CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-SSC-PDD)
Version 03 - in effect as of: 22 December 2006

CONTENTS

Annexes

Revision history of this document

Version Number	Date	Description and reason of revision
01	21 January 2003	Initial adoption
02	8 July 2005	• The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. • As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <http://cdm.unfccc.int/Reference/Documents>.
03	22 December 2006	• The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.

SECTION A. General description of small-scale project activity

A.1 Title of the small-scale project activity:

Replacement of Fossil Fuel by Agricultural Residues to Power a Crude Palm Oil (CPO) Refinery at BIDCO's Jinja facility in Uganda

Version: 01
Date: 28/05/2011

A.2. Description of the small-scale project activity:

Background of the company:

BIDCO Uganda Ltd., the largest edible oils refiner in East Africa, completed construction of a brand-new, state-of-the-art, crude palm oil (CPO) refinery in Jinja, Uganda, in May 2005. The facility is refining CPO imported from the Far East, to produce olein and steirin.

Purpose of the Project Activity:

The purpose of the project activity is the thermal energy generation using agricultural residues like Coffee Husk, Bagasse, Wood ships etc. for captive use. The project activity is the Greenfield project and aims to avoid the use of fossil fuels; in particular "Heavy fuel oil" to produce the steam required during the refining process and instead switches over to Biomass to meet the steam requirements. The project activity primarily involves installation of 16 TPH, 17.5kg/cm^2 biomass based boiler and associated accessories.

BIDCO's Greenfield project by the installation of biomass based boiler to meet its steam requirement has resulted in carbon emission reductions due to replacement of fossil fuels. Biomass is considered to be a carbon-neutral fuel because emissions from combustion are taken to completely offset by carbon captured (during photosynthesis) by the growing biomass.

Pre Project Scenario:

This being a Greenfield project, no energy generating units or the user of energy existed at the project site in the pre project scenario.

Project Activity Scenario

The project primarily involves installation of one new 16 TPH, 17.5kg/cm^2 Biomass based Boiler. Hence, the project activity aims to avoid the use of furnace oil to produce the steam required during the refining process and instead switches over to Biomass to meet the steam requirements.

Baseline Scenario:

In the absence of project activity, PP would have installed fuel oil based Boiler to meet the steam demands. PP had an alternative option of installation of Furnace oil based Boiler to meet the steam demands instead of project activity and found that this alternative is commonly practiced in the country. However, considering the fact that CDM revenue makes the project viable and attractive over the alternative, PP decided to go ahead with the implementation of the project activity.

Therefore, in the absence of the project activity, PP would have opted for Furnace oil based thermal energy generating system leading to CO_2 emissions.

Contribution of the Project Activity to Sustainable Development:

The following five indicators viz. Environmental, Social, Economical, Energy and Technological well being are considered as indicators for the sustainable development.

The project proponent believes that the project activity has a beneficial effect on the surrounding community and the employment in the region and thereby project activity improves the social, environmental and the economic status of the surrounding community.

Environmental Sustainability:

- The project activity involves fuel switch from furnace oil to renewable biomass fuel which is considered as GHG neutral. Therefore in addition to reduced consumption of fossil fuel resources, the project activity leads to GHG emission reductions. The project activity neither impacts human health nor the biodiversity negatively.
- The use of agro residues as opposed to fuel oil from fossil sources results in a net reduction in particulate matter air pollution.
- On a broader spatial scale, if the use of biomass were to be replaced by its industry-standard petroleum-based substitute, fuel oil normally contains as much as 4% sulphur; replacement by biofuels reduces both SO_2 and NO_x emissions, thereby mitigating local and long-range acid deposition

Social Well Being:

- The project activity generates both skilled and unskilled employments opportunities, during the construction and operation of the plants.
- Manual firing and handling of biomass would require additional manpower compared to automated furnace oil boilers. This leads to employment generation in the local village

Economic Sustainability:

- Act as a clean technology demonstration project, one – if not the first – of its kind in Uganda, encouraging development of modern and more efficient generation of steam using biomass fuel throughout the Country;
- As opposed to a fossil fuel-fired plant, the project does not lead to an outflow of foreign exchange capital, since the biomass waste does not have to be imported.
- The project activity will contribute to the general improvement in the living standards of local people by generating additional employment opportunities.

Energy Sustainability:

- Diversify the sources of steam generation;
- Use of clean and efficient technologies, and conserve natural resources;

Technological well being:

- The project activity uses environmentally safe and sound technology. The project will encourage the replication of the technology in the sector.

Thus the project activity meets all the requirements for the sustainable developments in the host country.

A.3. Project participants:

Name of Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
Government of Uganda (Host)	BIDCO Uganda Ltd. (a Private entity)	No

BIDCO Uganda Ltd. will be the sole owner of the CERs generated from the project activity.

A.4. Technical description of the small-scale project activity:

A.4.1. Location of the small-scale project activity:

A.4.1.1. Host Party(ies):

Uganda

A.4.1.2. Region/State/Province etc.:

East African/Great Lakes region

A.4.1.3. City/Town/Community etc:

Jinja

A.4.1.4. Details of physical location, including information allowing the unique identification of this small-scale project activity :

BIDCO Uganda Ltd. is located on the northern shore of Lake Victoria in eastern Uganda, on the eastern periphery of the town of Jinja. The latitude/longitude coordinates of the project site are: 0°26′29.68″ N, 33°14′49.13″ E. Jinja is a city lies in south eastern Uganda, Africa approximately 54 miles (87 km), by road, east of Kampala, the capital. Entebbe International Airport is the principal international airport of Uganda. It is located near the town of Entebbe, on the shores of Lake Victoria, and about 35 km (21 miles) from the capital, Kampala. All project activities are located within the confines of the refining plant.

Figure 1: Location of the project activity

A.4.2. Type and category(ies) and technology/measure of the small-scale project activity:

The project activity generates energy using renewable biomass and replaces the use of furnace oil for steam generation.

As per simplified modalities and procedures for small scale CDM project activities, the project activity qualifies under the

Sectoral Scope : 01 Energy Industries (Renewable/Non-Renewable Sources)
Type-I : Renewable Energy Projects
Category C : Thermal energy production with or without electricity

Technical Specifications of the Project activity:

The project activity has commissioned one biomass based Boiler with capacity 16 TPH, 17.5kg/cm^2 and related machineries. The Main Boiler and the balance of Plant (Auxiliaries) are manufactured by Thermax Ltd. The boiler will be operated by utilizing available agro-residues. The expected technical lifetime of the Boiler is 20 years and 0 months.

Steam Boiler:

Parameter	Remarks
Steam generation Capacity	16 TPH
Model	Combimax (CP 160)
Boiler manufacturer (Make)	Thermax
Type	Multi fuel fired horizontal composite, (smoke tube and water tube), two pass, natural circulation Boiler
Pressure of the Boiler	17.5 kg/cm^2
Temperature of the steam	Saturated
Feed water temperature	100ºC
Enthalpy of feed water	419 kJ/kg
Enthalpy of steam	2795 kJ/kg
Efficiency of the Boiler	75%
Life time of the Boiler	20 Years 0 months
The date biomass fuel boiler become operational	August 15, 2005

Along with Boiler, other auxiliary machineries like Wood Chipper Machine, Air pre-heater, Draft fans, Motors, Ash handling system, Fuel handling system, Piping works, Electricals, Instrumentation & Control systems etc., are installed.

The biomasses for the project activity would be sourced from the nearby vendors. A total of 29,736 MT of the firewood are to be combusted annually in 330 days of operation.

The technology is environmentally safe and sound and it does not have negative impact on human health or biodiversity. No technology transfer is involved in the project activity from Annex I countries.

A.4.3 Estimated amount of emission reductions over the chosen crediting period:

Years	Estimation of annual emission reductions in tonnes of CO_2e
2012	28,908
2013	28,908
2014	28,908

2015	28,908
2016	28,908
2017	28,908
2018	28,908
2019	28,908
2020	28,908
2021	28,908
Total estimated reductions (tonnes of CO_2 e)	289,080
Total number of crediting years	10
Annual average of the estimated reductions over the crediting period (tCO_2 e)	28,908

A.4.4. Public funding of the small-scale project activity:

There is no public funding from the Annex I parties or diversion of Overseas Development Assistance (ODA) in the project activity. The total project cost is met by the project participant.

