THE GOLD STANDARD:
Project Design Document for Gold Standard Voluntary Offset projects

(GS-VER-PDD)

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Explanatory information on how to complete the PDD and how to obtain Gold Standard registration can be found in the project developer's manual available on the Gold Standard website.

This template of the PDD is applicable for micro-, small- and large-scale projects. Note that the shaded boxes present information on the Gold Standard VER project development procedures. Project developers should delete these shaded boxes when preparing their PDD.

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

CONTENTS

Annexes

SECTION A. General description of small-scale project activity

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

>>
Title: Biomass Briquettes Based Earth Stove Project
Version: 02
Date: 26/07/2010

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

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The most common cooking device in urban areas in various states such as Punjab, Chandigarh, Haryana Himachal, Delhi, Bihar and Andhra Pradesh is the traditional metal LPG stove or Coal fire stove. An informal preliminary survey carried out by Nishant Bioenergy PVt Ltd (NBPL), in 2007-08, concluded that most of the end users (Dhabawalas, Hotels, and Restaurants etc) were relying on the LPG or Coal for cooking. These users often purchase subsidised LPG cylinders illegally, as they are meant to be used by domestic households and not by commercial operators. If the commercial establishments purchase their LPG or Coal legally, profits will drop due to high prices of unsubsidised fuel.

The project activity uses renewable energy (biomass briquettes) to generate heat energy in a sustainable way to satisfy commercial users' cooking needs. Biomass briquettes are GHG neutral and will displace fossil fuel based thermal energy. In addition, they will reduce the associated emissions (particulates) from Coal use in the Northern and Western region of India within the project boundary.

The proposed project involves sale and installation of Earth Stoves which is designed and manufactured by Nishant Bioenergy PVt Ltd (NBPL). The Earth Stove is a two pot gasifier stove made of a mild steel body and stainless steel combustion chamber and ceramic insulation. The stove has double walled combustion chamber for secondary air and to facilitate less flow of primary air. Once the stove is ignited with small wood pieces or charcoal, a blower (a 110 watt AC fan) is started and within minutes the glowing charcoal bed is ready for cooking. In the burning phase, the fan increases efficiency of combustion.

Biomass briquettes are fed from the fuel feeding gate on the side or from the top. Once the briquettes start burning, they release combustible gases (volatiles) which get burnt by the hot secondary air coming from holes at the top of the combustion chamber. This ensures that there is almost complete combustion of fuel and less smoke is released from the burning process.

The hot gases released from the main combustion chamber are channelled to the second pot through a link tunnel for use in the slow-cooking process or food warming. Then the smoke (flue gases) is released to the atmosphere through a chimney.

Briquettes are fed to meet heat demand on need basis and ash from the combustion of briquettes remains at the bottom of the combustion chamber. A "gear and worm" arrangement is used to scrape the ash to the water filled ash pot placed below the combustion chamber.

The stove is also fixed with an hour meter (which records up to 99,999 Hrs) to record the number of hours that the blower (fan) is ran. The purpose of this meter is to record the stove

operation hours and this record will be used by the monitoring team in calculating the stove briquette consumption.

The earth stove used for the project activity is under patent (India) and is completely developed and owned by NBPL.

Plate 1: Earth Stove Model ES4

Plate 2: Demonstration

Plate 3: Simple Briquette making machine

The stoves are manufactured in 3 different sizes i.e. ES4, ES10 and ES15. Their briquette consumption varies based on their capacities. The project started selling the Earth Stoves initially in Chandigarh region[1], the capital of Punjab & Haryana state. Thereafter other states or towns of India will be targeted where LPG or Coal is used as common cooking fuel. These stoves will considerably reduce greenhouse gas emissions while simultaneously offering co-benefits to end users in the form of revenue savings.

The distributor (NBPL) has given the guarantee for repair or replacement of defective or malfunctioning stoves. The guarantee period currently is set at 2 years, with an option for a 6 year maintenance period at a fee. It is intended that carbon funds from the project will be used to offer subsidy to end users as an incentive in the form of a discount (the offset money will go

[1] With regard to global warming mitigation, this project will be sent for formal accreditation as a high-quality Voluntary Emission Reductions Project in the category of renewable energy project. Due to its high costs of operation and the barriers faced, the project is dependent on carbon finance being available and is approved from the leading voluntary emissions standards bodies.

to stove users to provide long term deferred payment) during purchase and replacement of the stove throughout the crediting period and repair and maintenance.

Table 1A and 1B below shows conservative projections of Earth Stove sales/installations yearwise".

Table 1A: Installations in year 2008

Location	State	ES-4	ES-10	ES-15
Chandigarh	Chandigarh	30	2	2
Mohali	Punjab	15	1	0
Bhatinda	Punjab	0	0	0
Tarantaran	Punjab	0	0	16
Panchkula	Haryana	1	0	0
Karnal	Haryana	0	0	0
Kurukshetra	Haryana	0	0	0
Ambala	Haryana	0	0	0
Solan	Himachal	1	0	0
Delhi	Delhi	0	0	0
Jandha	Bihar	0	0	14
Mahuwa	Bihar	0	0	0
Patepur	Bihar	0	0	14
Bidhupur	Bihar	0	0	14
Hyderabad	Andhra Pradesh	0	0	0
Tirupati	Andhra Pradesh	0		
Total		**47**	**3**	**60**

Table 1B: Projected Installations in year 2009 & onwards

Location	State	ES-4	ES-10	ES-15
Chandigarh	Chandigarh	50	50	4
Mohali	Punjab	20	4	0
Bhatinda	Punjab	40	10	0
Tarantaran	Punjab	0	0	16
Panchkula	Haryana	20	4	0
Karnal	Haryana	20	0	0
Kurukshetra	Haryana	20	0	0
Ambala	Haryana	20	0	0
Solan	Himachal	20	0	0
Delhi	Delhi	50	50	19
Jandha	Bihar	0	0	14
Mahuwa	Bihar			16
Patepur	Bihar			14
Bidhupur	Bihar			14
Hyderabad	Andhra Pradesh	50	20	0
Tirupati	Andhra Pradesh	50		
Total		**360**	**138**	**97**

The Earth stoves are designed with an operational life of 10 years and will need replacement after the end of the 10th year. At the end of the 10 years, the users are expected to replace them with new stoves.

Biomass for Briquettes Manufacturing:
In order to establish availability of the raw material (biomass) for briquette making, NBPL conducted a survey on type, use and management practices employed in target regions. It was established that there is limited domestic use of these agricultural wastes and with the majority is disposed of by burning as a way of field preparation (to give way) for planting new crops.

The region where project is being implemented receives reliable rainfall and large scale agricultural activity is practised. However, the nature of agricultural activities being practised in these regions varies from sustainable to non-sustainable methods, these means that the decrease of level of carbon stocks on these land areas after implementation of the project will not be attributed to the project activity, since the waste to be briquetted will otherwise be burnt in the field to make way for new planting season. In addition, no other competing use of the biomass residues was identified in these regions.

Since the common practise is to burn waste in the field, rather than plough it in directly, there will be no loss of soil carbon stock.

