 2014 (USD)	
UNDP / PEI	50,000	30,000	Capacity building and training
SDC	400,000	400,000	Community forestry
ADB	950,000	950,000	Installation of family bio-gas units in southern region of Bhutan
BTFC	300,000	27,000	As per the information shared by PMU
RGoB	510,000	0	None
Private sector	116,700	0	None; decision pending on briquetting project with private sector and forms of incentive to private sector
Total:	2,326,700	1,407,000	

3.3.4 Project-Level Monitoring and Review Systems

The project's Monitoring and Evaluation (M&E) system consist of the indicators and outputs of the project PPM. The indicators, as mentioned in Section 3.2.1, are too numerous for the PMU to track therefore it tracks the project progress by output. Some of the indicators, as mentioned

above are no longer relevant and can be eliminated to reduce monitoring efforts and keeping the project focused on result oriented activities in the limited time available.

A review of the Combined Delivery Reports contributed to the analysis of the project's planned and actual expenditure. The exceptionally low expenditure in 2013 validates the constraints faced by the project during the initial six months after its start. The expenditures in 2014 have picked up and it is expected that by end of 2014 with project activities progressing, the percentage figure of the planned versus actual will further improve.

The project has allocated sufficient budget for the project's M&E activities including the MTR. The allocation is being done through the 18 months rolling work plan for effectiveness.

3.3.5 Stakeholder Engagement

The project faced restrictions in early 2013 due the guidelines of Election Commission as the timing for stakeholder consultation coincided with the 2nd Parliamentary elections in Bhutan. After mid-2013 the project made substantial progress in developing partnerships with DAHE, CBO's namely BAoWE, Tarayana Foundation, direct stakeholders, Gup, district administrations in all 20 districts, and forestry department necessary for building capacity of all concerned agencies and stakeholders in the country. The review team found sufficient evidence about the active involvement of national and district government stakeholders in various project activities such as training, and demonstration of cook stoves in the field. In addition, members of the PSC are drawn from GNHC and MoAF as well as DoE to provide wide but important perspectives in the decision making process to support the project. Other project stakeholders include the cook stove fabricator, local and international consulting organizations that have looked into establishing biomass consumption baselines and BET application in private industries. With the exception of private industries all the governmental agencies and department participate in the PB meetings.

One of the major issues with the stakeholder engagement efforts of the project has been the lack of experience and successful engagement of private sawmill industries for utilization of biomass. The effectiveness of this engagement, however, is somewhat complex given that the demonstration of biomass energy technology in industries is linked to the demand of briquette in the market and financial incentive provided by the project for pilot. The spread of BET among private sawmills is contingent upon the market demand for briquette and its price. Further, the lending restrictions imposed by the local banks make investment in new technologies challenging unless industry decide to use balance sheet financing. In the current operating environment, the owners of private sawmills have no clear incentive to add a new stream in the existing business due to uncertainty in the demand of briquettes as source of fuel.

3.3.6 Reporting

The project has been carrying out adaptive management and changes to the assumptions and targets defined in the ProDoc have been discussed, reported and shared with the PSC. The PMU has been providing project progress in the annual PIRs since 2013. The project is following the reporting format of PIR introduced by UNDP-GEF.

3.3.7 Communications

The internal communications between the project and its stakeholders is through the PSC and PAC meeting minutes. Prior to each PSC meeting, participants are provided with detailed minutes of the previous PSC meeting as well as other papers that serve as information to enhance the PSC discussions. This practice has led to productive discussions in the 2013 and 2014 PSC meetings. This is considered good practice for other projects.

Apart from the above, since the implementation of cook stoves is taking place in all the 20 districts of the country, the PMU has sent out letters to the district administrations and held training workshops. A project website and BERIS system is under preparation which will serve as a platform for communicating with external stakeholders the progress of the project. Additionally, the information about the project activity is mentioned on the website of MoEA.

In summary, SRBE project is developing a project website and database which will be operational in 2014, past the mid-term of the Project. With the limited time available to complete the project, it is important that the database and website are regularly updated to serve as a useful source of information on energy efficiency in biomass storage and conversion.

3.4 Sustainability

The project is currently on a track to be moderately sustainable based on possible issues with development of a mechanism which allows people to have access to improved cook stoves and, private industries investing in biomass energy technologies.

3.4.1 Financial Risks to Sustainability

Financial risks to SRBE sustainability are high given the absence of RGoB funding under the 11th Five-Year Plan to support implementation of improved cook stoves after the end of project (EOP). Under SRBE the capacity building support has been provided and a team of Non Formal Education Instructors and technicians are trained in installation of cook stoves in all the 20-districts of the country. The institutional arrangements created under the project involving DRE and DAHE, and SFED, MoAF, are well positioned to support the ongoing efforts if the incremental funds are made available to continue the work on improved cook stove installation targeting remaining low income households in the rural areas.

3.4.2 Socio-Economic Risks to Sustainability

The socio-economic risks to SRBE sustainability are rated as *moderately sustainable*. The main reason for this is that the cost of re-designed cook stoves have reduced by 75% of the original cost and construction of cook stoves in village is carried out using locally available resources and in-kind contribution of the household. The main cost associated with the cook stove is that of the fabricated metallic parts and delivery from fabrication shop to the village. Currently the project activities do not lead to a stage by EOP which ensures that supply of cook stove part would continue especially in the rural areas to those who are willing to bear the cost.

3.4.3 Institutional Framework and Governance Risks to Sustainability

The institutional framework and governance risks to SRBE sustainability are rated as moderately sustainable. This is due to the involvement of DRE, MoEA, Ministry of Education, District and

block level officials in the implementation of improved cook stoves. Possibility of future demand of cook stoves by the rural households is likely to be supported by the district officials. Further, NFE instructors are one of the stakeholders in the programme implementation in 75% of districts, therefore risk for sustaining the work in future is relatively less.

3.4.4 Environmental Risks to Sustainability

There is no environmental risk to SRBE sustainability since the project is designed to reduce use of fuel wood in improved cook stoves which are more energy efficient and emit less compared to conventional three-stone cook stoves. This is consistent with RGoB's strategy to limit the energy demand by adopting and using efficient technologies.

4. CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

- Project progress has been slow during the first three quarters of 2013 during which the work was initiated by the PMU on re-designing the cook stoves which lead to significant reduction in its cost, conducting training and awareness raising workshops on Implementing Sawdust Briquetting Technology, and Energy Efficient Biomass Technology and Gender roles implementation, and holding Project Inception workshop;
- Project has picked up steady progress since October 2013 and has gained momentum by first half of 2014. During the past 12-months (October 2013 to September 2014) the project has taken important steps towards the ultimate goal, starting with a Baseline study on Fuel Wood consumption to provide the latest per capita fuel wood consumption figure, and feasibility studies on gasification of sawdust and sawdust briquetting;
- Plantation activity by SFED has been highly satisfactory achieving 100% target of the project. However, only 2 officials against requirement of training 100 officials have been achieved failing seriously in fulfilling Outcome 3. The project target in the Project Planning Matrix may need to be revised in line with the available resources to complete the training of forestry officials on community forestry;
- The dissemination of improved stoves in two districts is in progress and two Memorandums of Understanding have been signed between DRE and Department of Adult and Higher Education for implementing improved cook stoves in 16 districts. Two community Based Organizations have been selected for implementation in the remaining four districts;
- The low rate of expenditure in the 21 months is a concern as the balance remaining has to be expended in remaining 14 months of the project, which requires meticulous planning and coordination among all stakeholders and timely delivery of metallic parts of the improved cook stoves in 18 districts;
- The modality of implementation of biomass briquettes needs to be finalized fairly soon allowing time for the procurement process, followed by pilot demonstrations in selected private industries by second quarter of 2015. This will help to consolidate the technical and economic viability of a BET in industrial sector;
- DAHE faces human resource constraint which the project needs to address urgently since close coordination and timely delivery of fabricated cook stove parts in 16 districts are critical to the timely completion of the project;
- Project will need to address the issue of poor response by private sector participants to its various procurement notices. Lack of access to bank finance is a major factor holding the private sector since they may not possess sufficient finances which are required to fulfil required obligations;
- The GEF-UNDP SRBE Project is covering approximately 16% of the rural households with improved cook stoves. For the potential demand from remaining households and sustainability of the activity, DRE and GNHC will need to prepare plan using the the experiences gained by the SRBE Project implementers namely, DAHE, BAoWE and Tarayana foundation;

- A mechanism is required to be put in place for the Project Management Unit to learn about the issues faced by technicians and NFE Instructors at the time of installation and operation of cook stoves, and find solutions in a time bound manner to prevent failures in the field.
- The project has been included by UNDP CO in the Gender Mainstreaming Initiative under which it set 3 goals for the Gender Action Plan. These goals are:
 - At least one women in every cook stove owning household trained in basic O&M of ICS
 - Improved health of women and children by use of the ICS
 - Both men and women will participate actively in the fuel wood plantation and management.
- The present progress of the project upto the time of conducting MTR, the third goal of the mentioned above has been met. The remaining two goals will be achieve by EOP

4.2 Recommendations

With 14 months and US \$ 1.6 million remaining, followings are recommended for the project to achieve its target by helping to accelerate the implementation of various activities and outputs. :

Recommendation 1: Strengthen DAHE with at least one human resource to share the increased volume of work and help with coordination and management of cook stove deliveries across 10 districts for remainder of the project. This recommendation is based on the review of the arrangements put in place by the project and its implementing partner, DAHE, for training, awareness building, roll-out and installation of cook stoves in 15 districts across the country. Currently, DAHE has only one person in the head quarter in Thimphu, who besides the regular work has an additional responsibility of tracking the progress of SRBE activities. Starting in October 2014 for the next three quarters approximately 12,000 cook stoves will be delivered in rural households, there is a need to closely coordinate the supply of metallic parts for the cook stoves at district and block level, and keep the NFE instructors informed about it so that the installation work can be carried out with minimum delays. It is critical that the project makes immediate arrangement for providing at least one (if possible two) dedicated human resources till end of project (EOP) to strengthen the functioning of DAHE. This will help in implementation as the project reaches an important stage and the presence of these human resources will help to mitigate delays due to lack of coordination.

Recommendation 2: Communication with the District Officials about the SRBE project; its implementing and supporting agencies; end users and the overall benefits will help in securing feedback from Dzongkhag for scale up. The project has been carrying out awareness and capacity building support about the biomass energy technologies including improved cook-stoves and its installation. Several workshops and field trainings have been carried out in about 7-8 districts and written communications provided to district administration. Though this is an ongoing work, the review team would like to emphasize the importance of keeping district and block level district administration officials apprised of the field activities namely, cook stove installations and community forestry plantations, as the project activities are implemented in their respective districts. The Gup and district administration have an important role while providing

feedback about the effectiveness of the programme to the national ministries and the feedback is important input for scaling up and sustaining the efforts after EOP.

Recommendation 3: Expedite the implementation of briquetting project with private sector saw mills to gain experience, build capacity and arrive at a better understanding of the market for briquettes. The SRBE has two main components for demonstration and deployment of BET. While the work on improved cook stoves has lately picked up and reaching satisfactory level, the interaction with the industries is yet to take place. In order for the project to achieve the EOP target of BET use, the project needs to expeditiously decide the way forward with the private sector, which faces constraints on account of restrictions imposed by RGoB and the banks. Therefore, project need to decide the modality of supporting the pilot demonstration of biomass briquetting to gain experience of technology and business models which are easy to replicate. It is important that the briquetting project is immediately taken up for implementation so that the experience gained of about 1 year, can be documented before EOP.

Recommendation 4: A qualitative and quantitative study in the 3rd quarter of 2015 to capture the benefits and the impact of improved cook stove. This recommendation is based on the information gathered by MTR reviewers from the field visit and interactions with rural household on the advantages of using improved cook stove over conventional cook stove and rice cookers. These cook stoves are in use for about a month, however it has already provided some tangible benefits in terms of reduced time required in cooking, relatively less fuel wood consumption and improved air quality inside the house. Once the roll out of the target number of cook-stoves is complete and households have gained a few months of experience of using the improved cook-stove, a post implementation study will help to capture the benefits both in qualitative and quantitative terms which will provide the necessary evidence for sustaining the efforts and extending the benefits to the other rural households. The post implementation study will also serve to monitor and evaluate the impact of the project in containing the rapid increase of biomass across country, and providing benefits to women and children.