A.4.5. Confirmation that the small-scale project activity is not a debundled component of a large scale project activity:

As per Appendix C, paragraph 2 of the Simplified Modalities and Procedures for Small-Scale CDM project activities states:

"A proposed small-scale project activity shall be deemed to be a debundled component of a large project activity if there is a registered small-scale CDM project activity or an application to register another small-scale CDM project activity:

- With the same project participants;
- In the same project category and technology/measure; and
- Registered within the previous 2 years; and
- Whose project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest point

The proposed project activity is not a debundled component of a large scale project activity as there is no registered project activity or an application for registration by the same project participant and in the same category.

SECTION B. Application of a baseline and monitoring methodology

B.1. Title and reference of the approved baseline and monitoring methodology applied to the small-scale project activity:

As per the appendix B of simplified modalities and procedures for small scale project activities, the applied methodology for the CDM project activity is:

Type : AMS-I.C

Title : Thermal energy production with or without electricity
Sectoral Scope : 01
Version : 18
EB : 56

Reference: http://cdm.unfccc.int/methodologies/DB/H2PMYUBPE9H1DP9S0WB470N5EKU1NP

B.2 Justification of the choice of the project category:

This project falls under the "Type I: Renewable energy projects" and "Category I C: Thermal energy production with or without electricity" as it displaces fossil fuels with biomass for generation of thermal energy.

Requirements with respect to technology/measure under AMS I.C – Thermal Energy production with or without electricity (Version 18) and its comparison for justification with the project activity are explained in the table below.

Sr. No	Applicability Criteria AMS I.C Version 18	Project Status	Remarks
1	This category comprises renewable energy technologies that supply users with thermal energy that displaces fossil fuel use. These units include technologies such as solar thermal water heaters and dryers, solar cookers, energy derived from renewable biomass and other technologies that provide thermal energy that displaces fossil fuel.	The project activity comprises of renewable biomass (Coffee husk, bagasse, wood chips etc.) based thermal energy generation by displacing the fuel oil. The steam generated in project activity is used for meeting the captive demand. In the absence of the project activity, the energy requirements would have been met by fuel oil based Boiler.	Since the project activity involves renewable biomass based thermal energy generation that displaces fuel oil, the applicability condition is met.
2	Biomass-based cogeneration systems consisting of steam generator(s) and steam turbine(s) are included in this category. For the purpose of this methodology cogeneration shall mean the simultaneous generation of thermal energy and electrical energy in one process. Project activities that produce heat and power in separate element processes (for example, heat from a boiler and electricity from biogas engine) do not fit under the definition of cogeneration project.	The project activity does not involve any cogeneration system.	Since the project activity is not a cogeneration activity, this condition is not relevant.
3	Emission reductions from a biomass cogeneration system can accrue from one of the following activities: (a) Electricity supply to a grid;	The project activity is not a cogeneration activity.	Since the project activity is not a cogeneration system, this condition is not

	(b) Electricity and/or thermal energy (steam or heat) production for on-site consumption or for consumption by other facilities; (c) Combination of (a) and (b).		applicable.
4	The total installed/rated thermal energy generation capacity of the project equipment is equal to or less than 45 MW thermal. (see paragraph 6 for the applicable limits for cogeneration project activities).	Based on the manufacturer's rated thermal output, the total installed thermal generation capacity is 10.56 MW thermal (Calculations are provided under this table).	Since the total installed thermal generation capacity is less than 45 MW thermal, this applicability condition is met.
5	For co-fired systems, the total installed thermal energy generation capacity of the project equipment, when using both fossil and renewable fuel shall not exceed 45 MW thermal (see paragraph 6 for the applicable limits for cogeneration project activities).	The project activity does not involve co-firing with fossil fuels.	Since the project is not a co-fire system, this condition is not relevant.
6	The following capacity limits apply for biomass cogeneration units. a. If the project activity includes emission reduction from both the thermal and electrical energy components, the total installed energy generation capacity (thermal and electrical) of the project equipment shall not exceed 45 MW thermal. For the purpose of calculating this capacity limit the conversion factor of 1:3 shall be used for converting electrical energy to thermal energy (i.e., for renewable project activities , the maximal limit of 15 MW(e) is equivalent to 45 MW thermal output of the equipment or the plant); b. If the emission reductions of the cogeneration project activity are solely on account of thermal energy production (i.e., no emission reductions accrue from electricity	The project does not involve cogeneration system.	Since project is not a cogeneration activity, this condition does not apply.

	component), the total installed thermal energy production capacity of the project equipment of the cogeneration unit shall not exceed 45 MW thermal; c. If the emission reductions of the cogeneration project activity are solely on account of electrical energy production (i.e. no emission reductions accrue from thermal energy component), the total installed electrical energy generation capacity of the project equipment of the cogeneration unit shall not exceed 15 MW.		
7	In case electricity and/or steam/heat produced by the project activity is delivered to another facility or facilities within the project boundary, a contract between the supplier and consumer(s) of the energy will have to be entered into specifying that only the facility generating the energy can claim emission reductions from the energy displaced.	The steam generated by the project activity is consumed onsite and not delivered to other facility.	Since the steam generated is not transferred to a third party, this condition is not applicable.
8	Project activities that seek to retrofit or modify an existing facility for renewable energy generation are included in this category.	The proposed project activity is the greenfield project and has installed new boiler and does not seek to retrofit or modify existing facility for renewable energy generation.	Since project activity does not retrofit or modify an existing facility, this condition is not applicable.
9	The capacity limits specified in the above paragraphs apply to both new facilities and retrofit projects. In the case of project activities that involve the addition of renewable energy units at an existing renewable energy facility, the total capacity of the units added by the project should comply with capacity limits in paragraphs 4 to 6 and should be physically distinct from the existing units.	The project is a new Greenfield facility and confirms to the capacity limits of 45MW thermal. The project does not involve retrofication or capacity addition of renewable energy units at an existing renewable energy facility.	Since the project being a new facility confirms to the 45MW thermal limit, the condition is met.
10	Charcoal based biomass energy generation project activities are	The proposed project activity uses agro-residues; it does not involve	Since the project does not intend to

	eligible to apply the methodology only if the charcoal is produced from renewable biomass sources provided: (a) Charcoal is produced in kilns equipped with methane recovery and destruction facility; or (b) If charcoal is produced in kilns not equipped with a methane recovery and destruction facility, methane emissions from the production of charcoal shall be considered. These emissions shall be calculated as per the procedures defined in the approved methodology AMS - III.K. Alternatively, conservative emission factor values from peer reviewed literature or from a registered CDM project activity can be used, provided that it can be demonstrated that the parameters from these are comparable e.g., source of biomass, characteristics of biomass such as moisture, carbon content, type of kiln, operating conditions such as ambient temperature.	charcoal based biomass energy generation.	use charcoal, this condition is not relevant.
11	If solid biomass fuel (e.g. briquette) is used, it shall be demonstrated that it has been produced using solely renewable biomass and all project or leakage emissions associated with its production shall be taken into account in emissions reduction calculation	The project activity will use renewable biomass residues and does not intend to use solid biomass fuels.	Since the project does not use solid biomass fuel, this condition is not relevant.

Small Scale Limit:

Based on the manufacturer's rated output, the calculations for the total thermal energy generated by the project activity are as follows:

S. No	Parameter	Value	Unit	Remarks
1	Steam Quantity	16	TPH	Technical specifications of boiler
2	Steam Pressure	17.5	kg/cm^2	Technical specifications
3	Enthalpy of steam at 17.5kg/cm^2	2795.2	kJ/kg	Estimated based on standard steam tables
4	Enthalpy of feed water at 100^0C	419	kJ/kg	Estimated based on standard steam tables
5	Net energy output of the boiler	2376	kJ/kg	Calculated

At the Rated Capacity

Total thermal output: 2376 kJ/kg * 16 TPH= 38,018 MJ/h

Thermal output from the boiler: 38,018 MJ/h / 3600= 10.56 MW of thermal

Hence, Total thermal output of Agro-Residues based Boiler: 10.56 MWth.