The following agricultural residues are found in the region:

1. Rice husk,
2. Rice straw
3. Saw dust
4. Mushroom waste
5. Mustard waste
6. Bagasse and
7. Sunflower waste

Total dry biomass availability in India are approximated to be about 300 million[2] tonnes /year, while the briquette production will need about 20,000 tonnes/year. Thus regions have a combined generation of biomass which is significantly higher than that required for the project activity. See more information on briquette production in annex 5.

Sustainable development

The sustainable development assessment was conducted by the project promoter as per the guidelines of the Gold Standard.

The sustainability analysis assesses the project in terms of environmental and sustainable development impact. The relevant indicators are:

- Livelihoods will be improved since the biomass fed Earth Stove reduces fuel costs. On average the each Biomass Briquette Earth Stove will save fuel cost approximately 70-75 % against commercial LPG.
- End users will have improved access to energy through easy availability of briquettes.
- The biomass earth stoves give rise to employment opportunities for enterprises manufacturing, distributing, retailing and maintenance the stoves and briquettes.

[2] http://www.fao.org/docrep/009/a0257e/A0257E04.htm, FAO, Rome, 2005.

- The combustion of biomass briquettes offers a sustainable method to deal with biomass waste that would otherwise be burned in the field and farms.
- Human capacity is raised through the business development component of the project i.e. collection, production and sale of biomass briquettes.
- The introduction of locally manufactured technology which optimises energy efficiency helps to build technological self-reliance.
- Relief from fire hazard, explosion or leakage of gas cylinders.
- Conservation of non-renewable natural resources (like fossil fuels).
- The biomass used (agro residue like mustard husk, cotton stalk, groundnut shell, rice husk, wood waste, mushroom farm waste etc) is collected from the nearby areas and it is used for making briquettes. This arrangement has contributed to creation of value and a market for unused agricultural waste which is currently not utilised for fuel.

Detailed description of impacts to the households and the community on specific components of sustainability by the project activity relative to the baseline scenario is outlined in the Project passport.

A.3. Project participants:

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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)
India	Nishant Bioenergy Pvt. Ltd.	No
United Kingdom	JP Morgan Ventures Energy Corporation Limited	No

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

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

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A.4.1.1. Host Party(ies):

>>

India

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

>>

Refer table in section A.4.1.4

A.4.1.3. City/Town/Community etc:

>>

Refer table in section A.4.1.4

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

>>

Table 2: States where the project will be implemented

Location	State	Latitude	Longitude
Chandigarh	Chandigarh	30.73	76.78
Mohali	Punjab	30.47	76.47
Bhatinda	Punjab	30.14	74.57
Tarantaran	Punjab	30.27	74.56
Panchkula	Haryana	30.44	76.48
Karnal	Haryana	29.42	77.02
Kurukshetra	Haryana	27.37	74.28
Ambala	Haryana	30.23	76.56
Solan	Himachal	30.55	77.76
Delhi	Delhi	28.37	77.13
Jandha	Bihar	25.42	85.13
Mahuwa	Bihar	25.4	85.22
Patepur	Bihar	25.42	85.13
Bidhupur	Bihar	25.42	85.13
Hyderabad	Andhra Pradesh	17.20	78.30
Tirupati	Andhra Pradesh	13.41	79.24

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

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As per the Gold Standard Version 2.1 Annex C, “Guidance on Project Type Eligibility”, the proposed project is falls under “Electricity and/or heat, and liquid biofuels from biomass resources” in Table C-1. The project activity being a renewable source of energy therefore meets all the conditions set out in the table.

The eligible project corresponds to category “AMS – I.C. Thermal energy for the user with or without electricity” of those qualifying for the small scale project status under approved CDM methodologies[3].

[3] http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html

This category comprises renewable energy technologies that supply individual households or users with thermal energy that displaces fossil fuels and hence can be defined as -

Project Type: **I –** Renewable Energy Projects
Project Category: **I.C. –** Thermal energy for the user with or without electricity, version 14

Since the proposed project activity will generate less than 5,000 tonnes of emission reductions annually, it falls under Micro–scale projects category as per the Gold Standard guidelines.

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

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Years	Annual estimation of emission reductions in tonnes of CO_2 e
2008	1,057.12
2009	4,207.34
2010	4,207.34
2011	4,207.34
2012	4,207.34
2013	4,207.34
2014	4,207.34
Total emission reductions (tonnes of CO_2 e)	**26,301.17**
Total number of crediting years	7
Annual average over the crediting period of estimated reductions (tonnes of CO_2e)	3,757

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

>>

No public funding is used in the project activity

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

In accordance with the Gold Standard Manual thresholds, the project falls under micro-scale project. Estimated emission reductions are 4,357 tonnes per year. Therefore, the limit of 5,000 tonnes CO_2e per year is not attained. The proposed micro-scale project is not a debundled part of a large project because it meets the de-bundling requirement. There is no small scale project activity being implemented or registered within the region with;

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

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:

>>

Project has applied approved methodology for small-scale CDM project by UNFCCC. The applicable methodology for the proposed project is as follows:

Type I: Renewable Energy Projects
Category ID: 1.C. Thermal energy for the user with or without electricity, version 14

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

>>

The project activity meets the applicability of the methodology in the following ways:

1. *The proposed project activity is a renewable energy technologies (biomass briquettes) that supply commercial users with thermal energy that displaces fossil fuels (LPG);*

Paragraph 1 of "Type AMS. I.C. Thermal Energy for the user (Version 14)" states that "This category comprises renewable energy technologies that supply individual households or users with thermal energy that displaces fossil fuels. Examples include solar thermal water heaters and dryers, solar cookers, energy derived from renewable biomass for water heating, space heating, or drying, and other technologies that provide thermal energy that displaces fossil fuel. Biomass-based co generating systems that produce heat and electricity for use on-site are included in this category."

In this project, briquettes (manufactured from renewable agricultural residues) displace LPG (fossil fuel), the project activity uses a renewable energy to produce thermal energy used for displacing fossil fuels, therefore this project falls under category AMS. I.C.

2. *There will be no co-firing of fossil fuels;*

The stove is designed to burn only biomass briquettes and as such, there will be no co-firing of fossil fuels when using the stove.

3. *The project activity is less than 45MW$_{th}$*;

In this project, Earth Stoves units of varying thermal rating (i.e. ES4- 18.6KW, ES10- 46.5KW, ES15-70KW) will be installed in various location across 3 states of India. The total output from the Earth Stove units will be cumulatively increase until the emissions outlined in Table A.4.3 above is reached. This limit when reached, its capacity will be 19.9MW$_{th}$ which is less than the threshold for small scale projects.

4. *The project has a definite project boundary which is easily identified*[4]*;*

The project is being implemented in 3 (*See A4.1.4 above*) regions whose state boundary is easily identifiable.

From the above therefore, the methodology is applicable for use in the proposed project activity.

[4] The project will sell stoves in certain regions/areas in selected states of India.