Recommendation 5: UNDP to work with DRE and GNHC to make budgetary provision in the annual plans for 2016, 2017 and 2018 to support improved cook stoves installations in the hilly regions and to low income rural households by the end of current plan period. The project's current focus is on the implementing various activities and achieve completion by EOP. There are multiple benefits to the rural families from using improved cook stoves, especially women benefit from improved health and more time for alternate economic activities, and thus it has the potential to support the RGoB's efforts on reducing the poverty level in the country. The SRBE is expected to benefit about 16% of the rural population and the MTR team is of the view that the benefits of improved cook stove needs to be shared with the remaining low income rural population. A great deal of effort have been spent to build the capacity of intermediary government agencies, CBO and NGO, therefore, RGoB should take advantage of this development by making budgetary provision in the annual plan of the current five-year plan which will allow the work to be continued. The sustainability of the project is moderately likely as the DRE is holding discussions with Norwegian government to support the programme. It is recommended that UNDP holds dialogue with DRE and GNHC and assist the concerned ministry in arriving at a decision to continue the work throughout the country until the end of current plan period.

Recommendation 6: Use standard methodologies of IPCC and UNFCCC to estimate GHG reduction from forestry.

This recommendation is being provided for the project to work with SFED to factor in the contribution of the project in reducing greenhouse gas emissions from as a result of direct intervention made due to community forestry plantations. Studies have showed a high rate of CO₂ absorption by the plants during the first 10 years. Due to the combined effect of the community forestry for carbon sequestration and efficiency improvement, the overall post-project GHG reduction benefit from SRBE is envisaged to be better than originally estimated during the project design. The suggested reference materials are (a) IPCC's 'The Good Practice Guidance for Land-Use and Land Use Change and Forestry'⁶, and (b) UNFCCC's CDM 'Methodology on Afforestation and reforestation of lands except wetlands' (AR-ACM0003)⁷.

4.3 Lessons Learned

- Since the project is designed to reach out to the population particularly the low income households in the rural areas, the project implementation faces the challenges of time involved in travelling in the hilly terrain of the country, weather and remote location of villages. The project activities in the field tend to slow down due to access issues and adds to the challenge of installing the improved cook stove on time;
- Adequate staffing of the partner agencies involved in the project implementation is important in a national level projects as the amount of coordination required is high. Frequent changes of staff in DAHE had an adverse effect on the project progress. Project Board must maintain an oversight on the staffing requirement since the project has tight time-line for completing all the activities within 3 years.
- The general experience in implementing pilot demonstration elsewhere has highlighted the importance of location of pilot demonstration site, which requires careful consideration with a preference to logistics and ease of access. This is based on the fact, and borne out of experience that a pilot faces many unforeseen challenges during its implementation and therefore easy access to its location makes the field monitoring easy and also helps in addressing the issues in a timely manner as they arise, a key to the success.
- An in-depth interaction with the banks and other stakeholders in Bhutan's financial sector was not carried out during project preparation. Without full information of the financial barriers the project document and the PPM has few outcomes to provide fiscal incentive and create market for BET. However, in the current situation of the financial market, these are unlikely to be achieved by EOP. The banks in Bhutan have imposed restriction on offering loans to the private sector under the directive of the RGoB to maintain the foreign currency exchange to contain the current account deficit. With the situation likely to continue, the project may not possibly be in a position to extend the fiscal incentives and push for any market linked mechanisms.
- The project has made implementation arrangement with the help of another RGOB agency DAHE, which has helped thus far in the implementing some of the key project activities through awareness creation and demand for cook stoves as the NFEI have strong links with rural population. The implementation capabilities and the support required by DAHE to ensure smooth roll out of cook stoves in 15 districts, however, has not been carefully evaluated by the

⁶ Report is available on http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf_files/GPG_LULUCF_FULL.pdf

⁷ Methodology is available on <https://cdm.unfccc.int/methodologies/DB/C9QS5G3CS8FW04MYXDFQDPXWM4OE>

project. The findings from the field visits of the review team warrants a strengthening of DAHE with additional human resources and establishment of a mechanism in the project to review the installation process of cook stove and to help address technical and operational issues by DRE in a timely manner to mitigate operational issues that would cause people to abandon the improved cook stoves due to lack of solutions.

4.4 Ratings

These are summarized in Table 5.

Table 5: MTR Ratings & Achievement Summary Table for SRBE

Measure	MTR Rating	Achievement Description
Progress Towards Results	Objective: Removal of barriers to sustainable utilization of biomass resources and application of BET Achievement Rating: 4 (Moderately Satisfactory)	Project progress had been slow until third quarter of 2013 after which progress picked up. The re-designing of cook stoves with fewer metallic part lead to reduction in its cost, the new design is owned by DRE; training and awareness raising workshops on Biomass Energy Technologies were completed in 2013. Order for supplies of cook stoves in 10 districts is being implemented, and procurement of cook stove parts for 8 districts is underway Post project implementation data from the field will be required to assess the amount of GHG reduction achieved at EOP and assign an achievement rating to the project.
	Outcome 1: Implementation of strengthened support policies and framework for sustainable practices in production and use biomass resources. Achievement Rating: 4 (Moderately Satisfactory)	<ul style="list-style-type: none"> Developed biomass information system M/s Bhutan Statistical Services and Environmental Consultancy conducted a baseline survey on assessment of fuel-wood consumption and baseline health study in Bhutan. Plantation of about 178,400 saplings by Community Managed Forest Groups carried out in seven districts. Review of policies related to biomass energy in progress
	Outcome 2: Implementation of BET applications Achievement Rating: 3 (Moderately Unsatisfactory)	<ul style="list-style-type: none"> Memorandum of Understanding (MoU) was signed between DRE and DAHE in July 2013 to implement pilot project in Trashigang; two MOU was signed between DRE and DAHE to implement project in other 15 districts; BAoWE selected for implementation in 3 districts while Tarayana Foundation selected for implementation in one district by the Project Board Procurement and delivery of metallic parts expected to be complete by the 1st quarter of 2015 Feasibility studies conducted on biomass gasification concluded project to be not feasible both technically and economically, while biomass briquetting is feasible technically and economically Completion of the installation of 13522 improved cook stoves and demonstration of BET in two industries is important for improving the achievement rating of this outcome and overall project.
	Outcome 3: Improved knowledge, awareness and capacity of policy makers, financiers and end users on BET Achievement Rating: 4 (Moderately satisfactory)	<ul style="list-style-type: none"> National Consultant developed construction manual for stoves (Cook stoves and fodder stoves) in English and national language The Project Management Unit developed Operational & Maintenance Guidelines and Brochures for improved stoves in English & National Language. Distribution of manuals completed for NFE Instructors of Trashigang Dzongkhag Design and printing of energy efficient fuel wood stoves' brochures completed 334 NFE instructors (121 male and 213 female), and 28 technicians (16 male and 12 female) of CBO received training on installation of improved cook stoves 878 CFMG members (557 male and 321 female) trained on sustainable wood energy by SFED out of 50 targeted Two Foresters were trained as ToT on sustainable wood energy in China out of 100 targeted
Project Implementation & Adaptive Management	Achievement Rating : 4 (Moderately Satisfactory)	<ul style="list-style-type: none"> Adaptive management carried out by the project The engagement of NGO/CBO and fabricators took longer than expected due to lack of response to government's procurement notices Cost escalation of material and services led to revision of some of the project targets