The chosen methodology for the project, AMS I C is justifiable since the project activity meets all the applicability conditions as discussed above. Thus, it is used in the following sections of the PDD.

B.3. Description of the project boundary:

As per AMS IC, Project boundary constitutes of "*the physical, geographical site of the project equipment producing the renewable energy delineates the project boundary. The boundary also extends to the industrial, commercial or residential facility, or facilities, consuming energy generated by the system and the processes or equipment that is affected by the project activity.*"

Therefore, project boundary includes Biomass storage area, Steam generation Boiler and related auxiliaries of the renewable energy generating system. The boundary extends to the refinery facility consuming the steam generated by the project.

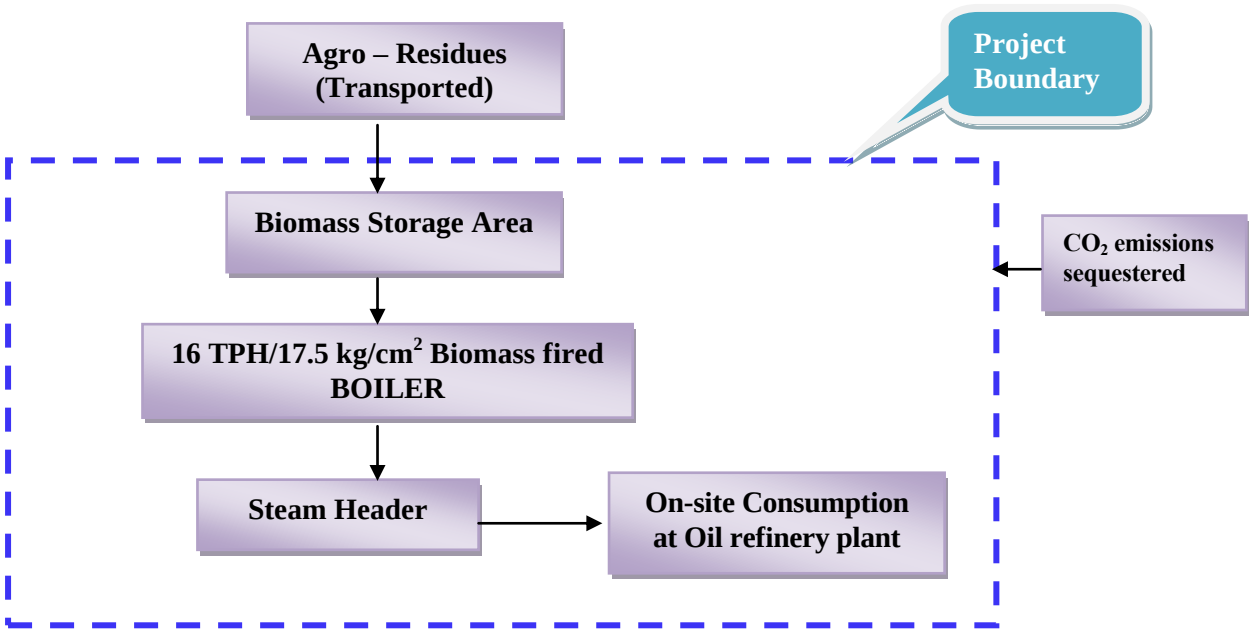

FIGURE 2: Project boundary

B.4. Description of baseline and its development:

The project activity involves renewable biomass based thermal energy generation. The renewable biomasses used in the project activity are Bagasse, Wood chips, Coffee husk etc., The project activity has come up to meet the steam demands of BIDCO's Jinja refinery process plant.

The identification of the baseline scenario has been carried out in line with the Para 13 of AMS IC Version 18 which states that:

"For renewable energy technologies that displace technologies using fossil fuels, the simplified baseline is the fuel consumption of the technologies that would have been used in the absence of the project activity times an emission factor for the fossil fuel displaced. For calculating the emission factor, reliable local or national data shall be used. IPCC default values shall be used only when country or project specific data are not available or demonstrably difficult to obtain."

Considering the case of the project activity, it is a stand-alone refinery which requires steam for its operation. The best option for the project proponent would be to adopt steam generation boiler to fulfill the steam requirements. Thus, the options considered for further analysis are

Alternative 1: Fuel oil based thermal energy generation system

In the absence of the CDM project activity, the steam requirements would have been met from fossil fuel (fuel oil) based thermal energy generation system of similar capacity. This alternative is in compliance with all applicable legal and regulatory requirements and may be a part of the baseline.

Alternative 2: Renewable Biomass based thermal energy generation system (i.e. project activity taken without CDM benefits)

BIDCO shall utilise agro fuel like Bagasse, Wood chips, Coffee husk etc. as a fuel to meet the steam requirements. This alternative is in compliance with all applicable legal and regulatory requirements. Hence this alternative is considered further for arriving at the baseline scenario.

It is found that the alternative 2 i.e. *"Renewable Biomass based thermal energy generation system"* is not economically attractive as alternative scenario 1 i.e. *"Fuel oil based thermal energy generation system"*.

Hence, the most economically attractive course of action, i.e. fuel oil based thermal energy generating system has been considered as baseline scenario.

Emission reduction is achieved by substituting heavy fuel oil with Biomass, specifically agricultural residues and plantation fuel wood. The baseline emission corresponding to thermal energy generation has been estimated using the emission coefficient for fuel oil. The baseline emissions have been computed on the basis of amount of fuel oil required to generate 16 TPH of steam supplied to the process over 330 days.

As per equation 2 of AMS IC, the baseline emissions are calculated using the following formula:

$BE_{thermal,\ CO2,y} = (EG_{thermal,y}/\eta_{BL,thermal})* EF_{FF,CO2}$

The following table illustrates the key parameters and assumptions used to determine the baseline emissions.

Key Parameter	Description	Value	Data Source
EG_y	Total energy generation	299 TJ/Annum	Estimated as discussed above
$EF_{FF, CO2}$	Emission Factor of Fuel oil	77.4 tCO_{2e} / TJ	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2: Energy; Table 2.2, Page Num 16
$NCV_{Fuel\ oil}$	Net Calorific Value of Fuel oil	9600 kCal/kg	As per the quotes from Suppliers
$\eta_{BL,thermal}$	Efficiency of baseline (fuel oil) boiler	80%	As per the Quotes from the Suppliers

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:

The project activity is located in BIDCO's crude palm oil (CPO) refinery in Jinja, Uganda. The project activity is the Greenfield project and displaces the use of heavy fuel oil by using renewable Biomass to meet the internal thermal requirements with the primary aim of reducing carbon dioxide emissions by fossil fuels.

PP has demonstrated the additionality based on the Micro-scale CDM project activities approach using the **"Guidelines for demonstrating additionality of micro scale project activities"** Version 02, EB 60, Annex 25.

As per the para 2

Applicability Condition:

Project activities up to 5 megawatts that employ renewable energy technology[1] are additional if any one of the below conditions is satisfied

(a) The geographic location of the project activity is in one of the Least Developed Countries or the Small Island Countries (LDCs/SIDs) or in a special underdeveloped zone of the host country identified by the Government before 28 May 2010;

(b) The project activity is an off grid activity supplying energy to households/communities (less than 12 hrs grid availability per 24 hrs day is also considered as "off grid" for this assessment);

(c) The project activity is designed for distributed energy generation (not connected to a national or regional grid) with both conditions (i) and (ii) satisfied;

[1] All technologies/measures included in approved Type I Small Scale CDM methodologies are eligible to be considered. Furthermore at its fifty-seventh meeting the Board clarified that all CDM project activities that meet the criteria specified in these guidelines are eligible to apply the guidelines irrespective of the scale of the approved CDM methodology applied to the project activity.

(i) Each of the independent subsystems/measures in the project activity is smaller than or equal to 1500 kW electrical installed capacity;
(ii) End users of the subsystems or measures are households/communities/SMEs.

(d) The project activity employs specific renewable energy technologies/measures recommended by the host country DNA and approved by the Board to be additional in the host country (conditions apply: the total installed capacity of the technology/measure contributes less than or equal to 5% to national annual electricity generation).