B.3. Description of the project boundary:

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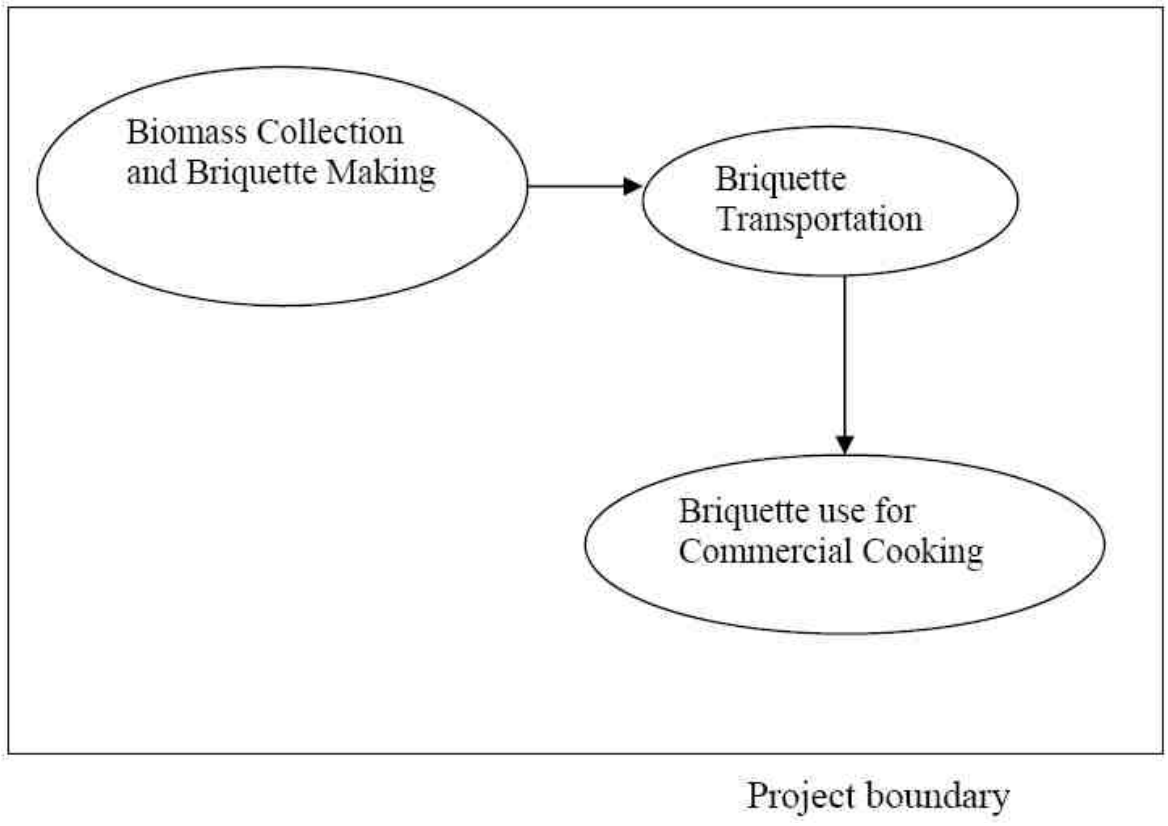
The project boundary encompasses the physical and geographical locations of project activity where the project activity will be implemented as specified in Section A.4.1.4 above. A schematic project boundary is shown below.



B.4. Description of baseline and its development:

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Apart from professionally established restaurants, most of the Indian cities are doted with small road side eating places. In north India these eating places are called Dhabas which are mostly family owned with few self owned. These dhabas are also dotted all over the national highways, providing freshly cooked, low cost foods to the variety of people like loaclas/travelers/truck drivers/labourers etc. Dhabas are run by self employed people with the help of 3-4 people[5].

These dhabas cook food using different fossil fuels like LPG, diesel, coal and wood[6]. They also use traditional cook stoves for LPG and some uses TANDOR (round earthen stove) run on wood or charcoal or coal. Being commercial establishment, they are not authorised to use subsidised LPG and Kerosene for their daily operations. Since they cook low cost food, they have low margins and always find difficult to buy commercial fuel at full market price. Instead,

[5] The dhaba rarely change hands because Indian entrepreneur culture demands that business remain in the family for posterity
[6] Diesel and wood is commonly used in temples, while coal is rarely used due to availability and smoke generation.

they are dependant on “black market” supply where they pay 325 rupees for 1 LPG cylinder compare to 500 rupees in commercial outlets.

The proposed project is designed to replace baseline fuels notably LPG and coal with biomass briquettes for their daily operations[7]. In order to replace these fossil fuels, the dhabas will use a special stove “Earth Stove” which is custom designed to use biomass briquettes and has a higher biomass fuel burning efficiency.

By switching to use of briquettes, the commercial establishments will stop purchasing subsidised LPG meant for domestic use and this will help in ensuring that the poor have access to enough cheap energy source while at the same time, reducing release of associated emissions to the atmosphere.

Without the proposed project activity, the baseline scenario will be continuation of use of subsidised fuel (LPG) meant for domestic households into the non-subsidised commercial sector. This practise of using non-subsidised fuel will have increased emissions since the diverted fuel which will have been used in domestic household and there will be more sale of subsidised fuel to compensate for the diverted fuel.

Since the baseline is the emissions associated with commercial cooking using LPG, the implementation of the proposed project will prevent the release of emissions from use of LPG, these will result to a net reduction of emissions on the atmosphere.

Baseline as per Paragraph 6 of “Type AMS. I. C. Thermal energy for the user (Version 14)” of Appendix B of the simplified M&P for small-scale CDM project activities 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 coefficient for the fossil fuel displaced. IPCC default values for emission coefficients may be used.”

Therefore the proposed baseline is the GHG emissions that would have occurred due to use of subsidised domestic LPG by commercial establishments (non-subsidised sector of the economy) in absence of this project activity.

Key information and data used to determine the baseline scenario (variables, parameters, and data sources) are:

Key information	**Average Value**	**Data Source**
Briquette consumption by Earth stove (Kg/hr)	ES4 =4 ES10 =10 ES15 =15	Consumption based on the actual briquette consumption as per stove size and capacity
Net Calorific Value (NCV) of LPG (TJ/KT)	47.3	Table 1.2 of Chapter 1 of Volume 2 of 2006 IPCC Guidelines for National Greenhouse Gas Inventories
NCV of Briquette (TJ/KT)	16.16	From test report of NBPL done by Idma Laboratories Limited (a Government Approved Test House).
CO_2 Emission Coefficient for LPG	63100	Table 2.2 of Chapter 2 of Volume 2 of 2006 IPCC Guidelines for National Greenhouse Gas Inventories

[7] However, only LPG has been considered in calculating the baseline emission reduction.

(Kg/TJ)		
CO_2 emission factor for Briquettes (Kg/TJ)	112000	Table 2.2 of Chapter 1 of Volume 2 of 2006 IPCC Guidelines for National Greenhouse Gas Inventories

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:

When Nishant Bioenergy innovation of Shanja Chula (stoves) worn the prestigious Ashden Awards in 2005, they decided to develop a stove to cater for the commercial cooking in order to replace LPG usage. The Earth Stove project was proposed and negotiation with ClimateCare was started on how best the project will use carbon funds to expand. The negotiation culminated with signing of ERPA in November 2007.