Sustainability	Achievement Rating : 3 (Moderately Likely)	<ul style="list-style-type: none"> • The demonstration of improved BET in the private sector industries are yet to be carried out to show its effectiveness and draw the industries' attention to adopt it; • The participation of private sector in SRBE has been much below anticipated level due to limitation in access to (bank) finance which is required to fulfil the contractual obligation. • The continuation of Government's restriction on offering loan from financial institutions to private business entities creates uncertainty about the fabricators and private industry's ability to respond to future demands • Efforts are required to secure finance from government and development agencies to continue deployment of improved cook stoves in rural households especially in the hilly areas. • The DRE is in discussion with Norwegian Government to roll out the improved stoves under its Energy plus programme by 2016. Exact number of stoves to be rolled out will be decided during the next Joint Coordination Group meeting
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APPENDIX A – MISSION TERMS OF REFERENCE

International Consultant for UNDP-GEF Mid-term Review of Bhutan Sustainable Rural Biomass Energy Project

Location :	Thimphu, BHUTAN
Application Deadline :	13-Aug-14
Type of Contract :	Individual Contract
Post Level :	International Consultant
Languages Required :	English
Starting Date :	01-Sep-2014
(date when the selected candidate is expected to start)	
Duration of Initial Contract :	20 days
Expected Duration of Assignment :	1st September 2014 to 31st October 2014

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Background

This is the Terms of Reference for the UNDP-GEF Midterm Review (MTR) of the full sized project titled Bhutan Sustainable Rural Biomass Energy (PIMS4181) implemented through the UNDP Bhutan Country Office/Department of Renewable Energy & Social Forestry and Extension Division, which is to be undertaken in 2014. The project started on the August 29, 2012 and is in its second year of implementation. In line with the UNDP-GEF Guidance on MTRs, this MTR process was initiated before the submission of the second Project Implementation Report (PIR). The MTR process must follow the guidance outlined in the document Guidance For Conducting Midterm Reviews of UNDP-Supported, GEF-Financed Projects (see Annex).

The project was designed to:

- Integrate a top-down approach of providing support through policy measures and incentives, and a bottom-top approach of promoting market mechanisms to create demand for the sustainable development and utilization of stoves and biomass energy technologies (BETs) using wood as fuel. To enhance the effectiveness of these approaches and to create an enabling environment among the stakeholders and participants in the Project, capacity building and training activities will be conducted among the different levels of participants and in the different stages of the Project execution.

The SRBE has the following Project Goal and Objective:

Project Goal: Reduction of GHG emissions in the rural household and industrial sectors of Bhutan through integrated and sustainable biomass resource production and utilization, and promotion of sustainable biomass energy technologies in Bhutan using market based approaches.

Project Objective: Removal of barriers to sustainable utilization of available biomass resources in the country; and application of biomass energy technologies that can support the economic and social development in the country's rural sector.

The Project has been designed to implement three components that are expected to generate outcomes that, when achieved, will realize the Project Objective. Moreover, the Project is expected to deliver certain outputs that will help to achieve the desired outcomes. These outcomes and their corresponding outputs are enumerated below:

Based on the above strategic considerations, the Project will focus on three major components as follows:

- **Component 1:** Mainstreaming sustainable biomass energy production, conversion and utilization
- **Component 2:** Supporting innovative practices and market mechanisms for local sustainable biomass energy technology development and promotion
- **Component 3:** Capacity building and knowledge management

Each of the above components will have outcomes that will be realized through the delivery of specific activities that are designed to produce certain outputs. These outcomes and their corresponding outputs are enumerated below:

Outcome 1: Implementation of strengthened support policies and regulatory frameworks and institutional capacity for adoption of sustainable practices production, conversion and use of biomass resources in Bhutan.

The expected outputs to achieve the above outcome are the following:

- Output 1.1: Developed and implemented roadmap for the promotion of sustainable biomass production and utilization, using both community-based woodlots and non-fuel wood energy resources;
- Output 1.2: Established Biomass Energy Resource Information System (BERIS) for facilitating systematic collection, analysis and dissemination;
- Output 1.3: Modalities and details of participation of community-based organizations and grassroots institutions finalized and agreed;
- Output 1.4: Earmarked areas for sustainable forest wood energy production.

Outcome 2: Implementation of BET applications due to improved confidence in their feasibility, performance, environmental and economic benefits through demonstration projects, market mechanisms and increased private sector participation

The expected outputs to achieve the above outcome are the following:

- Output 2.1: Menu of appropriate & efficient technologies made available;
- Output 2.2: Fiscal incentives such as smart subsidies to enable market mechanisms introduced;
- Output 2.3: Operational locally produced energy efficient industrial stoves for income generating local enterprises and efficient BETs supported;
- Output 2.4: Locally produced 20,000 energy-efficient stoves in rural households and community-based institutions for space heating and cooking needs implemented and promoted for replication;
- Output 2.5: Implemented and operational BET Full Scale Models on: [1] Wood briquetting/ pelleting technology for the production of bioenergy fuels and [2] Biomass gasification for electricity services and thermal applications.