Project Case:

The project activity is the Greenfield project and displaces the use of heavy fuel oil by using renewable biomass to meet the internal thermal energy requirements. Hence the project activity uses the renewable energy technology and applies the approved Type I Small Scale CDM methodology AMS I.C. Version 18.

The project activity is located in BIDCO's crude palm oil (CPO) refinery in Jinja, Uganda. As per the United Nations report publication titled "Handbook on the Least Developed Country Category: Inclusion, Graduation and Special Support Measures[2]" dated November 2008, Uganda has been included in Least Developed Country list in 1971[3].

So it is concluded that the geographic location of the project activity is in Least Developed Country i.e., Uganda identified by the United Nations before 28 May 2010. Hence the project activity satisfies the condition of Para 2(a) and termed as "Microscale CDM project activities".

As per the para 8

Applicability Condition:

Eligibility of project activities as Microscale CDM project activities shall be determined in accordance with the principles laid out in paragraph 3 and paragraph 4 of the "General Guidelines to SSC CDM methodologies" Version 16[4]. Also, definitions provided for output capacity and guidelines provided for conversion from electrical to thermal units in paragraph 4 of the "General Guidelines to SSC CDM methodologies" version 16 shall be used. Where applicable, additional guidelines provided in relevant methodologies shall be followed.

Hence, As per Para 4c of "General Guidelines to SSC CDM methodologies" Version 16,

"For biomass, biofuel and biogas project activities, the maximal limit of 15 MW(e) is equivalent to 45 MW thermal output of the equipment or the plant (e.g. boilers). For thermal applications of biomass, biofuels or biogas (e.g. the cook stoves), the limit of 45 MWth is the installed/rated capacity of the thermal application equipment or device/s (e.g. biogas stoves). For electrical or mechanical applications, the limit of 15 MW installed/rated output shall be used".

[2] http://www.un.org/en/development/desa/policy/cdp/cdp_publications/2008cdphandbook.pdf

[3] http://www.un.org/en/development/desa/policy/cdp/ldc/profile/country_197.shtml

[4] http://cdm.unfccc.int/Reference/Guidclarif/ssc/methSSC_guid06.pdf

Project Case:

As per the above guidance, the conversion factor of 3 is used to convert electrical energy (MW) equivalent into thermal energy equivalent (MWth). Hence the **"Guidelines for demonstrating additionality of micro scale project activities"** is applicable for the project activities up to 5 MW or 15 MWth.

The thermal energy equivalent (MWth) of the project activity is calculated based on the manufacturer's rated output; the calculations are as follows:

S. No	Parameter	Value	Unit	Remarks
1	Steam Quantity	16	TPH	Technical specifications of boiler
2	Steam Pressure	17.5	kg/cm^2	Technical specifications
3	Enthalpy of steam at 17.5kg/cm^2	2795.2	kJ/kg	Estimated based on standard steam tables
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5	Net energy output of the boiler	2376	kJ/kg	Calculated

At the Rated Capacity

Total thermal output: 2376 kJ/kg * 16 TPH= 38,018 MJ/h

Thermal output from the boiler: 38,018 MJ/h / 3600= 10.56 MW of thermal

Hence, Total thermal output of Agro-Residues based Boiler: 10.56 MWth.

Since the total installed thermal generation capacity is less than 15 MWth, the project activity qualifies under the Microscale CDM project activities and hence used the **"Guidelines for demonstrating additionality of micro scale project activities"** Version 02 to demonstrate additionality.

From the above analysis it can be concluded that the additionality of the project activity is justifiable since the project activity meets all the applicability conditions as discussed above.

Hence, CDM revenues are very indispensable for the project activity and will encourage the project investors to invest such kind of renewable energy projects in the least developed countries.

Thus the project activity proves to be additional.

Serious Consideration of CDM:

*As per Para 6(a) of **"guidelines on the demonstration and assessment of prior consideration of the CDM**", Annex 22 of EB 49 meeting report, the project participant must indicate awareness of the CDM prior to the project activity start date, and that the benefits of the CDM were a decisive factor in the decision to proceed with the project. Evidence to support this would include, inter alia, minutes and/or*

notes related to the consideration of the decision by the Board of Directors, or equivalent, of the project participant, to undertake the project as a CDM project activity.

For the proposed project activity, the evidence to support awareness of the CDM prior to the project activity start date, and that the benefits of the CDM were a decisive factor in the decision to proceed with the project is board resolution dated 20/03/2005 in which BIDCO has decided to implement the project activity considering CDM revenue.

*As per Para 6(b) of **"guidelines on the demonstration and assessment of prior consideration of the CDM**" Annex 22 of EB 49 meeting report, it has to indicate, by means of reliable evidence, that continuing and real actions were taken to secure CDM status for the project in parallel with its implementation.*

Below is the chronology referring to real and parallel action taken by BIDCO to secure the CDM status of the project, which clearly indicates that there is always a gap of less than 2 years between the real actions by BIDCO.

Date	**Project Execution Step**	**CDM registration efforts**	**Evidence**
14/02/2005	Offer letters received for Biomass based Boilers from Boiler supplier.		Letters from equipment Suppliers dated 14/02/2005
20/03/2005	BIDCO approves for the development of the biomass based energy generation project.	Board considered CDM revenue for financial viability	Extracts of the minutes of Board meeting
12/04/2005	Purchase order placed for the Boiler in the project activity.	**CDM Starting Date**	Letter from BIDCO to Boiler Suppliers dated 12/04/2005
15/08/2005	Commissioned dates of the project activity plant		Copy of Commissioning Certificates
April to June 2006		Local Stakeholders Survey for CDM conducted	Copy of Stakeholders survey forms
15/03/2007	-	Contracted CDM Consultant for PDD services	Copy of the Agreement
08/05/2008	-	Agreement with DOE for validation services	Agreement with Validator
19/11/2008	-	PDD submitted to Validator for Validation	Email Copy
11/11/2009	-	BIDCO signed an Emissions Reduction Purchase Agreement	Copy of ERPA
16/11/2010	-	Contracted new CDM Consultant for PDD services	Copy of the Agreement

28/04/2011	-	Proposal from DOE for Validation services	Copy of email communication
25/05/2011	-	Agreement with DOE for validation services	Copy of the Agreement
28/05/2011	-	Submission of PDD for Webhosting	Email Copy

*As per Para 8(a) of **"guidelines on the demonstration and assessment of prior consideration of the CDM**" Annex 22 of EB 49 meeting report,*

8. In validating proposed CDM project activities where:

(a) there is less than 2 years of a gap between the documented evidence the DOE shall conclude that continuing and real actions were taken to secure CDM status for the project activity;

From the above chronology table, it is clear that gap between two CDM related activities are not greater than two years. The PP has demonstrated the prior CDM awareness and within 2 years of the CDM starting date, CDM consultant was contracted and other CDM related activities also happened parallel with the implementation. The documented evidence for the same shall be provided to DOE.

Hence it can be concluded that continuing and real actions were taken to secure CDM status for the project in parallel with its implementation and the gap between the CDM related activities is also less than 2 years.

Thus, the project activity proves to be additional.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

The proposed project activity is the installation of biomass based Boiler uses renewable energy sources like coffee husk, bagasse, etc., that produces steam and displaces fossil fuel (Fuel Oil) used for thermal energy generation. Hence the baseline emissions is as per Para 18 of the methodology AMS I.C, Version 18, EB 56.

