Project design document form for small-scale CDM project activities

(Version 08.0)

Complete this form in accordance with the Attachment "Instructions for filling out the project design document form for small-scale CDM project activities" at the end of this form.

PROJECT DESIGN DOCUMENT (PDD)	
Title of the project activity	Bagepalli CDM Biogas Programme
Version number of the PDD	6
Completion date of the PDD	11 May 2017
Project participant(s)	Private Entity - Agricultural Development and Training Society (ADATS)
Host Party	India
Applied methodology(ies) and, where applicable, applied standardized baseline(s)	SECTORAL SCOPE - 01 Energy industries (Renewable/Non-Renewable Sources) TYPE I - Renewable Energy Projects CATETORY- I.E. Switch from Non-Renewable Biomass for Thermal Applications by the User, version 05.0, EB 68.
Sectoral scope(s) linked to the applied methodology(ies)	N/A
Estimated amount of annual average GHG emission reductions	18,645 tCO_2 e

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

>> The project "Bagepalli CDM Biogas Programme" is a registered CDM project activity. The details of the registered project are as follows:

UNFCCC Project Number:	**0121**
Registration date:	**10th December 2005**
Crediting Type:	**Renewable**
First Crediting Period:	**01 Sep 06 - 31 Aug 13 (Renewable)** **Changed from: 18 Dec 05 - 17 Dec 12**
Issued CERs:	For the 1st monitoring period, 11,761 CERs were issued for 1st Sept 2006 to 31st August 2007 and for the 2nd monitoring period, 35, 872 CERs were issued for the period 1st Sept 2007 to 31st July 2009. During the 3rd monitoring report for 1st August 2009 to 31st July 2011, 33,087 CERs have been issued.

Through the submission of this PDD, the project proponent intends to renew the crediting period in line with the Procedures for Renewal of the crediting period of a registered CDM project activity, version 06, EB 63, Annex-29 and the PDD has been accordingly updated. Based on guidelines of the document, sections of the CDM-PDD have been updated relating to the baseline, estimated emission reductions and the monitoring plan using an approved baseline and monitoring methodology as follows:

- The registered CDM project activity was registered under I.C. version 5. This applicability criteria of the methodology does not apply anymore to the project activity, which is principally replacement of non-renewable biomass by renewable fuel. Thus the applicable methodology at the time of submission of this PDD, i.e. AMS I.E has been chosen.
- For renewal of the crediting period of the project activity, the applied methodology is AMS I.E. Version 5.0. The emission reductions and the monitoring plan have been updated based on the approved baseline and monitoring methodology, AMS I.E. Version 5.0.

The project activity has been to set up 5,500 biogas plants (digesters) of 2 m^3 capacity each for single households. Each household utilises the dung of its cows to feed the digester for the production of biogas for cooking purpose and heating of hot water. The aim of the project was to replace the commonly used inefficient wood fired mud stoves technology, with clean, sustainable and efficient biogas. Based on Ramachandra, 2007, the fuel wood in the project area is 3.0733 t/family/day. This relatively high consumption compared to energy actually used is due to the low level of efficiency of the traditional stoves.

Families walk 2-5 km to collect this firewood as Chickballapur district, erstwhile part of Kolar District, like many other regions of India, is a fuel wood deficit region [Ref 3a]. 95% of biomass in Kolar District is non-renewable, which means that 95% of the fuel wood cannot be considered a renewable source of energy, and by burning this fire wood, the users are causing the emission of greenhouse gases. Fuel wood is replaced with the renewable biogas and the users are avoiding greenhouse gas emissions in the baseline case.

The project is in Chickballapur district, erstwhile part of Kolar District. In this semi-arid region wood resources are very scarce, but yet they are the main cooking fuel for the very poor population. As these fuel wood users are very poor, there is no incentive on anyone's part to grow biomass for cooking for them. Thus there is acute fuel wood scarcity combined with lack of cooking energy in any form, as they are too poor to pay for it.

A list of suitable and interested households who wished to switch from firewood to biogas was established. Implementation of the project was on the successful validation and registration of the

project as a CDM project since the project was financed exclusively from the carbon revenues from VELCAN ENERGY, France.

The project contributes to sustainable development of the region and the country by:

a) Saving GHG (Greenhouse Gas) emissions by avoiding the uncontrolled burning of unsustainable fuelwood (non-renewable biomass) while switching to biogas;
b) saving emissions from kerosene, which is avoided when switching to biogas;
c) increase women and children's overall health situation by reducing smoke in kitchen (more women in India die from respiratory diseases caused by fumes in kitchens than from malaria);
d) protecting the local environment by reducing the uncontrolled deforestation in the project area; helping women by saving cooking time.

A.2. Location of project activity

A.2.1. Host Party

>>
India

A.2.2. Region/State/Province etc.