Outcome 3: Improved knowledge, awareness and capacities of policy makers, financiers, suppliers and end-users on benefits and market opportunities for modern biomass energy technologies

The expected outputs to achieve the above outcome are the following:

- Output 3.1: Established and operational Knowledge and Learning Platform for Bhutan from where documented project lessons and best practices are disseminated;
- Output 3.2: Rural development planners trained on integrated rural energy planning and biomass resource assessment;
- Output 3.3: Project developers and micro-entrepreneurs trained on different aspects of BETs;
- Output 3.4: Communities and institutions trained on the installation and maintenance of biomass gasifiers, biodigesters and energy-efficient cook stoves/ furnaces;
- Output 3.5: Completed specialized Training of 100 Trainers on community forestry and sustainable forest wood energy;
- Output 3.6: Completed site visits to successfully operated BET applications and dialogues with policy makers, regulators, technology developers, entrepreneurs and financiers (from countries with more developed technologies and policies).

Duties and Responsibilities

The MTR team will consist of two independent consultants that will conduct the MTR - one team leader/international consultant (with experience and exposure to projects and evaluations in other regions globally) and one local consultant assisting the team leader/international consultant.

The MTR team will first conduct a document review of project documents (i.e. PIF, UNDP Initiation Plan, Project Document, ESSP, Project Inception Report, PIRs, Finalized GEF focal area Tracking Tools, Project Appraisal Committee meeting minutes, Financial and Administration guidelines used by Project Team, project operational guidelines, manuals and systems, etc.) provided by the Project Team and Commissioning Unit. Then they will participate in a MTR inception workshop to clarify their understanding of the objectives and methods of the MTR, producing the MTR inception report thereafter. The MTR mission will then consist of interviews and site visits to Trashigang, Zhemgang and Bumthang if necessary.

The MTR team will assess the following four categories of project progress and produce a draft and final MTR report. See the Guidance For Conducting Midterm Reviews of UNDP-Supported, GEF-Financed Projects (attached or hyperlinked) for requirements on ratings. No overall rating is required.

Project Strategy

Project Design:

- Review the problem addressed by the project and the underlying assumptions. Review the effect of any incorrect assumptions or changes to the context to achieving the project results as outlined in the Project Document;
- Review the relevance of the project strategy and assess whether it provides the most effective route towards expected/intended results;
- Review how the project addresses country priorities;
- Review decision-making processes.

Results Framework/Logframe:

- Undertake a critical analysis of the project's logframe indicators and targets, assess how "SMART" the midterm and end-of-project targets are (Specific, Measurable, Attainable, Relevant, Time-bound), and suggest specific amendments/revisions to the targets and indicators as necessary;
- Examine if progress so far has led to, or could in the future catalyse beneficial development effects (i.e. income generation, gender equality and women's empowerment, improved governance etc...) that should be included in the project results framework and monitored on an annual basis.

Progress Towards Results

- Review the logframe indicators against progress made towards the end-of-project targets; populate the Progress Towards Results Matrix, as described in the Guidance For Conducting Midterm Reviews of UNDP-Supported, GEF-Financed;
- Projects; colour code progress in a "traffic light system" based on the level of progress achieved; assign a rating on progress for the project objective and each outcome; make recommendations from the areas marked as "not on target to be achieved" (red);
- Compare and analyse the GEF Tracking Tool at the Baseline with the one completed right before the Midterm Review.;
- Identify remaining barriers to achieving the project objective;
- By reviewing the aspects of the project that have already been successful, identify ways in which the project can further expand these benefits.

Project Implementation and Adaptive Management**Using the Guidance For Conducting Midterm Reviews of UNDP-Supported, GEF-Financed Projects; assess the following categories of project progress:**

- Management Arrangements;
- Work Planning;
- Finance and co-finance;
- Project-level monitoring and evaluation systems;
- Stakeholder Engagement;
- Reporting;
- Communications.

Sustainability**Assess overall risks to sustainability factors of the project in terms of the following four categories:**

- Financial risks to sustainability;
- Socio-economic risks to sustainability;
- Institutional framework and governance risks to sustainability;
- Environmental risks to sustainability.

The MTR consultant/team will include a section in the MTR report setting out the MTR's evidence-based conclusions, in light of the findings.

Additionally, the MTR consultant/team is expected to make recommendations to the Project Team. Recommendations should be succinct suggestions for critical intervention that are specific, measurable, achievable, and relevant. A recommendation table should be put in the report's executive summary. The MTR consultant/team should make no more than 15 recommendations total.

The MTR consultant/team shall prepare and submit:

- 2 weeks before the MTR mission. To be sent to the Commissioning Unit and project management. Approximate due date: (25/08/2014);
- MTR Inception Report: MTR team clarifies objectives and methods of the Midterm Review no later than Presentation: Initial Findings presented to project management and the Commissioning Unit at the end of the MTR mission. Approximate due date: (13/09/2014);
- Draft Final Report: Full report with annexes within 1 week of the MTR mission. Approximate due date: (26/09/2014);
- Final Report*: Revised report with annexed audit trail detailing how all received comments have (and have not) been addressed in the final MTR report. To be sent to the Commissioning Unit within 1 week of receiving UNDP comments on draft. Approximate due date: (03/10/2014).

*The final MTR report must be in English. If applicable, the Commissioning Unit may choose to arrange for a translation of the report into a language more widely shared by national stakeholders.

Competencies

- Competence in adaptive management, as applied to Climate Change Mitigation;
- Demonstrated understanding of issues related to gender and (Climate Change Mitigation) experience in gender sensitive; evaluation and analysis;
- Excellent communication skills;
- Demonstrable analytical skills;
- Displays cultural, gender, religion, race, nationality and age sensitivity and adaptability;
- Highest standards of integrity, discretion and loyalty.

Required Skills and Experience

Education:

A Master's degree in Environmental Science, Climate Change Mitigation, Sustainable Development, Energy Management.

Experience:

- Development Studies or relevant discipline, or other closely related field;
- Recent experience with result-based management evaluation methodologies;
- Experience applying SMART targets and reconstructing or validating baseline scenarios;
- Experience working with the GEF or GEF-evaluations;
- Experience working in (South East Asia);
- Work experience in relevant technical areas for at least 10 years;
- Project evaluation/review experiences within United Nations system will be considered an asset.