Emission reductions are calculated as follows:

Emission reductions (ER_y):

$$ER_y = BE_y - PE_y - LE_y$$

Where:

$\boldsymbol{ER_y}$ Emission reductions in year y (t CO_2e)
$\boldsymbol{BE_y}$ Baseline emissions in year y (t CO_2e)
$\boldsymbol{PE_y}$ Project emissions in year y (t CO_2)

LE_y Leakage emissions in year *y* (t CO_2)

Baseline Emissions:

$$BE_{thermal,CO_2,y} = (EG_{thermal,y} / \eta_{BL,thermal}) * EF_{FF,CO_2}$$

Where:

$BE_{thermal, CO2, y}$	The Baseline emission from steam / heat displaced by the project activity during the year y (tCO_2)
$EG_{thermal, y}$	The net quantity of heat/steam supplied by the project activity during the year y (TJ). This has been calculated based on the manufacturer's rated output.
$EF_{FF, CO2}$	The CO_2 emission factor of the fossil fuel (Fuel Oil) that would have been used in the baseline plant; tCO_2/TJ, obtained from reliable local or national data if available, otherwise, IPCC default emission factors are used. PP has used IPCC default value 77.4 tCO_2/TJ.
$\eta_{BL, thermal}$	The efficiency of the plant using fossil fuel that would have been used in the absence of the project activity. As per Para 26b, PP has used the efficiency of the steam boiler using fuel oil from the documented efficiency specification for new boilers provided by manufacturers i.e., 80%

Project Emissions:

As per para 43 of applied approved small scale methodology, AMS I.C, the project emissions include:

a) *CO_2 emissions from on-site consumption of fossil fuels due to the project activity shall be calculated using the latest version of 'Tool to calculate project or leakage CO_2 emissions from fossil fuel combustio'.;*

b) *CO_2 emissions from electricity consumption by the project activity using the latest version of Tool to calculate baseline, project and/or leakage emissions from electricity consumption;*

c) *Any other significant emissions associated with project activity within the project boundary;*

d) *For geothermal project activities, project participants shall account for the following emission sources, where applicable: fugitive emissions of carbon dioxide and methane due to release of non-condensable gases from produced steam; and, carbon dioxide emissions resulting from combustion of fossil fuels related to the operation of the geothermal power plant.*

For the proposed project activity, the project emission could be only from the on-site consumption of fossil fuels due to the project activity and emissions due to collection/processing/transportation of biomass residues to the project site will be considered as the project emissions since all the other conditions that are mentioned are not applicable.

The project emissions from fossil fuel combustion shall be calculated using the latest version of Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion. Also, the consumption of fossil fuels will be monitored whenever there is not adequate supply of renewable biomass/agro-residues.

The project emissions would be calculated as per the below formula:

CO_2 emissions from fossil fuel combustion in process j are calculated based on the quantity of fuels combusted and the CO_2 emission coefficient of those fuels, as follows:

As per equation 1 of the "*Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion";*

$$PE_{FC,j,y} = \sum_i FC_{i,j,y} \times COEF_{i,y}$$

Where:

$PE_{FC,j,y}$ = Are the CO_2 emissions from fossil fuel combustion in process j during the year y (tCO_2/yr);

$FC_{i,j,y}$ = Is the quantity of fuel type i combusted in process j during the year y (mass or volume unit/yr);

$COEF_{i,y}$ = Is the CO_2 emission coefficient of fuel type i in year y (tCO_2/mass or volume unit)

i = Are the fuel types combusted in process j during the year y

The CO_2 emission coefficient $COEF_{i,y}$ can be calculated using one of the following two Options (A & B), depending on the availability of data on the fossil fuel type i, as follows:

PP has chosen option B

Option B: The CO_2 emission coefficient $COEF_{i,y}$ is calculated based on net calorific value and CO_2 emission factor of the fuel type i, as follows: Equation 4:

$$COEF_{i,y} = NCV_{i,y} \times EF_{CO2,i,y}$$

Where:

$COEF_{i,y}$ = Is the CO_2 emission coefficient of fuel type i in year y (tCO_2/mass or volume unit)

$NCV_{i,y}$ = Is the weighted average net calorific value of the fuel type i in year y (GJ/mass or volume unit)

$EF_{CO2,i,y}$ = Is the weighted average CO_2 emission factor of fuel type i in year y (tCO_2/GJ)

i = Are the fuel types combusted in process j during the year y

Leakage Emissions:

As per Para 45 and 46 of the applied approved methodology AMS I.C., the leakage is to be considered:

- *If the energy generating equipment is transferred from another activity, leakage is to be considered.*

There is no transfer of energy generating equipment from another activity, hence leakage is not considered and has been fixed ex-ante.

- *In case collection/processing/transportation[5] of biomass residues is outside the project boundary, CO_2 emissions from collection/processing/transportation of biomass residues to the project site.*

The project activity involves the transportation of biomass residues from outside the project boundary. As per para 46 of AMS I.C, Version 18, if biomass residues are transported over a distance of more than 200 kilometres due to the implementation of the project activity then this leakage source attributed to transportation shall be considered, otherwise it can be neglected. But the project activity involves the transportation of biomass residues within 200 kilometres and hence the leakage emissions are neglected.

B.6.2. Data and parameters that are available at validation:

Data / Parameter:	**$EF_{FF,CO2}$ - Fuel Oil**
Data unit:	tCO_2/TJ
Description:	CO_2 emission factor of the fossil fuel type (Fuel oil) that has been identified as the most likely baseline scenario
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2: Energy; Table 2.2, Page Num 16
Value applied:	77.4
Justification of the choice of data or description of measurement methods and procedures actually applied :	The methodology allows (AMS I.C, Ver. 18, Para 13) that value can be obtained from reliable local or national data if available; otherwise IPCC default emission factors are used. Hence we have chosen to obtain the value from 2006 IPCC Guidelines for National Greenhouse Gas Inventories.
Any comment:	--

Data / Parameter:	**$\eta_{BL,thermal}$**
Data unit:	%
Description:	The efficiency of the plant using fossil fuel that would have been used in the absence of the project activity.
Source of data used:	Manufacturer's Specifications
Value applied:	80%
Justification of the choice of data or	As per Para 26 b of AMS I.C, Version 18 , Highest of the annual operational efficiency values provided by two or more manufacturers for boiler with

[5] If biomass residues are transported over a distance of more than 200 kilometres due to the implementation of the project activity then this leakage source attributed to transportation shall be considered, otherwise it can be neglected.

description of measurement methods and procedures actually applied :	similar specifications
Any comment:	--

Data / Parameter:	**$SEC_{biomass}$**
Data unit:	TJ of Biomass input energy /TJ of energy output
Description:	Specific fuel consumption of biomass
Source of data to be used:	Calculated based on design parameters of biomass consumption and energy output
Value of data	1.33
	As per paragraph 40 of the Indicative simplified baseline and monitoring methodology I-C, Version 18, "*In the case of project activity consuming biomass and fossil fuel to produce thermal and or electrical energy, specific energy consumption of each type of fuel (biomass or fossil) to be used shall be specified ex ante. The consumption of each type of fuel shall be monitored".* In accordance with the methodology, the specific fuel consumption of Biomass has been stated ex ante and the detailed calculation is provided in levelised cost analysis sheet.
Any comment:	This data is calculated based on the total quantity of biomass consumed, calorific value and the enthalpy of steam (at both operating conditions). This data is provided ex-ante. The actual quantity of each type of biomass used will be monitored ex-post; details of which are provided in Section B.7.1.

Data / Parameter:	**$Q_{Biomass\ available}$**
Data unit:	Tonnes/Annum
Description:	Quantity of surplus biomass available in the region
Source of data to be used:	As per biomass assessment survey report
Value of data	--
Justification of the choice of data or description of measurement methods and procedures actually applied :	Report prepared by the reputed third party consultant based on the Publicly available information on the annual generation of biomass.
Any comment:	--

B.6.3 Ex-ante calculation of emission reductions:

Emission reductions (ER_y)

$ER_y = BE_y - PE_y - LE_y$

$=28,908 – 0 – 0$

=28,908 tCO_2e/year

Baseline Emissions:

$BE_{thermal, CO2, y}$ = $(EG_{thermal,y} / \eta_{BL, thermal}) * EF_{FF, CO2}$

$EG_{thermal,y}$ = (2358 kJ/kg * 16 TPH * 1000 kg * 7920 hrs)

$\eta_{BL, thermal}$ = 80%

$EF_{FF, CO2}$ = 77.4 tCO_2/TJ

$BE_{thermal, CO2, y}$ = (2358 kJ/kg * 16 TPH * 1000 kg * 7920 hrs) / 80 %) * 77.4 tCO_2/TJ

= 28,908 tCO_2e/ year

Project Emissions:

For ex-ante emission reduction calculations, fossil fuel consumption in the project activity has been considered as zero. Also, the consumption of any fossil fuels would be monitored whenever there is not adequate supply of renewable biomass/agro-residues. The provision to monitor the same has been provided in section B.7.1 of the PDD.