>>
Chickballapur District[1], Karnataka

A.2.3. City/Town/Community etc.

>>
5 Taluks of Chickballapur District namely Bagepalli, Chickballapur, Chintamani, Gudibanda and Sidlaghatta

A.2.4. Physical/Geographical location

>>

[1] 6 districts of former Kolar district have been separately and named Chickballapur district. Chickballapur district was carved out of Kolar district on 23th August 2007 (http://chikballapur.nic.in/district_profile.html). The 6 taluks includes Gowribidanur, Gudibanda, Bagepalli, Chintamani, Sidlaghatta and Chickballapur taluks. Thus the project site is now in Chickballapur district.

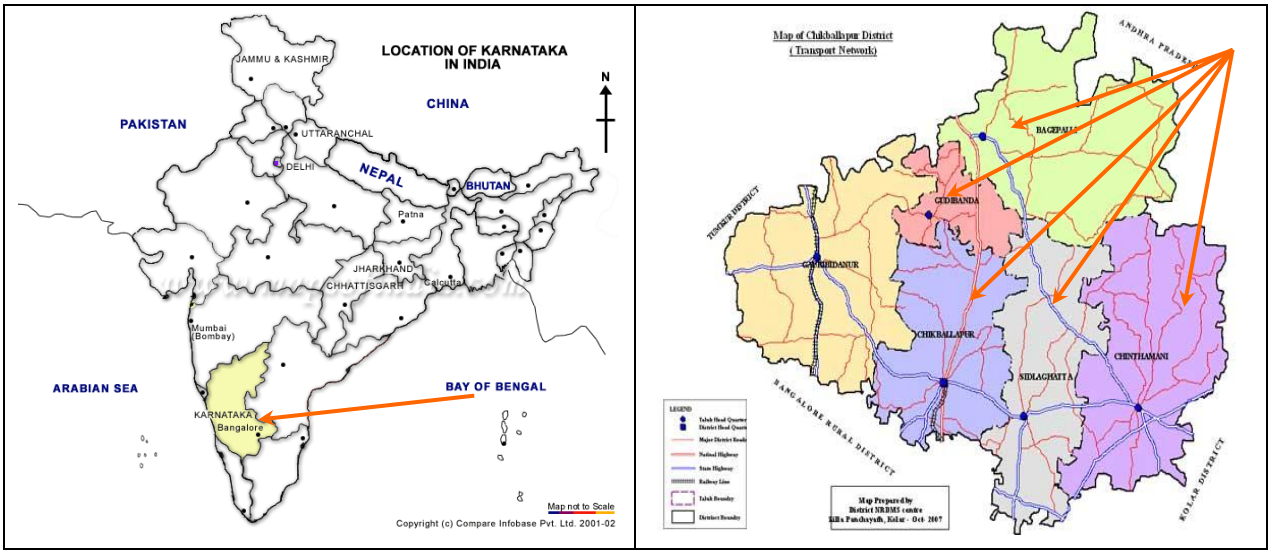

Fig 1: Map showing Karnataka State and the 5 taluks in Chickballapur district where the project is implemented.

The geographical coordinates of the taluks are as follows.

Taluks	Coordinates
Bagepalli	13° 47' 5" North, 77° 47' 35" East
Chikkaballapur	13° 26' 3" North, 77° 43' 27" East
Chintamani	13° 24' 0" North, 78° 4' 0" East
Gudibanda	13° 40' 10" North, 77° 41' 54" East
Sidlaghatta	13° 23' 17" North, 77° 51' 46" East

A.3. Technologies and/or measures

>> The project was registered under Type I. RENEWABLE ENERGY PROJECTS, Category I.C. - Thermal energy for the user. This methodology is not applicable anymore for renewal of the second crediting period. The chosen type and category for this second crediting period is as follows:

SECTORAL SCOPE - 01 Energy industries (Renewable/Non-Renewable Sources)
TYPE I - Renewable Energy Projects
CATETORY- I.E. Switch from Non-Renewable Biomass for Thermal Applications by the User, version 05.0, EB 68.

The project activity is a bundle of small biogas plants of a total of less than 15 MW total generating capacity, supplying thermal energy directly to users.

Justification how the proposed activity conforms to the project type from Appendix B:

Generation capacity where generation capacity is specified by the manufacturer, it shall be less than 15MW.

Error! Reference source not found. Table 1 provides the underlying data and assumptions for calculating generation capacity

Table 1:

Biogas plant size	Benefiting households	Average persons per household	Average cows per household	Average cooking hours
2 m^3	5500	5	4	4

Since no detailed information on the capacity of the biogas plants is available, we suggest a rough estimation based on the methane production potential of cow-dung according to IPCC guidelines (see Annex 4). We assume that the lower methane IPCC production value from dung reflects best the situation in this district, since the cows owned by the families are typically small, similar to non-dairy cows, feeding on crop-residues. The calculations are given in Table 2. The total capacity of the biogas systems is calculated as the sum of the estimated capacity of all plants built by the project activity, and is approximately 6 MW and thus below the limit for small-scale CDM project.