Language:

- Fluent in English.

Note:

The consultants cannot have participated in the project preparation, formulation, and/or implementation (including the writing of the Project Document) and should not have a conflict of interest with project's related activities.

13. EVALUATOR ETHICS

Mid-term review consultants will be held to the highest ethical standards and are required to sign a Code of Conduct (Annex E) upon acceptance of the assignment. UNDP evaluations and reviews are conducted in accordance with the principles outlined in the [UNEG 'Ethical Guidelines for Evaluations'](#).

APPENDIX B – EVALUATIVE CRITERIA

Ratings for Progress Towards Results: (one rating for each outcome and for the objective)		
6	Highly Satisfactory (HS)	The objective/outcome is expected to achieve or exceed all its end-of-project targets, without major shortcomings. The progress towards the objective/outcome can be presented as “good practice”.
5	Satisfactory (S)	The objective/outcome is expected to achieve most of its end-of-project targets, with only minor shortcomings.
4	Moderately Satisfactory (MS)	The objective/outcome is expected to achieve most of its end-of-project targets but with significant shortcomings.
3	Moderately Unsatisfactory (MU)	The objective/outcome is expected to achieve its end-of-project targets with major shortcomings.
2	Unsatisfactory (U)	The objective/outcome is expected not to achieve most of its end-of-project targets.
1	Highly Unsatisfactory (HU)	The objective/outcome has failed to achieve its midterm targets, and is not expected to achieve any of its end-of-project targets.

Ratings for Project Implementation & Adaptive Management: (one overall rating)		
6	Highly Satisfactory (HS)	Implementation of all seven components – management arrangements, work planning, finance and co-finance, project-level monitoring and evaluation systems, stakeholder engagement, reporting, and communications – is leading to efficient and effective project implementation and adaptive management. The project can be presented as “good practice”.
5	Satisfactory (S)	Implementation of most of the seven components is leading to efficient and effective project implementation and adaptive management except for only few that are subject to remedial action.
4	Moderately Satisfactory (MS)	Implementation of some of the seven components is leading to efficient and effective project implementation and adaptive management, with some components requiring remedial action.
3	Moderately Unsatisfactory (MU)	Implementation of some of the seven components is not leading to efficient and effective project implementation and adaptive, with most components requiring remedial action.
2	Unsatisfactory (U)	Implementation of most of the seven components is not leading to efficient and effective project implementation and adaptive management.
1	Highly Unsatisfactory (HU)	Implementation of none of the seven components is leading to efficient and effective project implementation and adaptive management.

Ratings for Sustainability: (one overall rating)		
4	Likely (L)	Negligible risks to sustainability, with key outcomes on track to be achieved by the project's closure and expected to continue into the foreseeable future
3	Moderately Likely (ML)	Moderate risks, but expectations that at least some outcomes will be sustained due to the progress towards results on outcomes at the Midterm Review
2	Moderately Unlikely (MU)	Significant risk that key outcomes will not carry on after project closure, although some outputs and activities should carry on
1	Unlikely (U)	Severe risks that project outcomes as well as key outputs will not be sustained

APPENDIX C – MISSION ITINERARY (for October 5-14, 2014)

The mid-term review mission was conducted by Mr. Sandeep Tandon, International Consultant and Mr. Yeshey Penjor in accordance with the objectives of the midterm review and obtained data relevant for making judgments regarding Project success and lessons learned.

DATE	TIME	VENUE	MEETING
05/10/2014		Paro/Thimphu	Arrival of International Consultant
06/10/2014	0930	UNDP CO Kawajangsa	RR, DRR, Mr. Karma L Raptan & Mr. Nawaraj Chhetri,
	1100	DRE, MoEA	Mr. Karma Tshering (Director), Mr. Mewang Gyeltshen, Mr. Ugyen (17161920)
	1215-1300	ADB Office	Mr. Tshewang Norbu; tnorbu@adb.org (17512774/02 339150)
	1400	GNHC	Mr. Throwa Tenzin; throwa@gnhc.gov.bt
	1530	BAWoE	Mr. Ngawang Tshering; baowe.bhutan@gmail.com
07/10/2014	0930	Ministry of Education (MoE), Namgaycholing	Mr. Tshewang Tandin (DG), Mr. Tenzin Rabgyel (17641375) t_rabgyel@yahoo.com
	1030	MoE	In presence of Mr. Tenzin Rabgyel, telephonic interview of project implementers in Trashigang; 1) Ms. Jigme Wangmo, NFE Instructor, Bephu, Khaling. (17968786) 2) Ms. Zangmo, NFE Instructor, Brekha, Khaling. (17324792) 3) Sangay, Jerrey Lemi, 77200395 4) Pem Choki, Khaling LSS, 17532897 5) Tshering Choki, Gomchhu, 17760866 6) Mr. Ugyen Thinley, Sr. DEO, Trashigang. (17579362)
	1130	DoFPS/SFD	Chief FO of SFD & Mr. Tashi Wangchuk; (17113920) twangchuk73@gmail.com
			Mr. Kinley Dorji, CFO for SDC assisted Participatory Forest Management Project (PFMP).
08/10/2014	0600	Travel to Zhemgang	Thimphu – Zhemgang; (Night halt at Zhemgang)
09/10/2014	0930	Zhemgang Dzong	Call on Dasho Dzongda
	1030	Zhemgang Dzong	Call on Chairman, Dzongkhag Tshogdu/Trong Gup 17666621
	1130	Travel to Zurphel	Zhemgang - Zurphel
	1400-1800	Field visits to Zurphel and Tsanglajong villages	Ms. Karma (Zurphel Community Technician) 17813784 Mr. Norbu, Tshogpa/Tshanglajong Technician 17729692
10/10/2014	1000	Travel to Thimphu	Night halt at Trongsa
11/10/2014	0800	Travel to Thimphu	Arrival in Thimphu
13/10/2014	1030	UNDP CO	Mr. Nawaraj Chhetri
	1130	DRE	Mr. Ugyen
	1400	GNHC	Mr. Thinley Namgyel, Director and GEF National Focal Person
14/10/2014	1500	UNDP/DRE	Mission debriefing

			<p>Mission debriefing – present:</p> <ul style="list-style-type: none">• Ms. Christina Carlson, RR, UNDP,• Mr. Nawaraj Chhetri, UNDP,• Mr. Cheki Dorji, SRBE, DRE• Mr. Tashi Wangchuk, SFED, DoFPS,• Ms. Tshering Pelden, BAoWE
15/10/2014	Departure of International consultant		

APPENDIX D – MEETINGS HELD DURING MISSION

This is a listing of persons contacted in Thimphu, Zurphel and Tshanglajong in Zhemgang Dzong (unless otherwise noted) during the midterm review period for the MTR only. The midterm review team regrets any omissions to this list.