PE_y = 0 tCO_2e/year

Leakage Emissions:

LE_y = 0 tCO_2e/year

B.6.4 Summary of the ex-ante estimation of emission reductions:

Year	Estimation of project activity emissions (tCO_2 e)	Estimation of baseline emissions (tCO_2 e)	Estimation of leakage (tCO_2 e)	Estimation of overall emission reductions (tCO_2 e)
2012	0	28,908	0	28,908
2013	0	28,908	0	28,908
2014	0	28,908	0	28,908
2015	0	28,908	0	28,908
2016	0	28,908	0	28,908
2017	0	28,908	0	28,908
2018	0	28,908	0	28,908
2019	0	28,908	0	28,908
2020	0	28,908	0	28,908
2021	0	28,908	0	28,908
Total (tonnes of CO_2e)	0	289,080	0	289,080

B.7 Application of a monitoring methodology and description of the monitoring plan:

B.7.1 Data and parameters monitored:

Data / Parameter:	**Continuous operation of the equipment/system**
Data unit:	--
Description:	Continuous operation of the equipment/system
Source of data to be used:	-
Value of data	--
Description of measurement methods and procedures to be applied:	Monitoring: Manual inspection of the operation of the equipments to ensure that they are still operating. Data type: Monitored and Archived Archiving Procedure: Paper Recording Frequency: Annually Responsibility: Shift in charge.
QA/QC procedures to be applied:	The senior manager would cross check the data.
Any comment:	Data archived will be kept 2 years beyond the crediting period

Data / Parameter:	**Annual operating hours**
Data unit:	Hours
Description:	Number of hours of operation of the project activity in year y
Source of data to be used:	Plant records
Value of data	7920
Description of measurement methods and procedures to be applied:	Monitoring: The boiler operator will be recording the daily hour of operations. This will be aggregated annually Data type: Monitored and Archived Archiving Procedure: Paper Recording Frequency: Daily, aggregated annually Responsibility: Boiler operator
QA/QC procedures to be applied:	Shift in-charge will cross check the data.
Any comment:	Data archived will be kept 2 years beyond the crediting period

Data / Parameter:	**$EG_{PJ,thermal}$**
Data unit:	TJ
Description:	Net quantity of thermal energy supplied by the project activity
Source of data to be used:	Calculated
Value of data	299
Description of measurement methods and procedures to be applied:	Calculation procedure: Enthalpy of steam from Boiler is calculated from steam tables based on the corresponding pressure and quantity of steam. The net energy content of steam

	generated from the project activity (TJ) is then obtained as a product of the total steam generated and the enthalpy of steam. Data type: Calculate and archived Archiving procedure: Paper and Electronic Recording Frequency: Hourly steam quantity and pressure to get monthly average enthalpy Responsibility: Boiler operator would be responsible for monitoring and checks for regular calibration of steam flow meters and pressure gauge and Shift in charge will be responsible for the calibration of steam flow meters.
QA/QC procedures to be applied:	QA/QC procedures will be ensured as the steam flow meters would be calibrated at regular intervals.
Any comment:	Data archived will be kept 2 years beyond the Crediting period

Data / Parameter:	**Q_{Steam}**
Data unit:	TPH
Description:	Quantity of steam supplied by the Boiler
Source of data to be used:	Measured data at the plant site by Steam flow meter
Value of data	16
Description of measurement methods and procedures to be applied:	Monitoring: Steam flow meters are installed at the boiler outlet will monitor the total quantity of steam supplied for process. Data type: Measured and archived. Archiving procedure: Paper and Electronic Meter: Steam flow meter Accuracy class: 0.2% Recording Frequency: Hourly Calibration Frequency: Once in a year Responsibility: Boiler operator would be responsible for monitoring and checks for regular calibration of steam flow meters and Shift In-charge will be responsible for calibration of the steam flow meters.
QA/QC procedures to be applied:	QA/QC procedures will be ensured as the steam flow meters would be calibrated at regular intervals.
Any comment:	Data archived: Crediting period + 2 yrs

Data / Parameter:	**Pressure**
Data unit:	kg/cm^2
Description:	Pressure of steam at the outlet of boiler
Source of data to be used:	Pressure gauge
Value of data	17.5
Description of measurement methods and procedures to be applied:	Monitoring: Pressure gauge will measure the pressure of the steam at the boiler outlet Data type: Measured and archived Recording Frequency: Hourly

	Archiving procedure: Paper and Electronic Responsibility: Boiler operator would be responsible for monitoring and checks for regular calibration of pressure gauge and Shift In-charge will be responsible for calibration of the pressure gauge. Calibration Frequency: Calibration will be carried out at regular intervals
QA/QC procedures to be applied:	QA/QC procedures will be ensured as the pressure gauge would be calibrated at regular intervals.
Any comment:	The data will be daily monitored. The data is required to calculate enthalpy of steam at the Boiler. Data archived will be kept 2 years beyond the Crediting period

Data / Parameter:	$\mathbf{B}_{\mathbf{Biomass,y}}$
Data unit:	MT/Annum
Description:	Quantity of Biomass used in the project activity per Annum
Source of data to be used:	1. Invoices 2. Plant records
Value of data	29,736
Description of measurement methods and procedures to be applied:	Monitoring: Weigh bridge at plant entry would record the total quantity of different biomass residue to be used and the same would be confirmed with the invoices raised by the biomass suppliers Data Type: Measured and Archived Archiving Procedure: Electronic and Paper Recording frequency: Annually Responsibility: Plant head with Officer (Stores) would be responsible for monitoring and checks for regular calibration of the weigh bridge and maintaining the copy of invoices received on a regular basis
QA/QC procedures to be applied:	QA/QC procedures will be ensured since the equipment would be calibrated at regular intervals.
Any comment:	Data archived will be kept 2 years beyond the Crediting period

Data / Parameter:	$\mathbf{NCV}_{\mathbf{biomass}}$
Data unit:	kcal/kg
Description:	Net calorific value of biomass
Source of data to be used:	Third party lab records for monthly tests
Value of data	3,200
Description of measurement methods and procedures to be applied:	Monitoring: The calorific value analysis will be conducted by the competent third party and the same would be confirmed with the invoices raised by the biomass suppliers Data Type: Calculated and Archived Archiving Procedure: Paper Recording frequency: Monthly Responsibility: Plant head along with Officer (Stores) would be responsible for monitoring
QA/QC procedures to	--

be applied:	
Any comment:	Data archived will be kept 2 years beyond the Crediting period

Data / Parameter:	**$NCV_{i,y\ Fossil\ fuel}$**
Data unit:	kcal/kg
Description:	Net calorific value of fossil fuel type *i* used in the project activity
Source of data to be used:	Plant Records.
Value of data	--
Description of measurement methods and procedures to be applied:	Monitoring: The calorific value of fossil fuel type *i* used in the boilers will be calculated and the same will be crosschecked with the purchased fossil fuel bills. Data Type: Calculated and Archived Archiving Procedure: Paper Recording frequency: Monthly Responsibility: Plant head along with Officer (Stores) would be responsible for monitoring
QA/QC procedures to be applied:	--
Any comment:	Data archived will be kept 2 years beyond the Crediting period