In order to demonstrate additionality of the project, the project developer has demonstrated using the Tool for the demonstration and assessment of additionality, version 5.2. The project will reduce the amount of GHGs emitted through substitution of LPG with biomass briquettes as cooking fuels for heat generation. The Earth Stoves being introduced are of a high efficiency and their introduction, sale and uptake will face several barriers. The project activity would not have occurred due to one of the following barriers outlined below and the carbon funds will be utilised in overcoming the barriers identified:

Step 1. Identification of alternatives to the project activity consistent with current laws and regulations

Realistic and credible alternatives to the project activity are defined through the following sub-steps:

Sub-step 1a: Define alternatives to the project activity:

In absence of the proposed project, reasonable and credible alternatives that are in accordance with current laws and regulations and are available to the project participants or similar project developers that provide outputs or services comparable with the proposed VER project activity are:

1. The proposed project activity undertaken without being registered as a VER project activity;
2. Continuation of the current situation.

All the above identified alternatives are realistic and credible.

Sub-step 1b: Consistency with mandatory laws and regulations:

Alternatives 1 above is consistent with mandatory and regulatory requirements in India. However, alternative 2, does not comply with all mandatory applicable legislation and regulations more especially the Public Distribute System, but enforcement of subsidised domestic LPG which is ‘always’ diverted into commercial sector illegally and enforcement of Public Distribute System enforcement measures is not completely enforced. This is because there are several loopholes in the administration of government subsidy on household fuel and this has increased non-compliance, to the point of making LPG diversion “legal”.

The first alternative is in compliance with the applicable laws and regulations, while the second alternative is realistic based on non-compliance and current practices. These two alternatives are therefore realistic and credible alternatives available to the project participants. Therefore, the project is additional under step 1.

Step 2. Investment Analysis
This step has been foregone and barrier analysis has been applied.

Step 3. Barrier analysis

This step is used to determine whether the proposed project activity faces barriers that:

a. Prevent the implementation of this type of proposed project activity
b. Do not prevent the implementation of at least one of the alternatives

Sub-step 3a. Identify barriers that would prevent the implementation of type of the proposed VER project activity:

In order to establish that there are barriers that would prevent the implementation of the proposed project activity from being carried out if the proposed project activity was not registered as a VER activity, the following are considered:

(a) Investment barriers
(b) Technological barriers
(a) Barriers due to prevailing practice

Realistic and credible barriers that would prevent the implementation of the proposed project activity from being carried out if the project activity was not registered as a VER activity. Such realistic and credible barriers may include, among others:

(a) Investment barrier:
The easiest fuel option for heat generation for dhabas is the continuation of the current arrangement where subsidised LPG is diverted from the domestic sector into commercial establishment (non-subsidised sector). With purchase of subsidised LPG, the dhaba operators will spend less to meet their energy needs compared with purchasing of LPG from commercial outlets.

Investing in the Earth Stoves which cost around 14200[8] Rupee (£1776 approximate), is linked with constant availability and supply of briquettes. Without a steady supply of briquettes, the risk is considered too high and hence a no investment at all. In the absence of the project activity, the customers will instead invest in LPG stoves since they are assured of availability of subsidised LPG in the market. Even though purchase of subsidised LPG is illegal, it is reliable and the price at which it is sold is still lower than buying at commercial retail rates. Due to the above obstacles, the project is not an attractive investment without availability and steady supply of biomass for briquette production for the restaurant owner.

[8] This is the cost of ES4 Earth Stove, while that of ES10 is 21200 Rupee. (Price list of these stoves are **ES4 – 14,200/-** broken down as follows: Stove -13100, VAT 4%- 524 and Freight/installation- 576. Upfront Payment- 1000, Financed amount= 13200/- and Weekly instalment Rs 150 for next 88 weeks. **ES 10 stove - 21200/-** broken down as follows: Stove -19950 VAT 4%- 798, Freight/installation- 452. Upfront Payment- 950, Financed amount= 20250/- Weekly instalment Rs 250 for next 81 weeks).

From the stove and briquette manufacture side, the project needs a lot of seed capital investment to manufacture and retail the stoves, in addition to arranging for constant supply of briquettes at 'suitable prices'[9].

The project could attract loans and other form of financing but, there are few banks and financial institutions that will be willing to finance the purchase of stoves. Simply because the technology being employed is new and this would lead to slow uptake of stove, because most commercial vendors don't know the technology and this will make them sceptical to embrace it and test its reliability. In addition, the financing institutions are worry due to project magnitude and the implementation risk of the project. The two factors reduce loan repayment capability and promptness of the restaurant owners in meeting repayment schedule.

(b) Technological barrier:
LPG stove technology is more entrenched India and its applicability and reliability have become common practise. This is because the technology has been there for long time. Since the LPG stove technology has been there and tested, more restaurant owners will be inclined to continue using it because it involves much lower performance risk as opposed to the new Earth Stove which they have to learn how to use. Without proper use, the risk of failure will be high.

Also, the LPG stove technology becomes more favourable alternative to the proposed project activity because subsidised domestic LPG is readily available across India under Public Distribution System. Availability of LPG to dhabas operators increases the continued acquiring of subsidised fuel even if the Government increases its checks to ensure that subsidised fuel is not used for commercial purposes. This non-compliance is compounded by the fact that there is no risk of non-availability of LPG, because even if there is slight non-availability of subsidised LPG in the market, commercial vendors will still purchase LPG from commercial outlets during shortage of subsidised fuel.

The stove requires that the user must have an electricity connection for running the fan[10]. This operational design presents a technological barrier compared with freely available alternative of LPG stove and traditional (tandor) stove. The requirement for electrical connection for powering the fan will limit the potential customers and slow uptake of the stove.

Operating the Earth stove using briquettes requires attention (i.e. briquette unloading, feeding, fan regulation, ash removal and disposing). Availability of LPG now and in future gives the dhaba operators confidence of sustained business success. However, briquette availability is linked to good management and logistical arrangement in place for production and supply of the briquettes to dhabas at 'right' prices, bearing in mind that the source of briquettes is agricultural residue, which is highly seasonal and depended on crop cycle and at times yields.

Without proper planning for collection biomass and production of briquettes then, any interruption in supply of briquettes will 'scare' those would be potential Earth Stove customers. The risk of non-delivery during the rainy season is high and the technology barrier is more increased if collected biomass is not dried before briquetting.

The use of traditional stoves i.e. LPG stove compared with use of briquette earth stove which has a lower efficiency[11] means that the operator will spend a lot of time to cook the same

[9] In addition to logistical arrangement for storage of briquettes, sale of briquettes and prompt payment collection for deliveries.
[10] Without electricity supply, restaurant operators will not purchase the stove.
[11] Earth Stove have an efficiency of 50%

amount of food. This will make earth stove unpopular and a lot of awareness will be done to convince the operators to embrace them.

(c) Barrier due to prevailing practice:
The regulatory policy in India for giving subsidy to household energy has lead to availability of domestic fuel at a lower price compared with commercial fuel. Due to lack of good enforcement in the distribution system of subsidised fuel, there is massive diversion of subsidised fuel into commercial sectors of the economy and the diverted fuel is sold at a slightly lower price but than the commercial prices.