Table 2: Summarised capacity of all 2 m^3 biogas plants in the project activity (reference values see Annex 7)

CH_4 energy from cow dung (IPCC conservative value)	MJ/cow/year	1421.9
Energy derived from 4 cows	kWh / year	1579.8
Family cooking hours per day	H	4.0
Capacity of one system	KW	1.1
Capacity of all 5500 plants	**MW**	**~6**

The chosen technology is a domestic biogas plant. It is a small thermal appliance that displaces the use of non-renewable biomass by introducing a system for utilising cattle dung and converting it into renewable energy by means of a digester in which the substrate undergoes acidification and methanation. Biogas is included in the specified methodologies as an example of a suitable end user technology.

Technology/measure

The biogas plant (Deenbandhu Model) consists of a digester with a fixed, non-movable gas space. Families load the raw cow dung through the inlet into the fixed dome made of bricks and cement, located outside the kitchen. Gas is produced through anaerobic digestion of the dung and stored in the upper part of the digester before being piped to the biogas stove in the kitchen. The gas pressure displaces the digested slurry into the compensating tank, ready to be used as excellent manure.

Advantages:

- low construction cost, locally available material and technology;
- no moving parts, no rusting steel parts, hence long life (25 years or more);
- safe and secure underground construction;
- low indoor emissions (pollution) from biogas combustion, families benefit immensely from smoke-free kitchens, quick, easy and clean operation, and relief of drudgery;
- construction creates locally employment.

Disadvantages:

- needs to be emptied every 5 years (build- up of mud, sand and pebbles);
- needs to be fed and maintained regularly to provide constant gas flow.

The size of the biogas digester depends on the family (household) size and the number of cows per household. For this project activity we evaluated average systems which best fit the conditions and needs of the users.

The technology used in this project activity is already available in India – thus no environmentally safe and sound technology and know-how will be transferred to the host party (country).

In the project activity, users prepare batches of slurry in the mixing tank, before allowing the final mixture to flow into the digester for methane formation phase. After digestion, evacuated spent slurry is used as manure in agricultural fields. The recovered gas is combusted and used for cooking and water heating. The chosen methane recovery and combustion system is the time tested Deenabandhu model biogas technology which is well-known in India[2]. The project activity has 5,500 households using cattle dung in individual household methane recovery systems of biogas for cooking and water heating. The 5,500 individual plants consist of a mixing chamber where water and cow dung are mixed at 1:1 ratio, an inlet pipe to feed the slurry into the reactor, the main biogas reactor / digester where methane formation / recovery takes place, a slurry outlet pipe, an outlet chamber, and a slurry platform. The outlet pipe and tank are provided to remove the digested / treated sludge or fermentation residue and the slurry platform is provided to maintain the treated slurry in clean condition. A pipe leading from the top of the dome to the stove will be provided to supply biogas to a 2-ring stove inside the house.

A.4. Parties and project participants

Party involved (host) indicates host Party	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
India (host)	Private Entity - Agricultural Development and Training Society (ADATS)	No

A.5. Public funding of project activity

>>
There was no public funding involved in the project activity. The project was financed completely with carbon revenues from VELCAN ENERGY, France, an Annex I country.

A.6. Debundling for project activity

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The small-scale project activity is not a debundled component of a large project activity since there is no 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 or technology; and
- Registered within the previous two years; and
- Whose project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest point.

According to Para 7 of "Guidelines on assessment of debundling for SSC project activities", Version 3, Annex 13, EB 54, if each of the independent subsystems/measures (e.g., biogas digesters, residential solar energy systems, kerosene or incandescent lighting replacements) included in one or more CDM project activities is no greater than 1% of the small scale thresholds defined by the applied methodology and the subsystems/measures are indicated in the PDDs to be each implemented at or in multiple locations (e.g., installed at or in multiple homes) then these CDM project activities are exempted from performing a de-bundling check, i.e., considered as being not a de-bundled component of a large scale activity.

[2] Approved design by the Ministry of New and Renewable Energy. http://www.mnre.gov.in/schemes/decentralized-systems/schems-2

- Each of the independent biogas unit is having an installed capacity of 1.1 kW_{th}. This is not greater than 1% of small scale thresholds defined by the applied methodology I.E. under Type I – renewable energy project activity, i.e. not greater than 0.45 MW_{th} or 450 kW_{th}.

Thus the project activity is exempted from performing the debundling check. Thus the small scale project is not a debundled component of a large scale project activity.