1. Ms. Christina Carlson, Resident Representative, UNDP CO
2. Ms. Hideko Hadzialic, Deputy Resident Representative, UNDP-CO
3. Mr. Nawaraj Chhetri, Portfolio Manager, Climate Change Mitigation and Energy, UNDP-CO
4. Mr. Karma Tshering, Director, DRE, MoEA
5. Mr. Mewang Gyeltshen, National Project Director, SRBE Project
6. Mr. Ugyen, Project Manager, SRBE project
7. Mr. Tshewang Norbu, Resident Representative, Bhutan Resident Mission, ADB
8. Mr. Thinley Namgyel, Director, GNHC (GEF Operational Focal Point)
9. Mr. Wangchuk Namgay, Dy. Chief Planning Officer, Sustainable Development, GNHC
10. Mr. Throwa Tenzin, Senior Planning Officer, GNHC
11. Mr. Ngawang Tshering, Project Manager, BAoWE
12. Mr. Tshewang Tandin, Director General, DAHE, MoE
13. Mr. Tenzin Rabgyel, Chief Education Officer, NFCED, DAHE, MOE
14. Mr. Tashi Wangchuk, Chief Forestry Officer, SFED, DoFPS
15. Mr. Kinley Dorji, Chief Forest Officer, PFMP, SFED, DoFPS
16. Dasho Karma Dukpa, Dzongda, Zhemgang Dzongkhag Administration
17. Mr. Kinley, Dzongkhag Planning Officer, Zhemgang
18. Mr. Dorji Wangchuk, Gup, Trong Geog and Chairman, Dzongkhag Tshogdu, Zhemgang
19. Ms. Karma, Zurphel Community Technician
20. Mr. Norbu, Tshogpa/Tshanglajong Technician

Total Meetings held: 20

APPENDIX E – LIST OF DOCUMENTS REVIEWED

1. Project Document
2. Combined Delivery Reports
3. Project Board meeting minutes
4. Workshop Report on Strategic Workshop on Energy Efficient Biomass Energy Technologies and Gender Roles, organized by SRBE Project in August 2013
5. Feasibility Study on Biomass Gasification for Power Generation from Sawmills in Bhutan by EVI supported by Ecotech Solutions in September 2013
6. Assessment of Fuelwood consumption and baseline health impact study in Bhutan by Bhutan Statistical Services & Environmental Consultancy
7. Feasibility Study on Saw Briquetting for Sawmills in Bhutan by Emergent Ventures India (EVI) Pvt Ltd in March 2014
8. Workshop Report on the workshop for Communication and Capacity Building Strategy and Action Planning for the Implementation of Sawdust Briquetting Technology in Bhutan organized by SRBE Project in June 2014
9. Powerpoint slides of Project Progress Report presentation to 4th PB Meeting held on 12th August 2014
10. 18 months rolling work plan of UNDP CO
11. Project Inception report

APPENDIX F – AUDIT TRAIL

Response to Comments provided by UNDP CO

1. There are two figures of NEF instructors being reflected in Table A. Can you verify?

Reviewers: This is based on the information shared by the PMU. The gender based information is included

2. SFED training not included. You need to have gender disaggregated data as well

Reviewers: This is now included

3. In Outcome 3, the midterm assessment figure should have captured workshops conducted by PMU

Reviewers: The information has been updated

4. Regarding the information given 1st para of section 3.3.2, there were re design works being carried out

Reviewers: Developments and progress made during that period is captured here.

5. Achievement rating 3 for Outcome 2 - Might have to revisit rating as this is rated against number of stoves disseminated. Hope you have taken into account other activities that are completed

Reviewer: The rating also reflects the financial progress under the outcome as there is large unspent funds at the time of MTR. Also, one of the main output (2.4) is lagging behind.

6. Recommendation 6 - As discussed is it possible to quantify this

Reviewers: - This recommendation is being provided to capture the 'additional benefit' of SRBE. Estimating GHG reduction from forestry is best done by the Min. of Agriculture and Forests as it involves collection of field data and monitoring the growth of trees in various plantations.

7. Regarding the figures presented in Section 2.1 - Recommend using latest data from fuel wood survey if available

Reviewer: - These figures are used here from Bhutan Energy Data Directory since this section about the context under which the programme was designed for GEF endorsement.

8. Regarding the total geographical area to remain under forest cover % figure presented in section 2.2 - Is this 60 or 70?

Reviewers: - the figure is 60%

9. The section 2 bullet point under section 3.2.1 – we believe this was due to unforeseen reasons like freezing of loan and not necessary lack of proper study

Reviewer: - A study on the financial sector's preparedness to offer support to private sawmills was not carried out during the programme design.

10. The bullet point 5 - It would be good to reflect sex disaggregated data both for DAHE and CFM training

Reviewer: - Gender disaggregated figures provided in the current version.

11. The midterm level and Assessment figure of the project indicator – total quantity of GHG emissions mitigated by EOP - It was believed that the PMU had some figure while submitting PIR

Reviewer: - The reviewers did not come across the GHG reduction figures for the cook stove installed hence it is reported as 'nil'.

12. The project indicator on reduction of fuel wood consumption for energy use in households and industries by EOP - Need to check with PMU

Reviewers: - No data available was with reviewers backed by field data on reduction in fuel wood consumption

13. The midterm level and Assessment figure of Outcome 2 'Degree of satisfaction by end-users of BETs & furnaces/stoves implemented - 0' - Is this correct? How was this measured?