Road side commercial cooking is done to cater for people who are willing to spend less on food and this practice is there to stay in India. Use subsidised LPG diverted from domestic use to non-subsidised commercial use will therefore continue to occur as long as the roadside food selling outlets continue to be in operation.

By switching from use of LPG stove to use of biomass briquettes stove, restaurant operators require investment (purchase of stove), awareness, logistical support and briquette availability (constant supply). The stove also faces other challenges such as the size of the stove (bulky), low efficiency compared with LPG stove and requirement for electrical connection to run the fan (in order to increase burning efficiency).

The above factors tend to encourage the adoption of prevailing practices being undertaken in the regions for food production.

In absence of this project dhabas operators would have continued to use LPG stoves as this is what they have been doing and it is the prevailing practice in the region. Since the majority of dhabas operating across India rely on diverted subsidised LPG for cooking, thus the project activity is not the baseline scenario and estimated emission reductions would not occur in the absence of the project activity since diverted LPG will not be reduced.

Thus the barriers due to technological acceptance, investment in stove manufacture, purchase and risk of briquettes availability and prevailing practices would have led to continuation of LPG diversion and usage and this would have led to higher GHG anthropogenic emissions.

Other barriers
The project faces other barrier such as political and institutional support. Political support is essential for formulating policies aimed at encouraging small and micro-scale enterprises (SMEs) which favours use of locally made products aimed at rural development, while institutional support helps the project in implementing the government policies.[12]

Another barrier to successful implementation of such project is cooperation by stove users. A project of this nature depends on goodwill of its customers. Societal perception and user reliability of the stove will make them to continue repaying the loan for the stove and the briquettes. This barrier of trust is an inherent barrier when compared with a government funded programme where the customer is compelled to make repayment due to fear of government taking action should he/she default on payment.

[12] http://www.institut.veolia.org/ive/ressources/documents/1/175,Dr-V-V-N-Kishore.pdf

Government initiatives covered efficiency cooking and provision of clean fuels. This programmes covered improved cook stoves, solar cookers, LPG etc. The project s therefore disadvantaged when competing in the open market for customers when compared with other projects which has government support and funding. Due the above, the project is therefore prevented from achieving widespread uptake of efficient stoves.

It is therefore apparent from the above that, the proposed project activity is additional.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

>>

Baseline:

The applicable baseline methodology AMS I.C, the project activity falls within the renewable energy technologies that supply individual households or users with thermal energy that displaces fossil fuels. The proposed project activity involves use of biomass briquettes for use in restaurants. The biomass briquettes will substitute fossil fuel (LPG) for generation heat for cooking purposes.

As per the methodology, the baseline emissions for technologies that displace technologies using fossil fuel are calculated as simplified baseline is the fuel consumption of the technologies that would have been used in the absence of the project activity times an emission coefficient for the fossil fuel displaced. IPCC default values for emission coefficients may be used.

For heat produced using fossil fuels in the baseline scenario, the baseline emissions are calculated as follows:

$BE_y = HG_y * EF_{CO2} / \eta_{th}$ …….. (1)

Where:

BE_y the baseline emissions from steam/heat displaced by the project activity during the year y in tCO_2e.

HG_y the net quantity of steam/heat supplied by the project activity during the year y in TJ.

EF_{CO2} the CO_2 emission factor per unit of energy of the fuel that would have been used in the baseline plant in (tCO_2/TJ), obtained from reliable local or national data if available, otherwise, IPCC default emission factors are used.

η_{th} the efficiency of the plant using fossil fuel that would have been used in the absence of the project activity.

Project emissions

The methodology applied to this project activity accounts for the GHG emissions related to the energy consumption by the stoves for running the fan. Biomass briquette transportation has not been accounted for because they cancel out with transportation of LPG.

The Earth stove has a 110 watt fan which increases combustion efficiency. The stove also has a log for recording the operation hours. The log reading will be used to calculate fan running time and the electricity consumption by the stove will be calculated[13].

[13] In addition, the biomass briquettes sold would be used to correlate and counter check the stove(s) operation hours.

Electricity consumed will be multiplied with the Emission Factor of the Indian grid to give the project emission related with electricity consumption from the grid each year. The project emissions are calculated as follows:

$PE_y = EG_{P\,j,y} * EF_y$

Where:
PE_y Baseline emissions for the year y (tCO_2e/yr)
EG_y Electricity consumed by the project activity in the year y (MWh)
EF_y CO_2 emission factor of the electricity grid in the year y (tCO_2/MWh)

Leakage:
The Earth Stove to be installed will be new, while LPG cylinders to be replaced will not be transferable to another activity since biomass briquettes will be cheaper than the LPG, there will be no incentive for use of 'de-commissioned' stove in another activity, thus leakage (L_y) associated with the project activity is zero.

Emission Reductions:

$ER_y = BE_y – (PE_y + L_y)$

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

Data / Parameter:	$TE_{y,LPG}$
Data unit:	TJ per year
Description:	Quantity of heat generation by all units during the year y
Source of data used:	Baseline survey calculations
Value applied:	37.86
Justification of the choice of data or description of measurement methods and procedures actually applied :	All the heat generated in the baseline scenario by fossil fuels will be substituted with biomass sources.
Any comment:	

Data / Parameter:	NVC_{LPG}
Data unit:	TJ/t
Description:	Net Calorific Value of LPG
Source of data used:	IPCC values will be applied
Value applied:	0.0473
Justification of the choice of data or description of measurement methods and procedures actually applied :	This data is key in determine the overall baseline emission associated with displacement of LPG

Any comment:	

Data / Parameter:	η_{th}
Data unit:	%
Description:	The efficiency of the plant using fossil fuel (LPG) that would have been used in the absence of the project activity.
Source of data used:	IPCCC values
Value applied:	56
Justification of the choice of data or description of measurement methods and procedures actually applied :	The efficiency of the stove using fossil fuels will used in determining the baseline emission
Any comment:	

Data / Parameter:	η_{th}
Data unit:	%
Description:	The efficiency of the Earth Stove burning biomass briquettes that replaces baseline fuels
Source of data used:	IPCCC values
Value applied:	50
Justification of the choice of data or description of measurement methods and procedures actually applied :	The efficiency of the Earth Stove burning biomass briquettes will used in determining the amount of useful energy replacing the displacing fossil fuels based energy source
Any comment:	

Data / Parameter:	$Q_{y, LPG}$
Data unit:	t/yr
Description:	Quantity of LPG replaced during the year y in tonnes
Source of data used:	Baseline survey calculations
Value applied:	800.39
Justification of the choice of data or description of measurement methods and procedures actually applied :	The amount of LPG replaced by biomass briquettes gives the total quantity of heat energy to be replaced with heat energy from biomass briquettes. The quantity of LPG replaced is crucial in determining the amount of energy to be replaced in the baseline.
Any comment:	The amount of LPG fuel used is computed using the energy needs equivalent per comparable Earth stove use.