SECTION B. Application of selected approved baseline and monitoring methodology and standardized baseline

B.1. Reference of methodology and standardized baseline

>>
SECTORAL SCOPE - 01 Energy industries (Renewable/Non-Renewable Sources)
TYPE I - Renewable Energy Projects
CATETORY- I.E. Switch from Non-Renewable Biomass for Thermal Applications by the User, Version 05.0, EB 68

B.2. Project activity eligibility

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This project is applicable as per the definition in the Annex B of the simplified methodologies for selected small-scale CDM project activity categories, AMS I.E. Switch from Non-Renewable Biomass for Thermal Applications by the User, version 05.0 due to the following:

1. *This category comprises activities to displace the use of non-renewable biomass by introducing renewable energy technologies. Examples of these technologies include, but are not limited to biogas stoves, solar cookers, passive solar homes, renewable energy based drinking water treatment technologies (e.g. sand filters followed by solar water disinfection; water boiling using renewable biomass).*

The project activity comprises of biogas units that will displace the use of non-renewable biomass by introducing new renewable end-user technology, the biogas units.

2. Project participants are able to show that non-renewable biomass has been used since 31 December 1989, using survey methods or referring to published literature, official reports or statistics.

As shown in section B.4, the communities are using non-renewable biomass since 31st December 1989 based on official reports or statistics by the Forest Survey of India, Government of India.

The capacity of the project activity is approximately 6 MW_{th} and will remain under this limit during every year of the crediting period as shown in section A.3.

B.3. Project boundary

In accordance with Paragraph 3 of the chosen methodology, Type I.E. Switch from Non-Renewable Biomass for Thermal Applications by the User, Version 05.0:

The project boundary is the physical, geographic site of the use of biomass or the renewable energy.

Based on the methodologies, the GHGs included are as follows:

	Sources	GHG	Included/Excluded	Justification/Explanation
Base line	Emissions from burning non-	CO_2	Included	Major source of emission from use of non-renewable

	renewable wood			biomass
		CH_4	Excluded	Not a major source
		N_2O	Excluded	Not a major source
Project Activity	Emissions from use of non-renewable wood by non-project household/users that previously used renewable energy	CO_2	Included	Leakage from use of non-renewable woody biomass by non- project households/ users that previously used renewable energy is a source according to AMS I.E, Version 5.0.
		CH_4	Excluded	Not a source
		N_2O	Excluded	Not a source

B.4. Establishment and description of baseline scenario

>>

In line with "Tool to assess the validity of the original/current baseline and to update the baseline at the renewal of a crediting period, Annex 20, EB 65, Version 3" it stipulates the following procedures to be used for the assessment of continued validity of the original baseline and its update.

Step 1: Assess the validity of the current baseline for the next crediting period

The procedures for the renewal of the crediting period of a registered CDM project activity approved by the CDM Executive Board require assessing the impact of new relevant national and/or sectoral policies and circumstances on the baseline, using the following steps:

Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies

There are no relevant national and/or sectoral policies and circumstances ever since the project was registered that have an impact on the baseline. The Ministry has been supporting programmes for the deployment of renewable energy systems and devices such as biogas plants, in rural areas of the country[3]. But the implementation of biogas is still very low. The baseline scenario remains unchanged and is the same as that determined during the start of the project activity.

Step 1.2: Assess the impact of circumstances

The baseline scenario identified at the validation of the project activity was thermal energy from fuel wood, of which a large part of it was non-renewable for domestic cooking and water heating. Thus, this project activity was a voluntary investment which replaced equivalent amount of thermal energy from renewable source, the biogas. The project proponent was not bound to incur this investment as it was not mandatory by national and sectoral policies. Thus, the continued operation of the project activity would continue to replace thermal energy from fuel wood, hence the same baseline as identified in the previous crediting period is still valid for the project. Therefore, the assessment of the changes in market characteristics is not required for the renewal of the project's crediting period under CDM.

The target population are the rural households of Chickballapur District. The rural households are primarily dependent on fuel wood for cooking and heating water. This is concurrent with the latest survey conducted at the national and state level, wherein nearly 77.6% of rural household use fuel wood for household energy need at national level, 85.7% at the state level of Karnataka (NSSO,

[3] http://mnre.gov.in/file-manager/annual-report/2011-2012/EN/Chapter%203/chapter_3.htm

2010)[4] and 77.67% of the rural population in Chickballapur District use fuel wood for cooking (Directorate of Economics and Statistics, 2011)[5]. The region is scarce of biomass and non-renewable biomass is part of the biomass used for cooking and heating water. In 5,500 households, the fuel wood has been replaced with biogas, a renewable source of thermal energy through this CDM project activity.