Reviewers: - Very little information available about the satisfaction level since only 570 cook stoves were installed at the time of MTR mission

14. Output 2.2 Achievement rating - Is this not part of feasibility study carried out by PMU?

Reviewers: - The achievement rating has been revised since the Cost of metallic part of cook stoves subsidized by the Project; 30% subsidy for heating stoves. However financial support to industries yet to be finalized

15. Output 2.3 Achievement rating - need to consider BAoWE, DAHE and Tarayana as partners also

Reviewers: – The achievement rating has been revised by including the mentioned partners

16. Output 2.4 – Justification for rating mentioned 5100 ordered - Is this verified by PMU?

Reviewers: – The figure of 5100 was received from the PMU

17. Output 2.5 - Number of enterprises that locally produces stoves by EOP – This should be 2.

Reviewer: – Correction made

18. Output 3.1 – Project website and database is under development - This is completed

Reviewer] – Noted and correction made

19. Output 3.1 – Number of information packages prepared and disseminated was 1 - How did you arrive at this figure

Reviewers: The numbers of information packages prepared were 3, correction made

20. Output 3.3 – Midterm level and assessment rating '0' - Workshop were conducted

Reviewers: – Workshops were held in 2013 and 2014 on efficient cook stoves and BET were attended by fabricators, saw millers, government, and NGO representative.

21. Output 3.6 – Achievement rating 'MU' - It could be MS

Reviewers: - Work has been done in only 1 out of 3 indicators, therefore the rating of MU

22. Section 3.2.2., first bullet point - Not clear, suggest rephrasing

Reviewers: – Point is re-written to clearly convey the message

23. Section 3.3.2., first paragraph - There were re design works being carried out

Reviewers: – The paragraph is re-written

24. Table 2 – the budget and expenditure figures given in USD – needs to be verified

Reviewers: – All expenditure figures given in CDR are in USD

25. Table 3 – Confirm Co-financing amount of BTFEC with PMU -

Reviewers: – The information is updated as per the information available from the 4th PB/SC report

Response to Comments provided by UNDP CO

1. Project Information table – The provided by PEI The PMU could only avail USD 30,000 out of USD 50,000 as co-financing since the PEI project was being wrapped up.

Reviewers: The correction is made in the table

2. In Table A on Summary Review of Project – Regarding the rating given to Outcome 3, the PMU is of the view that the rating provided is very low and does not commensurate the efforts expended in brining out volumes of information booklets and manuals.

Reviewers: The rating has been revised based on the progress and tasks completed

3. The sustainability section in Table A - The matter regarding securing finance to continue the improved cookstove program is being discussed

Reviewer: The rating is revised based on the information furnished by the PMU

4. Regarding Recommendation 2, the local administrative functionaries are engaged at all steps of the project. In fact the number of stoves to be distributed across the gewogs and identification of beneficiaries within the geogs are decided by Dzongkhag administration and Geog Administration officers. I think this observation is a biased observation as the implementation model adopted by NGO cannot be to related to the model adopted by DAHE for the implementation. Even for the dzongkhags where NGOS are involved, local administrative functionaries are extensively consulted.

Reviewers: The recommendation is based on the direct interaction of two reviewers with district officials in one of the districts where improved cookstoves were installed recently. . Although the project has sent communications to the concerned district level officials and engaged them in training programs, the finding was of a communication gap which needs to be covered by the PMU before installation of cook stoves begin in other districts

APPENDIX G –: CODE OF CONDUCT AGREEMENT

Signed Copies of UNEG Code of Conduct for Evaluators/Midterm Review Consultants⁸

Evaluators/Consultants:

1. Must present information that is complete and fair in its assessment of strengths and weaknesses so that decisions or actions taken are well founded.
2. Must disclose the full set of evaluation findings along with information on their limitations and have this accessible to all affected by the evaluation with expressed legal rights to receive results.
3. Should protect the anonymity and confidentiality of individual informants. They should provide maximum notice, minimize demands on time, and respect people's right not to engage. Evaluators must respect people's right to provide information in confidence, and must ensure that sensitive information cannot be traced to its source. Evaluators are not expected to evaluate individuals, and must balance an evaluation of management functions with this general principle.
4. Sometimes uncover evidence of wrongdoing while conducting evaluations. Such cases must be reported discreetly to the appropriate investigative body. Evaluators should consult with other relevant oversight entities when there is any doubt about if and how issues should be reported.
5. Should be sensitive to beliefs, manners and customs and act with integrity and honesty in their relations with all stakeholders. In line with the UN Universal Declaration of Human Rights, evaluators must be sensitive to and address issues of discrimination and gender equality. They should avoid offending the dignity and self-respect of those persons with whom they come in contact in the course of the evaluation. Knowing that evaluation might negatively affect the interests of some stakeholders, evaluators should conduct the evaluation and communicate its purpose and results in a way that clearly respects the stakeholders' dignity and self-worth.
6. Are responsible for their performance and their product(s). They are responsible for the clear, accurate and fair written and/or oral presentation of study limitations, findings and recommendations.
7. Should reflect sound accounting procedures and be prudent in using the resources of the evaluation.

MTR Consultant Agreement Form


Agreement to abide by the Code of Conduct for Evaluation in the UN System:

Name of Consultant: Sandeep Tandon _____

Name of Consultancy Organization (where relevant): Not Applicable _____

I confirm that I have received and understood and will abide by the United Nations Code of Conduct for Evaluation.

Signed at NOIDA (U.P.), India _____ (Place) on 15th September 2014 _____ (Date)

Signature:  _____

⁸ www.undp.org/unegcodeofconduct

Signed Copies of UNEG Code of Conduct for Evaluators/Midterm Review Consultants

Evaluators/Consultants:

8. Must present information that is complete and fair in its assessment of strengths and weaknesses so that decisions or actions taken are well founded.
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MTR Consultant Agreement Form

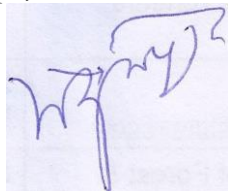
Agreement to abide by the Code of Conduct for Evaluation in the UN System:

Name of Consultant: Mr. Yeshey Penjor _____

Name of Consultancy Organization (where relevant): Not Applicable _____

I confirm that I have received and understood and will abide by the United Nations Code of Conduct for Evaluation.

Signed at Thimpu, Bhutan _____ (Place) on 15th September 2014 _____ (Date)



Signature: _____