B.6.3 Ex-ante calculation of emission reductions:

>>

Baseline burning of fossil fuel (LPG) for heat generation for cooking needs

$HG_{y,\ biomass\ briquettes} = Q_{y,biomass\ briquettes} * NCV_{biomass\ briquettes} * \eta_{th}$

Where:

HG_y = Quantity of heat generation by all units during the year y in TJ/yr

$Q_{y,\ biomass\ briquettes}$ = Quantity of biomass used for heat generation by all units during year y in tonnes

$NCV_{biomass\ briquettes}$ = Net Calorific Value of biomass briquettes in TJ/t

$Q_{y,\ biomass\ briquettes}$= Earthstove briquette consumption/hr * Number of Earth Stove/yr * Operating Hrs./year * Efficiency of the Earth stove * Net Calorific value for briquettes

η_{th} Efficiency of the Earth Stove

$HG_{y,\ biomass\ briquettes}$ = 4681.13 * 0.016162327 * 50%

$HG_{y,\ biomass\ briquettes}$ = 37.829 TJ/yr

Thermal energy from LPG being substituted is calculated as follows:

$TE_{y,\ LPG} = Q_{y,\ LPG} * NCV_{LPG}$

$Q_{y,\ LPG} = HG_{y,\ biomass\ briquettes} / NCV_{LPG}$

Where:

$TE_{y,\ LPG}$ = Quantity of heat generation by all units during the year y in TJ/yr

$Q_{y,\ LPG}$ = Quantity of LPG replaced during the year y in tonnes

NCV_{LPG} = Net Calorific Value of LPG in TJ/t

$Q_{y,\ LPG}$ = 37.829 /0.0473 = 799.767

$TE_{y,\ LPG}$ = 37.829 TJ/yr

Since biomass briquettes will replace LPG for energy generation, then $TE_{y,\ LPG} = HG_{y,\ biomass\ briquettes}$, therefore:

$TE_{y,\ LPG} = HG_{y,\ biomass\ briquettes}$ = Quantity of heat generation by all units during the year y in TJ

$TE_{y,\ LPG} = Q_{y,\ LPG} * NCV_{LPG}$

= 799.767 * 0.0473

$TE_{y,\ LPG} = HG_{y,\ biomass\ briquettes} = HG_y$ = 37.829 TJ/yr

Baseline Emissions

$BE_y = HG_y * EF_{CO2} / \eta_{th}$

Where:

BE_y the baseline emissions from steam/heat displaced by the project activity during the year y in tCO_2e.

HG_y the net quantity of steam/heat supplied by the project activity during the year y in TJ.

EF_{CO2} the CO_2 emission factor per unit of energy of the fuel that would have been used in the baseline plant in (tCO_2/TJ), obtained from reliable local or national data if available, otherwise, IPCC default emission factors are used.

η_{th} the efficiency of the plant using fossil fuel that would have been used in the absence of the project activity.

BE_y = 37.829 * 63.1/ 56%
= 4,262.52
BE_y = 4,262.52 tCO_2/yr

Project emissions

PE_y = $EG_{P\,j,y}$ * EF_y

= 71.61 * 0.82
= 58.48 tCO_2/yr

Emission Reductions:

ER_y = BE_y – (PE_y+ leakage)
= 4,262.52 - 58.48- 0
= 4,204.04 tCO_2/yr

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

>>

Year	Estimation of project activity emission reductions (t CO_2e)	Estimation of baseline emission reduction (t CO_2e)	Estimation of leakage (t CO_2e)	Estimation of emission reductions (tCO_2e)
2008	58.48	4,262.51	0	4,204.03
2009	58.48	4,262.51	0	4,204.03
2010	58.48	4,262.51	0	4,204.03
2011	58.48	4,262.51	0	4,204.03
2012	58.48	4,262.51	0	4,204.03
2013	58.48	4,262.51	0	4,204.03
2014	58.48	4,262.51	0	4,204.03
Total	**409.36**	**29,837.57**	**0**	**29,428.21**

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

B.7.1 Data and parameters monitored:

Data / Parameter:	Hours of operation
Data unit:	hrs
Description:	Average daily operation hours of Earth stove
Source of data used:	Daily recorded by the electronic meter

Value applied:	3
Justification of the choice of data or description of measurement methods and procedures actually applied :	The hours of operation will be used for calculation of project emissions. A sample of stoves will be taken annually for reading in order to calculate project emissions.
QA/QC procedures to be applied:	There will be monthly log reading by the field personnel who is also responsible for collecting payment for briquette deliveries. The log reading will be entered into excel sheet and at the end of the year, hours of running will be computed. Also the amount of briquettes sold will be used to counter check the running hours.
Any comment:	

Data / Parameter:	Amount of Biomass briquettes used
Data unit:	Tonnes per year
Description:	Quantity of biomass briquettes consumed by restaurant for heat generation per day
Source of data used:	Daily sale records
Value applied:	ES4= 1,576.80, ES10= 1,511.10 and ES15= 1,593.23
Justification of the choice of data or description of measurement methods and procedures actually applied :	The daily sales records will be compiled to give the total amount of biomass briquettes sold and utilised for displacement of LPG by the project
QA/QC procedures to be applied:	Data will be calculated as per the information stored& maintained in the sales records of the project promoter and counter checked with briquette orders placed, which is available at the time of verification
Any comment:	N/A

Data / Parameter:	$EF_{CM,grid,y}$
Data unit:	tCO_2/MWh
Description:	CO_2 emission factor of the electricity grid in the year y
Source of data to be used:	Calculated by the Central Electricity Authority, Indian Government
Value of data	0.816
Description of measurement methods and procedures to be applied:	The data is calculated as per the procedures set out in the tool to calculate the emission factor for an electricity system
QA/QC procedures to be applied:	The value will be updated annually through checking for the yearly updates released by the CEA.
Any comment:	Due to the very small meter of these emissions from the project. The CEA default factor has been used and the value

Data / Parameter:	EG_y
Data unit:	MWh
Description:	Electricity consumed by the project activity in the year y
Source of data to be used:	The data is compiled from field record (log reading) for a sample of stoves and extrapolated to represent the total stove population.
Value of data	71.67
Description of measurement methods and procedures to be applied:	Each stove in operation has a meter log for recording stove operation hours. The reading from the log is used to calculate the electricity consumption of the stove based on the capacity of the stove fan. Also, the fuel sold to will be used to counter check the total running time of the stoves
QA/QC procedures to be applied:	Data will be calculated as per the information collected from the sample reading and kept in the project log of the project promoter. The data will be available at the time of verification or there will be monthly log reading by the field personnel who is also responsible for collecting payment for briquette deliveries. The log reading will be entered into excel sheet and at the end of the year, hours of running will be computed
Any comment:	N/A

Data / Parameter:	Stove numbers
Data unit:	Number of stoves
Description:	Number of stove operating
Source of data to be used:	Record kept by the NBPL manager.
Value of data	595
Description of measurement methods and procedures to be applied:	Sales records and maintenance records. Data is kept on stove installation and payment, maintenance and repair records.
QA/QC procedures to be applied:	The records will be updated regularly by the project manager on an ongoing basis
Any comment:	-

Data / Parameter:	Net calorific value of briquettes
Data unit:	Kcal/Kg
Description:	Net Calorific Value of Biomass Briquette
Source of data used:	Reported quarterly by National Approved Laboratory
Value applied:	3861
Justification of the choice of data or description of measurement methods and procedures actually applied :	Standard laboratory Procedures and calculated based upon the calorific value of Biomass Briquettes. Briquettes were tested by government approved agency- Idma Laboratories Limited.
QA/QC procedures to be applied:	The calorific value for briquettes will be analysed bi-annually.