Hence, the new circumstances do not have an impact on the baseline emission. The conditions used to determine the baseline emissions in the previous crediting period are still valid even now. In the absence of the project activity, the baseline scenario in the project boundary is the use of non-renewable biomass for cooking and heating water on traditional cook stoves with low efficiencies. There are no mandatory national and sectoral policies or regulations for use of biogas (renewable energy) at household level. Thus, the GHG emissions under the baseline condition comprise CO_2 emissions from the use of non-renewable biomass for thermal energy.

Step 1.3: Assess whether the continuation of use of current baseline equipment(s) or an investment is the most likely scenario for the crediting period for which renewal is requested.

As explained in step 1.2, the baseline scenario was thermal energy from fuel wood, of which a large part of it was non-renewable for domestic cooking and water heating. Therefore this condition is not applicable to the project activity.

Step 1.4: Assessment of the validity of the data and parameters

This step stipulates to *"assess whether data and parameters that were only determined at the start of the crediting period and not monitored during the crediting period are still valid or whether they should be updated.*

In the context of the present project activity the emission factor has been updated along with the approach used to calculate the emission factor. The registered CDM project activity was registered under I.C. version 5. This applicability criteria of the methodology does not apply anymore to the project activity, which is principally replacement of non-renewable biomass by renewable fuel. Thus, the applicable methodology at the time of submission of this PDD, i.e. AMS I.E, Version 5 has been chosen and accordingly, been updated.

According to the guidelines, updates should be undertaken in the following cases:

Where IPCC default values are used, the values should be updated if any new default values have been adopted and published by the IPCC, for example, in guidelines for national GHG inventories, IPCC assessment report or special reports by the IPCC;

The default values for net calorific value (NCV) for woody biomass and emission factor (EF) for fossil fuels given in the methodology I.E., Version 5 has been adopted for emission reduction calculations.

Where emission factors, values or emission benchmarks are used and determined only once for the crediting period, they should be updated, except if the emission factors, values or emission benchmarks are based on the historical situation at the site of the project activity prior to the implementation of the project and cannot be updated because the historical situation does not exist anymore as a result of the CDM project activity.

[4] NSSO 2010. National Sample Survey Organization, Household Consumer Expenditure in India, Ministry of Statistics and Programme Implementation, Government of India. (Page No A-38 and A-39)

[5] Karnataka at a glance, Directorate of Economics and Statistics, Government of Karnataka, 2011(Page no 155)

The emission factors have been updated for emission reduction calculations as the baseline situation exists even now even after the implementation of the CDM project activity. The quantity of woody biomass than has been substituted or displaced (B_y) and fraction of woody biomass used in the absence of the project activity that is non-renewable (f_{NRB}) has been updated.

Thus, the data and parameters that were only determined at the start of the crediting period and not monitored during the crediting period are not valid anymore and the current baseline has been established for the subsequent crediting period.

Step 2: Update the current baseline and the data and parameters

This step is only applicable if any of the Steps 1.1, 1.2, 1.3 and/or 1.4 showed that the current baseline needs to be updated.

Step 2.1: Update the current baseline

According to the guidelines, *the current baseline emissions has to be updated for the subsequent crediting period, without reassessing the baseline scenario, based on the latest approved version of the methodology applicable to the project activity. The procedure should be applied in the context of the sectoral policies and circumstances that are applicable at the time of request for renewal of the crediting period.*

Without reassessing the baseline scenario, the baseline emissions has been updated for the subsequent crediting period based on the latest methodology i.e. I.E., Version 5 now applicable to the project activity. At the time of the request for renewal of the crediting period, the circumstances that are applicable are as follows:

The Central Sector Scheme has been implementing National Biogas and Manure Management Programme (NBMMP) that caters to setting up of family type biogas plants since 1981-82. National Biogas and Manure Management Programme provides for central subsidy in fixed amounts for biogas plants built for various capacities. A cumulative total of 4.31 million family type biogas plants have been set up in the country against estimated potential of 12 million plants[6]. This scheme was in force at the time of the completion of the baseline study for the registered PDD.

All these fiscal and financial incentives were in force at the time of completion of the baseline study for the registered PDD of the project activity and still continue to exist. However, in spite of the financial incentives given by the government to biogas units in India, the use of fuel wood has continued and the extent of use of biogas is still very low. Based on the latest report, biogas is used for cooking by 0.2% at the national level[7]; 0.6% at the state level[7] and 0.99% at the district level[8].

Step 2.2: Update the data and parameters

If the application of Step 1.4 showed that the data and/or parameter(s) that were only determined at the start of the crediting period and not monitored during the crediting period are not valid anymore, project participants should update all applicable data and parameters, following the guidance in Step 1.4.