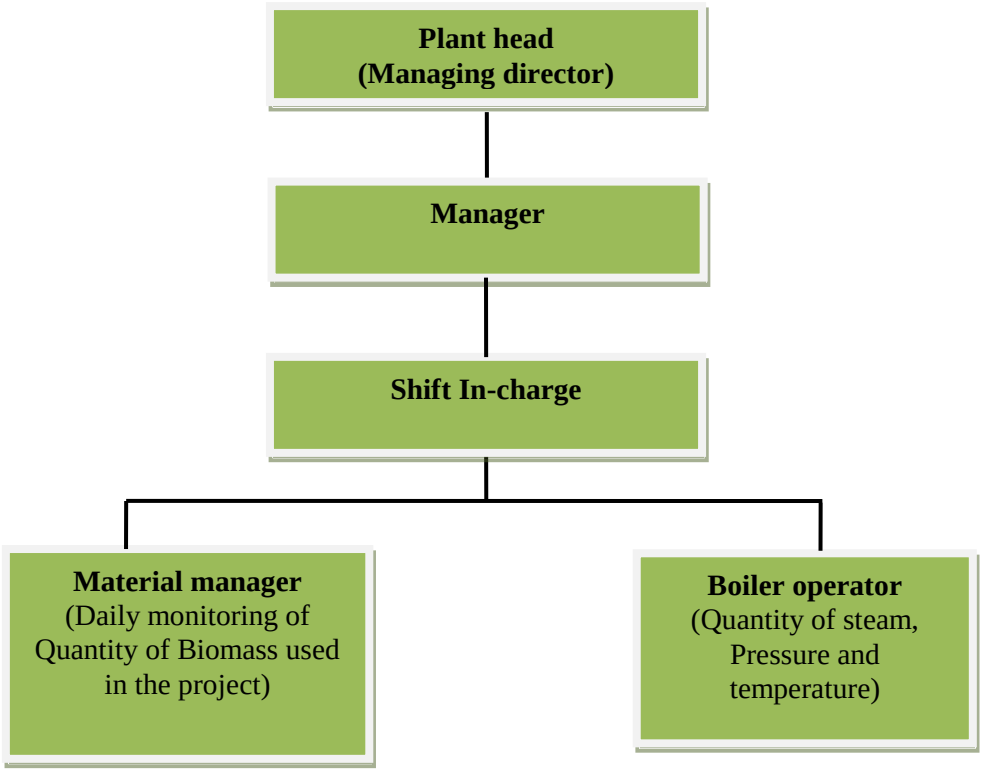
Data / Parameter:	**$Q_{fossil\ fuel\ ,i,\ y}$**
Data unit:	Tonnes/Annum
Description:	Quantity of fossil fuel type *i* used in the project activity
Source of data to be used:	Plant records
Value of data	--
Description of measurement methods and procedures to be applied:	Monitoring: The quantity of fossil fuel type *i* used in the project activity will be calculated and the same will be crosschecked with the purchased fossil fuel bills. Data Type: Calculated and Archived Archiving Procedure: Paper Recording frequency: Monthly Responsibility: Plant head along with Officer (Stores) would be responsible for monitoring.
QA/QC procedures to be applied:	--
Any comment:	Data archived will be kept 2 years beyond the Crediting period

Data / Parameter:	**Moisture Content $_{biomass}$**
Data unit:	%water
Description:	Moisture content of the biomass residues
Source of data to be used:	Moisture analysis in the in-house laboratory
Value of data	--

Description of measurement methods and procedures to be applied:	Monitoring: The moisture content of a batch of biomass residues will be measured in the in-house laboratory once in a month. Weighted average will be used for the calculations. Batch having homogenous quality will be selected. Data Type: Measured and archived Archiving Procedure: Paper Recording Frequency: Once in a month Responsibility: Lab technician will be analysing the moisture content of a batch of biomass residues using a standard method.
QA/QC procedures to be applied:	A sample of biomass residues from a batch having homogenous quality will be given in the external lab for moisture testing once in three months.
Any comment:	Data archived will be kept 2 years beyond the crediting period

B.7.2 Description of the monitoring plan:

The Managing Director (MD) of BIDCO has constituted the CDM project team, which is responsible for the project activity. The team is responsible for monitoring, verification and recording of the data.



Roles and responsibilities:

Plant Head:

- The Managing Director would head the CDM team and will be responsible for compliance with CDM related matters and ensure to follow the plan.

Manager:

- The Manager would manage the CDM team and will be responsible for compilation and checking of all the results.

Shift In-charge:

- Implementing the monitoring procedures lay down
- Ensure calibration of meter reading

Material manager:

- Daily recording of the biomass used in the project activity.

Boiler operator:

- Maintenance of the boiler and its metering equipments
- Daily recording of the meter equipments (like pressure, temperature, quantity of steam) in the log book

The detailed monitoring plan is provided in Annex 4.

B.8 Date of completion of the application of the baseline and monitoring methodology and the name of the responsible person(s)/entity(ies)

Name of the responsible entity for applying baseline study and the monitoring methodology to the project activity and its contact information:

BIDCO Uganda Ltd, Uganda

This is a project participant (contact details are given in Annex 1)

Date of completion of baseline Study: 05/12/2010

SECTION C. Duration of the project activity / crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

12/04/2005 (this start date is Purchase order date of major equipment i.e. Boiler for the proposed project activity)

C.1.2. Expected operational lifetime of the project activity:

20 years 0 Months

C.2 Choice of the crediting period and related information:

Fixed crediting period of 10 years is chosen

C.2.1. Renewable crediting period

C.2.1.1. Starting date of the first crediting period:

Not Applicable

C.2.1.2. Length of the first crediting period:

Not Applicable

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

01/01/2012 or the date of registration (whichever is later)

C.2.2.2. Length:

10 years 0 months

SECTION D. Environmental impacts

D.1. If required by the host Party, documentation on the analysis of the environmental impacts of the project activity:

The National Environmental Management Authority, Uganda's DNA and the Host Party, has separately received a completed "Sustainable Development Template." The project also completed an Environmental Impact Assessment prior to receiving a permit to proceed; the said permit (number 456) is shown below. As biomass waste will be used for energy generation with efficient combustion, there are no significant environmental impacts of the project activity.

Original

000456

THE REPUBLIC OF UGANDA

THE NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY (NEMA)
The National Environment Statute, No. 4 of 1995
The Environmental Impact Assessment Regulations, S.I. No. 13 of 1998

Certificate of Approval of Environmental Impact Assessment

Certificate No. NEMA/EIA/ 456

This is to certify that the Project Brief/Environmental Impact Statement **
received from

M/s BIDCO UGANDA LIMITED

of P.O. BOX 24933, KAMPALA

submitted in accordance with the National Environment Statute to the National Environment Management Authority (NEMA) regarding:

THE PROPOSED JINJA VEGETABLE OIL REFINERY COMPLEX AND ASSOCIATED OIL MILL, SOLVENT EXTRACTION PLANT, SOAP FACTORY, RAILWAY LINE AND JETTY
(Title of Project)

briefly described as THE VEGETABLE OIL REFINERY COMPLEX
SOAP FACTORY,
RAILWAY LINE AND JETTY
(Nature, Purpose)

located at AT MASESE, JINJA DISTRICT
(District/Sub-county/City/Town/Ward)

has been reviewed and was found to:
** xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
** have significant environmental impacts and the following appropriate mitigation measures were identified and made a condition precedent for approval and implementation:

=PLEASE TURN OVER=

(Attach relevant details where nec

Dated at KAMPALA on 15TH APRIL, 2004 19

Signed
Executive Director (NEMA)

ORIGINAL: Developer; DUPLICATE: Lead Ag ... QUADRUPLICATE: Any other relevant agency

** Delete whichever is not applicable

D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

There was no significant environmental impacts assessed by the project participants and no trans-boundary effect was envisaged. This is in accordance with the local and country level pollution regulations.

However, the project activity has obtained all the necessary environmental, technical and legal clearances and has been regularly renewing the clearances whenever required.

SECTION E. Stakeholders' comments

E.1. Brief description how comments by local stakeholders have been invited and compiled:

The local stakeholders are identified as the people living in the villages in vicinity of the BIDCO refinery. The comments are received by the survey through following questionnaire. The actual survey was conducted in local language as well as in English. The Local stakeholder's survey was carried out in the month of April to June 2006.

Survey form for 16 TPH biomass based Boiler project at BIDCO refinery unit in Jinja, Uganda

You are aware of the BIDCO's oil refinery unit operating in your neighbouring area. The BIDCO Uganda Ltd has implemented the renewable biomass based heat generation project at its Crude Palm Oil (CPO) refinery unit in Jinja, Uganda. The renewable biomasses like coffee husk, firewood, etc., would be used in the project. The steam generated by the project will be consumed internally.