Any comment:	The new value obtained will be applicable for calculation of emission reduction.

B.7.2 Description of the monitoring plan:

>>
The project proponent will keep daily records of briquettes bought and the quantities sold to dhaba operators. Briquette invoices for briquette deliveries will be kept to verify the sales records.

A project "monitoring officer" will be employed to collect data from stove logs for use in calculating the electricity consumption by the stoves. In order to collect the log reading, a representative sample will be drawn and the data collected will be analysed using sound statistical method in order to determine the average electricity consumption by each stove.

The project proponent will also keep records on stove maintenance and replacement and at the end of the year, the data will be compiled and submitted to the NBPL management for approval.

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

>>
More detailed baseline information is provided in Annex 2.

Date of completion of the baseline study: 15/12/2008

The baseline study was conducted by:
MITCON Consultancy Services Ltd,
1st Floor, Kubera Chambers, Shivajinagar,
Pune - 411 005 Maharashtra, India

And

JP Morgan Ventures Energy Corporation Limited,
Eden Square Business Centre, Westlands Rd,
PO Box 856 00606, Nairobi. Kenya.
Email: joash.obare@jpmorgan.com

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:

>>
06/01/2007 (Date of First Operation)

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

>>
10 years 0 Months

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

C.2.1. Renewable crediting period

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

>>
07/02/2008 (the date on which first Earth stove was installed)

C.2.1.2. Length of the first crediting period:

>>
7 years 0 Months

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>
Not Applicable

C.2.2.2. Length:

>>
Not Applicable

SECTION D. Environmental impacts

>>

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

>>
According to the Gold Standard VER Manual an Environmental Impact Analysis is necessary if required by appropriate host country law or if required by the Gold Standard. In order to decide if an EIA must be performed the results of the Sustainable Development Assessment Matrix and the preliminary stakeholder consultation are considered.

India government gives guidance of which projects is required by law to conduct an Environmental Impact Assessment[14]. The proposed project by its nature does not fall among those required to conduct an EIA, in addition, the nature and design of the project will not have a negative impacts. The project was therefore found to be in order and was implemented without an EIA being carried order.

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:

>>
Not applicable

[14] http://envfor.nic.in/divisions/iass/eia/Annex1.htm Accessed on 28/04/2010.

SECTION E. Stakeholders' comments

>>

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

>>

The Gold Standard preliminary Consultation consisted of convening a public meeting where the stakeholders were given a forum to air their views. The NBPL sent out personal invitations to each stakeholder identified. The invitation process involved delivery of hand bill along with invitation. Some of the stakeholders were invited through mobile/phone prior to the preliminary stakeholders' consultation meeting.

The meeting was attended by several stakeholders who represented the following stakeholder categories.

- MITCON Consultancy Services Ltd.
- Local representatives
- Local villagers
- Rural entrepreneurs
- NGOs

A total of 66 participants from various firms and places along with NGOs were represented in the consultation meeting.

NBPL also invited the Gold Standard supporters NGOs namely Development Alternatives, Winrock International and a local NGO operating in the region, The Rural Energy Enterprises Development Society (REED). The invitation was done by sending out invitation letters. Out of above supporter NGOs, only REED attended the consultation meeting.

E.2. Summary of the comments received:

>>

The stakeholder consultation process was conducted according to the Gold Standard version 1[15] guidelines. A non-technical visual presentation was given to stakeholders. The questions raised by the stakeholders were answered and their concerns which were raised will be incorporated during the development of project design document

The stakeholders did not identify any negative impact due to design and development of the project activity on community and environment. Since no negative impacts which may arise from the project were raised or identified, the sustainability of the project was reaffirmed

See full stakeholders' consultation report is annexed separately with this PDD

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

>>

The report of the stakeholder consultation shows that the stakeholders have predicted no negative impacts on environment as well as on society. As a result of these positive assessments no changes were adopted in the project design and implementation

[15] Although the project is being registered using GS version 2, the consultation meeting was carried out before the GS version 2 guidelines were published.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Nishant Bioenergy (P) Limited
Street/P.O.Box:	Ambala - Chandigarh road
Building:	BS Pump wali gali, near Oriental Bank of Commerce
City:	Zirakpur
State/Region:	Punjab
Postfix/ZIP:	140603
Country:	India
Telephone:	01762-656145
FAX:	1762-526301
E-Mail:	nibhoria@gmail.com
URL:	www.nishantbioenergy.org
Represented by:	
Title:	Chief Managing Director
Salutation:	Mr
Last Name:	Nibhoria
Middle Name:	-
First Name:	Ramesh Kumar
Department:	Administration
Mobile:	+91 9815609301
Direct FAX:	-
Direct tel:	-
Personal E-Mail:	nibhoria@rediffmail.com

Organization:	JP Morgan Ventures Energy Corporation Limited
Street/P.O.Box:	Westlands Road, PO Box 856 00606
Building:	Eden Square Business Centre
City:	Nairobi.
State/Region:	-
Postfix/ZIP:	-
Country:	Kenya
Telephone:	+254 (0) 20 3673183
Fax:	+254 (0) 20 3752 245
E-Mail:	environmental.markets@jpmorgan.com
URL:	www.jpmorganclimatecare.com
Represented by:	
Title:	Executive Director
Salutation:	Mr
Last Name:	Morton
Middle Name:	-
First Name:	Tom
Department:	NA
Mobile:	NA
Direct Fax:	NA
Direct Tel:	NA
Personal E-Mail:	tom.morton@jpmorganclimatecare.com

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funds are used in the project

Annex 3

BASELINE INFORMATION

Calorific value of Biomass briquettes.
The calorific value of biomass briquettes were measured in the national laboratory and its value was found to be 3864Kcal/Kg.

Values for emission factor and net calorific values applied for fossil fuel are obtained from the IPCC 2006 values.

The following default values were considered from the IPCC 2006 data.

Parameter	Data Value
Carbon emission factor for LPG (tCO_2/TJ)	63.1
Calorific Value of LPG (TJ/Gg)	47.3

Earth stove fuel consumption
The stove(s) being sold by the project comes in different sizes with varying biomass briquette consumption. The consumption for each stove size is in Kilogrammes of briquettes per hour as follows:
Model ES 04 = 4 Kg/hr
Model ES 10 = 10Kg/hr
Model ES 15 = 15Kg/hr

Stove Usage Time
A survey was done to determine the average usage time (actual cooking time) a stove is in operation. From the findings of the baseline survey, it was established that restaurants spend on average 3 hours to prepare food. This is time is normally between 11 am to 1 PM. This is the time when most people who rely on roadside restaurants come for lunch.

Emission factor for the grid
The emission factor for the grid for each year is calculated by the Government body (i.e. Central Electricity Authority) which is under the Ministry of Power (*see link below*). The data is publicly available on the internet for use by any person and it is reliable. http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm.