<u>Updated baseline for the second crediting period</u>

According to the methodology applicable for the project activity, it is assumed that in the absence of the project activity, the baseline scenario would be the use of fossil fuels for meeting similar

[6] http://www.mnre.gov.in/schemes/decentralized-systems/schems-2/

[7] http://des.kar.nic.in/sites/des.kar.nic.in/files/Directories/Files/CRSN/NSS/NSS%20Final%20For%20WEB.pdf

[8] http://www.kar.nic.in/des/ptc/kag-general-2009-10.pdf

thermal energy needs. In accordance with Paragraph 4 and 5 of the chosen methodology, Type I.E. Switch from Non-Renewable Biomass for Thermal Applications by the User, Version 05.0:

It is assumed that in the absence of the project activity, the baseline scenario would be the use of fossil fuels for meeting similar thermal energy needs.

and

Emission reductions are calculated as:

$$ER_y = B_y * f_{NRB,y} * NCV_{biomass} * EF_{projected\_fossilfuel} \quad \textbf{(1)}$$

Where:

ER_y	Emission reductions during the year *y* in tCO_2e
B_y	Quantity of woody biomass that is substituted or displaced in tonnes
$f_{NRB,y}$	Fraction of woody biomass used in the absence of the project activity in year *y* that can be established as non-renewable biomass using survey methods or government data or approved default country specific fraction of non-renewable woody biomass *(f_{NRB})* values available on the CDM website
$NCV_{biomass}$	Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonne)
$EF_{projected\_fossilfuel}$	Emission factor for the substitution of non-renewable woody biomass by similar consumers. Use a value of 81.6 tCO_2/TJ

Step 1: By is determined:

According to Paragraph 6 of the chosen methodology, Type I.E. Switch from Non-Renewable Biomass for Thermal Applications by the User, Version 05.0, EB 68, using Option (a):

By is determined by taking the following option:

(a*) Calculated as the product of the number of appliances multiplied by the estimate of average annual consumption of woody biomass per appliance (tonnes/year). This can be derived from historical data or estimated using survey methods.*

Adopting Option (a) of the methodology:

A third party study by Ramachandra *et al*., 2005[9] was conducted to assess the quantity of fuelwood that is used for cooking and water heating in the district encompassing the 5 taluks of the project area. The details of the survey from the study are as follows:

	Fuelwood for cooking (kg/capita/day)			**Fuelwood for water heating (kg/capita/day)**			**Fuelwood for cooking (t/family/yr)**
Taluk	**Monsoon**	**Summer**	**Winter**	**Monsoon**	**Summer**	**Winter**	
Bagepalli	1.35	1.31	1.36	0.68	0.66	0.7	3.6865
Chickballapur	1.29	1.23	1.29	0.57	0.5	0.57	3.3154
Chintamani	1.25	1.25	1.25	0.11	0.11	0.11	2.4820
Gudibanda	1.42	1.42	1.42	0.55	0.5	0.58	3.5831
Sidlaghatta	1.13	1.13	1.13	0.13	0.13	0.13	2.2995
Average	**3.0733**						

[9] Ramachandra, T.V., Vamshee Krishna S and Shruthi, B.V. 2005. Decision support system for regional domestic energy planning. Journal of Scientific and Industrial Research. Vol 64, pp 163-174.

Table 3: Fuel wood use for cooking and water heating in the 5 taluks of the project area

The fuelwood use from the study is 3.0733 t/family/year. The study being a third party assessment and conservative; has been considered to determine B_y.

Thus the total quantity of biomass that is substituted from project is 16,903 tonnes/year.

Adopting option (a), the B_y value is shown below

Amount of Biomass using survey method - option (a)	
Parameter	**Value**
Number of Biogas Units	5,500
Average annual biomass consumption per biogas Unit (tonnes/family/year)	**3.0733**
B_y = Quantity of Biomass that is substituted or displaced for 5,500 biogas units (in tonnes/yr)	**16,903**

The quantity of biomass that will be substituted or displaced is 3.0733 t/yr/family or 16,903 t/year for 5,500 families.

Step 2: Determining $f_{NRB,y}$:

In accordance with Paragraph 7 of the chosen methodology, Type I.E. Switch from Non-Renewable Biomass for Thermal Applications by the User, Version 05.0:

Project participants shall determine the shares of renewable and non-renewable woody biomass in B_y (the quantity of woody biomass used in the absence of project activity) the total biomass consumption using nationally approved methods (e.g. surveys or government data if available) and then determine $f_{NRB,y}$.