Through the implementation of this project, BIDCO Uganda Ltd will be displacing the GHG emissions that would have occurred due to the Fuel oil combustion. Thus, the project is leading to CO_2 emission reductions generating environmental sustainability. BIDCO Uganda Ltd has undertaken this project as Clean Development Mechanism project. This survey is a step towards the registration of the project under Clean Development Mechanism of the Kyoto Protocol. You are requested to fill your response in the following questionnaire.

Name: …… Location: ……

Occupation: …… Education: …….

Sr. No.	Question	Response
1	Is your environment affected by the project?	
2	Is there any environmental / social problem due to biomass collection and transportation to project site?	
3	Does the project have any negative impact on human health or biodiversity?	
4	Has the employment increased due to the project?	
5	Has your livelihood negatively affected by the project?	
6	What are the benefits from the project?	
7	Any other comments and suggestions?	

Signature: Date:

The responses are categorised as positive and negative based on the comments. The positive responses indicate that respondent feels that the project activity will lead to overall good of their own and the society.

E.2. Summary of the comments received:

All of the individual respondents are of the view that the project activity is of good to them and the society. The renewable biomass based project activity has lead to the environmental sustainability without causing any pollution. Summary of detailed response is as follows:

S. No	Question	Response	
		Yes (%)	No (%)
1	Is your environment affected by the project?	0	100
2	Is there any environmental / social problem due to biomass collection and transportation to project site?	0	100
3	Does the project have any negative impact on human health or biodiversity?	0	100
4	Has the employment increased due to the project?	100	0
5	Has your livelihood negatively affected by the project?	0	100
6	What are the benefits from the project?	Below	Below
7	Any other comments and suggestions?	Below	Below

The other comments received were as follows:

(a) Further increment in job opportunities among the local skilled & unskilled labours
(b) Beneficiary for the local labours & local biomass producers as well.
(c) Very good initiative by BIDCO towards sustainable development & environment friendliness.

The stakeholders viewed BIDCO as a reputed company contributing to the local economy. Overall there was view and agreement that the proposed project is a beneficial project from sustainability view-point

E.3. Report on how due account was taken of any comments received:

The comments received were positive for the project activity and did not required follow up action from the project proponent. There were no specific comments that required follow up action from CDM project activity point of view.

In general there was no adverse comment on the project activity by the local stakeholders. The stakeholders have given very positive feedback and thus no measures were required to be taken. However, project proponents assured that during the operation of the project activity any concerns regarding the project activity can be brought to their notice and quick action would be taken up to any negative impacts from the project activity affecting the stakeholders. The project proponent thanked the local stakeholders for their co-operation in installation and operation of the project activity.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	BIDCO Uganda Ltd
Street/P.O.Box:	P.O. Box 24933
Building:	--
City:	Kampala, Jinja District
State/Region:	--
Postfix/ZIP:	--
Country:	Uganda
Telephone:	(+256-31) 263925
FAX:	(+254-67) 30102
E-Mail:	--
URL:	www.bidco-oil.com
Represented by:	--
Title:	Director,
Salutation:	Mr
Last Name:	Shah
Middle Name:	--
First Name:	Vimal
Department:	--
Mobile:	--
Direct FAX:	--
Direct tel:	--
Personal E-Mail:	vimal@bidco-oil.com

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

Public funding from Annex I countries and diversion of official development assistance (ODA), is not involved in this project activity. The project cost is met by the project proponents through own sources and in part by debt financing from banks.

Annex 3

BASELINE INFORMATION

Please refer section B.4 and B.6.1 of this document

Annex 4

MONITORING INFORMATION

The monitoring plan is developed for developing suitable data collection methods to measure & collect each parameter and maintenance of records according to the monitoring methodology of AMS – I.C., ver. 18. The monitoring plan is project specific for which the project performance with all relevant criteria will be monitored. Proper training is being provided to concerned personnel and instruments used to monitor data are also calibrated.

Overall Project Management and CDM Team:

A dedicated team responsible for the CDM project activity comprising of technical and management personnel from relevant departments will be responsible for monitoring of all the parameters mentioned in the section B.7.1. The CDM team will ensure the proper management of the CDM project activity. The team would be responsible for reviewing the data monitored & recorded, monthly report, annual report for emission reduction, the report on the operation and maintenance and timely calibration of monitoring equipment. The CDM team will prepare an annual report pertaining to the total quantity of steam generation by the project activity and hence total quantity of fossil fuel (fuel oil) that would be displaced against which the CDM benefit are to be claimed. The operation and maintenance team would be responsible for regular inspection of monitoring equipment functioning. The CDM team will be guided by CDM consultants.

1. Director - The Director will oversee all the monitoring requirements of the CDM project. He would review the half yearly and annual report pertaining to the emission reduction estimation. He will be responsible for Quality Assurance and ensure transparency in the monitoring system and data recording. The internal audit team will be headed by him.

2. Manager: The Manager will be responsible for compliance with CDM monitoring plan, reviewing monthly report prepared by the Shift In-charge (Steam Generation Unit) and based on that generating half yearly and yearly report pertaining to the total fuel oil consumption based on which the emission reduction would be estimated. He will organize & conduct the training program for CDM and related activities for the staffs and also carry out internal audit pertaining to the operation, monitoring and archiving of data.

3. Shift In-charges (Steam Generation Unit): The personnel will ensure proper monitoring of the data/parameters, completeness and quality assurance of data recorded by the Operators (Steam Generation Unit) and prepare of monthly report. The Shift In- charge of 1st shift will prepare daily report and submit to Shift In-charge.

4. Operator – Steam Generation Unit: The personnel will ensure proper running of the machines in terms of routine checks on daily basis, periodical maintenance. The personnel will also be entitled for biomass consumption data, steam generation data, steam temperature and pressure data recording on shift basis.

Addressing Uncertainty of Data in Monitoring:

The steam generation data monitored will be cross-checked with the biomass consumption data and invoice of biomass procurement to ensure accurate data recording. For exceptional circumstances related to the failure of the metering system, immediate replacement would be carried out by the project

proponent. Under such exceptional condition the vendor invoice would be used for the monitoring purpose.

Calibration of Measuring Equipments:

The reliability of the monitoring system depends on the accuracy of the measuring system and the quality of the relevant equipment. Thus, measuring instruments would be calibrated as per manufacturers manual or at least once a year to ensure the reliability of the system and the accuracy of the readings. Once the meters are found to be malfunctioning or registering data outside the acceptable limits of accuracy, it shall be repaired, re-calibrated or replaced as soon as possible.

Maintenance procedures:

All the monitoring instruments (fixed and portable) e.g. pressure gauge, temperature meter, steam flow meter, weighing machine etc. should be inspected on weekly basis. Equipment should be checked and maintained in accordance with manufacturer's manual. The lifetime and accuracy of the equipments will be checked during internal audit process.

Internal audit process:

The Internal Energy Audit would give a positive orientation towards energy conservation, energy cost reduction, proper storing procedure, preventive maintenance and quality control programmes which are vital for production and utility activity compliances with CDM rule and the quality plan. Such an audit programme will help to keep focus on variations which occur in energy costs, availability and reliability of supply of energy, etc. Internal audit should be undertaken on annual basis one month before each CDM verification process. Manager (Plant) will be responsible for internal audit. He will review day to day recording procedure in the project, storing procedure practiced in the project, etc and suggest corrective measures wherever is required. CDM Consultant will be involved in internal audit process and guide on CDM requirements.

Plant Energy Performance:

Plant Energy Performance (PEP) is the measure and comparison of energy consumption for manufacture of products with the past practice. This will help in taking corrective actions whenever a plant will operate in inefficient mode and achieve optimum level of specific fuel consumption. Thus it will ensure minimum or no wastage of biomass in steam generation system.

Training on Monitoring and Archiving of Data Related to Project Activity:

Training will be provided to the staff members of the plant on the procedure of recording and archiving of data. The training pertaining to the monitoring and archiving of the data is to be carried out by Manager Plant along with other members of CDM team. CDM Consultants will provide training to the monitoring team for CDM project on procedure of baseline emission calculation and emission reduction estimation. The Director shall be reported on the progress of implementation of corrective actions by the team on half yearly basis. The non-conformities if any shall be closed within the stipulated time frame and approved by the Director.