CENTRAL ELECTRICITY AUTHORITY: CO2 BASELINE DATABASE

VERSION **5.0**
DATE **Nov-09**
BASELINE METHODOLOGY **ACM0002 / Ver 10**

EMISSION FACTORS			
Weighted Average Emission Rate (tCO2/MWh) (excl. Imports)			
	2005-06	2006-07	2007-08
NEWNE	0.84	0.83	0.82
South	0.73	0.72	0.72
India	0.82	0.80	0.80
Simple Operating Margin (tCO2/MWh) (excl. Imports) (1)			
	2005-06	2006-07	2007-08
NEWNE	1.02	1.02	1.01
South	1.01	1.00	0.99
India	1.02	1.01	1.01
Build Margin (tCO2/MWh) (excl. Imports)			
	2005-06	2006-07	2007-08
NEWNE	0.67	0.63	0.60
South	0.71	0.70	0.71
India	0.68	0.65	0.63
Combined Margin (tCO2/MWh) (excl. Imports) (1)			
	2005-06	2006-07	2007-08
NEWNE	0.85	0.82	0.81
South	0.86	0.85	0.85
India	0.85	0.83	0.82
for an Electricity System", Ver.1.1 (p.4)			

Annex 4
MONITORING INFORMATION

Biomass Briquettes:
NBPL will maintain the region wise sale records of Earth Stoves & biomass briquettes supplied to end users. Biomass briquettes will be measured in kg and sold to end users as per their requirement but with a minimum order of 100Kg. The inquiry for the supply of biomass briquettes from the end user is received by NBPL representative by telephonic booking. Once the order is received, biomass briquettes will be delivered to end user by NBPL or representative within 24 hrs from booking. Delivery is done using a Rickshaw unless the customer is located far away, a vehicle is used to deliver the order.

The quantity of the biomass briquette sold to end user will be archive from sale records maintained by NBPL and will be cross verified with the invoices / bills raised by NBPL to end user against sale of the biomass briquette.

NBPL bi-annually checks Net Calorific value of the biomass briquette will be analyse from the national approved laboratory and maintains records for the same throughout the crediting period.

Operation of Earth stove:
The Earth stove has electronic hour meter which will maintain all records related to total operational hours of the individual Earth Stove. NBPL will carry out annual reading for a sample of stove and the value obtained will be extrapolated to represent the all the stoves in operation[16].

This value will then be used for the calculation of the biomass briquettes consumed in a specific time. This value is also cross checked with the sales receipts record (total mass of biomass briquettes sold) of the briquettes and the value is considered conservatively for the emission reduction calculation.

The records for operation and maintenance of each earth stove will be maintained by the project promoter to assure its performance efficiently. The necessary agreement is made between the project promoter and the end user for repair and maintenance. NBPL will give free service in the first 2 years of purchase and a further 6 year optional contract at a fee.

Project promoter will maintain the records of training, qualification for directly employed personnel & the number of end users.

The project promoter will maintains all records for new Earth Stove user added or replaced by the old one in the same area to abide with declared capacity and avoid double counting.

[16] In case it is found that meter log is not working, the NBPL will use the briquette sales records and the stove briquette consumption capacity to calculate the running time.

Annex 5

Biomass Collection and Briquettes Manufacturing Process

There are several briquette making plants operating in India. These plants supplies briquettes to various industries for use in boilers for steam generation. One such plant is JDS Agro Industries located 28 kilometres from Chandigarh. The plant has capacity to make 3 tonnes of briquettes per hour, although it is producing 500 kilogrammes per hour due to briquette demand.

Currently, NBPL buys briquettes from JDS Agro Industries and transports the briquettes by lorry to their stores located within the NBPL office compound.

NBPL has no contractual agreement for exclusive purchase of briquettes from JDS. Instead, NBPL is making arrangement to purchase briquettes from Siau Women Group which is near Chandigarh. The women group briquette making plant project is under development and the group has secured finance from a bank to finance the project. The financial debt has been negotiating with a guarantee of briquette purchase by NBPL in consideration. The women group project will have a capacity of 100 kilogrammes per hour and their biomass supply is localised and consists of agricultural waste.

The NBPL project will give priority for purchase of briquettes from Siau Women Group plant first before supplementing the deficit with purchase from JDS Agro Industries.

The region around Chandigarh received moderate rainfall and biomass supply is guaranteed. However, during wet season, biomass waste collected will be spread to dry before briquetting. In order to cover for the likely shortfall in supply of briquettes, NBPL will purchase more briquettes and stock them for use by dhaba customers during the wet season since briquette production volumes will decrease.

Briquette Ordering and Delivery

Earth Stove users have signed a contractual agreement requiring them to source briquettes from NBPL. Each customer has the telephone number (both Mobile and Landline) of NBPL sales office. The customer will call to place an order for delivery of briquettes[17], once the order is received, necessary paperwork is done and a sales bill is raised to accompany briquette delivery. The order is processed and briquettes delivered within 24 hours from the time the sales team receives an order.

In the sales bill the following is shown:

1. The weight of briquettes
2. Corresponding value at 5 – 5.5 rupees per Kilogramme (inclusive in of tax)
3. Sales tax at 4%
4. Location of the customer
5. Customer name

[17] Minimum order the stove user makes is 100 Kg of briquettes

Briquettes are delivered using a rickshaw which has capacity to carry 150 kilogrammes and for those customers who are located far away from Chandigarh, a lorry is used to deliver the briquettes.

Briquette payment
Once the delivery of briquette is done, one of the NBPL employees ("revenue collection clerk") goes round on weekly basis to collect payment for the Earth Stove and for briquettes delivered. Payment is done weekly because customers cannot afford cash payment.

The Stove
The stove has a 10 year life and during purchase, the customer is given a 2 year free maintenance guarantee with an option for a further 6 year maintenance contract at a fee of 500 rupees per year.

On the day of stove purchase, the customer is given a 10 day test period and the customer is free to return the stove without any payment if the stove does not meet his/her expectation. However, during the test period, the customer is expected to pay for the briquettes used during that period.

If the customer is satisfied with the performance of the stove, a contact is entered with the customer and NBPL for supply of briquettes and maintenance.

Briquette Diversion Risk
The prevailing prices for various fuels in the region and India as whole are high than briquette prices. The following are the prevailing prices for various fuels used for cooking currently compared with briquettes:

1. Coal 8 rupees per kilogram
2. Wood 6 rupees per kilogramme
3. Charcoal 20 rupees per kilogramme
4. Briquettes 5.5 rupees per kilogramme

Based on the above prices, there is no incentive to switch from briquette use to use of any of the above fuels. In addition, the stove is not designed to burn the above fuel efficiently other than briquettes.

Stove pricing
The following are the prices for the various stove sizes being sold
ES 4 RS150/week for 88 week + RS1000 upfront payment = 14,200
ES 10 RS250/week for 81 week + RS950 upfront payment = 21,200
ES 15 RS250/week for 101 week + RS1000 upfront payment = 26,250

Stakeholders' Consultation Report

The report is annexed separately with the PDD