According to Paragraph 8 of the methodology, the fraction of woody biomass saved by the project activity is year y that can be established as non-renewable is

$$f_{NRB,y} = \frac{NRB}{NRB + DRB}$$

Where

NRB = Non-renewable woody biomass
DRB = Demonstrably renewable woody biomass

A national study was conducted by the Forest Survey of India, Ministry of Environment and Forests, Government of India to assess the woody biomass demand and availability at the state and national level[10]. Based on the study, the consumption of fuel wood for each of the state was determined based on surveys conducted at household level for each of the state. The annual production of wood from forests was determined from records of each of the forest division in the state. Using this data, the state and national level data was generated. Further, the production of wood and fuel wood from the trees outside forests was determined from short rotation, medium rotation and long rotation species. Also the trees harvested for industrial wood provide substantial quantity of fuel wood as by-product. This has also been accounted for the production of fuel wood from trees outside forests. Thus according to the study, the total fuel wood consumption for Karnataka state is 20.967 Mt. Fuel wood production from forests and from trees outside Forests account for 0.03 Mt and 0.907 Mt respectively. Therefore the total fuel wood production of DRB

[10] State of Forest Report. 2011. Forest Survey of India, Ministry of Environment and Forests, Government of India(Chapter 7, Page no's 72, 73 and 77).

component is 0.937 Mt. Thus the NRB component of fuel wood consumption is 20.03 Mt. This accounts for an f_{NRB} of 0.95. The following table summarizes the calculations for f_{NRB} based on FSI, 2011.

f_{NRB} Calculations for Karnataka State based on Forest Survey of India, 2011		
Parameter	**Value**	**Source of Data**
Fuel wood Consumption (tonnes)	2,09,67,000	State of Forest Report, Forest Survey of India, Ministry of Environment and Forests, Government of India, 2011
Fuel wood production from Forest (tonnes)	30,000	
Fuel wood production from trees outside Forests (tonnes)	9,07,000	
Non-Renewable Biomass (NRB) (tonnes)	2,00,30,000	(Consumption) minus (Production from forests and outside forests) 2,09,67,000 – (30,000+9,07,000)
Demonstrably Renewable Biomass (DRB) (tonnes)	9,37,000	Production from forests and from trees outside forests (30,000+9,07,000)
$f_{NRB,y} = \frac{NRB}{NRB + DRB}$	**0.95**	Based on formula given in I.E. Version 5 methodology

The fraction of non-renewable woody biomass used in the absence of the project activity **is 0.95.**

According to the methodology, the Non-renewable woody biomass (NRB) is the quantity of woody biomass used in the absence of the project activity (B_y) minus DRB component, as long as at least two of the following supporting indicators are shown to exist:

- *A trend showing an increase in time spent or distance for gathering fuel-wood by users (or fuel-wood suppliers) or alternatively, a trend showing an increase in the distance the fuel-wood is transported to the project area;*
- *Survey results, national or local statistics, studies, maps or other sources of information such as remote-sensing data, that show that carbon stocks are depleting in the project area;*
- *Increasing trends in fuel-wood prices indicating a scarcity of fuel-wood;*
- *Trends in the types of cooking fuel collected by users that indicate a scarcity of woody biomass.*

To demonstrate the non-renewability of woody biomass, the supporting indicators that exist are as follows:

- *Decrease in carbon stocks:* A periodic 2-year assessment of status of forest cover in India is carried out by Forest Survey of India, Ministry of Environment and Forests, Government of India. This assessment is carried out at District level for all the States of India. An assessment of forest cover of Chickballapur District (which is part of Kolar District for the FSI assessment) shows a decrease in forest cover from 6.9% to 6.19% of geographic area. Further analysis of density of forest cover shows that there has been considerable decrease in dense forests from 189 sq km in 2001 to 59 sq km in 2011. Dense forests are forests with a crown cover between 70-40%. This accounts to a decrease of 69% area of dense forests in a decade. This implies a decrease in biomass i.e. carbon stocks. Most of the dense forests have got converted to open forests i.e. a crown cover between 40-10% (Fig 2). Thus the remote sensing data compiled by the Forest Survey of India for the district shows that carbon stocks are depleting in the project area.

A comparison of growing stock or carbon stocks of forest cover is not available at the district level. The available data is at the State level of Karnataka for the time period of 2009[11]-2011[12]. A comparison of carbon stock at the state level shows that the total growing stock of vegetation has decreased from 419.83 million cubic metres in 2009 to 416.889 million cubic meters in 2011 from forests and trees outside forest area. This demonstrates that there is decrease in carbon stocks.

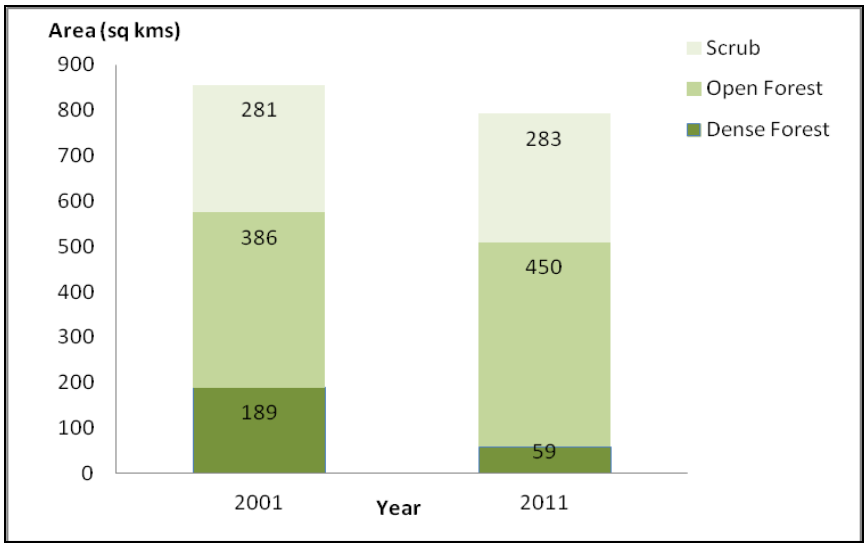

Fig 2: Change in status of dense forests and open forests showing decreasing trend in carbon stocks over years for Kolar District[13]

- *Increasing trends in fuel wood price indicating scarcity;* Yearly consumer expenditure survey among Indian households is carried out by the National Sample Survey Organisation (NSSO) for rural areas at the state level. Information on energy sources used both for cooking and lighting are collected as part of the survey. The survey conducted during 2004 presented separately the energy used for cooking and lighting in rural areas, which shows that fuel-wood consumption accounted for 54% of the total consumption expenditure. As such, it can be seen that there is an increase in price beyond the yearly inflation rate, indicating scarcity (Fig 3).

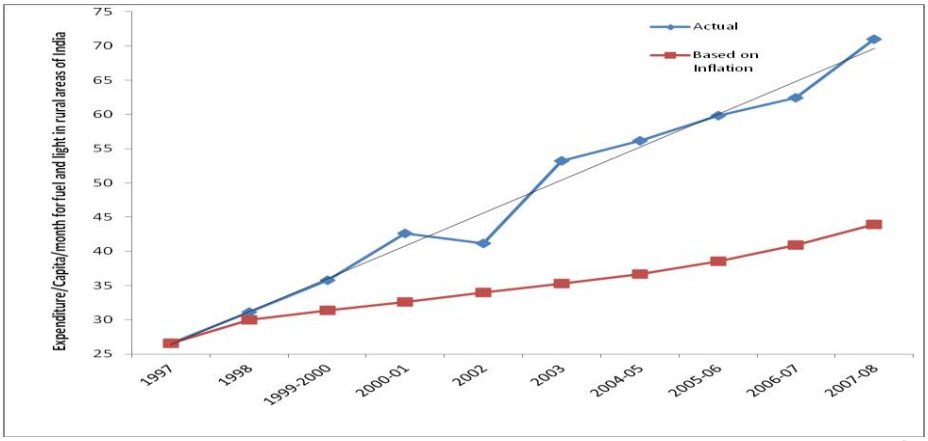

Fig 3: Relative escalation of prices (average yearly inflation rate in India vis-á-vis the actual prices) towards fuel and light spent by rural population in Karnataka[14]

[11] FSI, 2009. Chapter 5: Growing Stock. India State of Forest Report. Forest Survey of India, Ministry of Environment and Forests, Government of India. Page 46. www.webline.co.in/fsi/sfr2009/chapter5.pdf

[12] FSI, 2011. Chapter 5: Growing Stock. India State of Forest Report. Forest Survey of India, Ministry of Environment and Forests, Government of India. Page 54. www.fsi.org.in/cover_2011/chapter5.pdf

[13] Chickballapur District is part of Bangalore Rural for the GIS Assessment by the Forest Survey of India

[14] http://mospi.nic.in/rept%20_%20pubn/ftest.asp?rept_id=442&type=NSSO (1997) (Page no 19) http://mospi.nic.in/rept%20_%20pubn/ftest.asp?rept_id=448&type=NSSO (1998) (Page no 22)

As mandated in the methodology, the above two conditions; increase in time spent for gathering fuel wood by users, remote sensing data from Forest Survey of India (FSI) showing depleting carbon stocks in the project area and increasing trends in fuel wood price indicating scarcity clearly proves non-renewable woody biomass use in the project area.

Use of non-renewable biomass since 31st December 1989.

A study was conducted by Forest Survey of India, Ministry of Environment and Forests during 1987 to assess the wood consumption in Kolar district[15]. Based on the study, the fuelwood requirement in 1987 was 8 lakh tonnes/annum against the production of 0.31 lakh tonnes. Thus the $f_{NRB,y}$ in 1987 was 96%.

Thus non-renewable biomass is being used since 1989 in Chickaballapur district.

Step 3: Choosing $EF_{projected\_fossilfuel}$

According to Paragraph 5 of the chosen methodology, Type I.E. Switch from Non-Renewable Biomass for Thermal Applications by the User, Version 05.0, this should be *emission factor for the substitution of non-renewable woody biomass by similar consumers. Use a value of 81.6 tCO_2/TJ.*

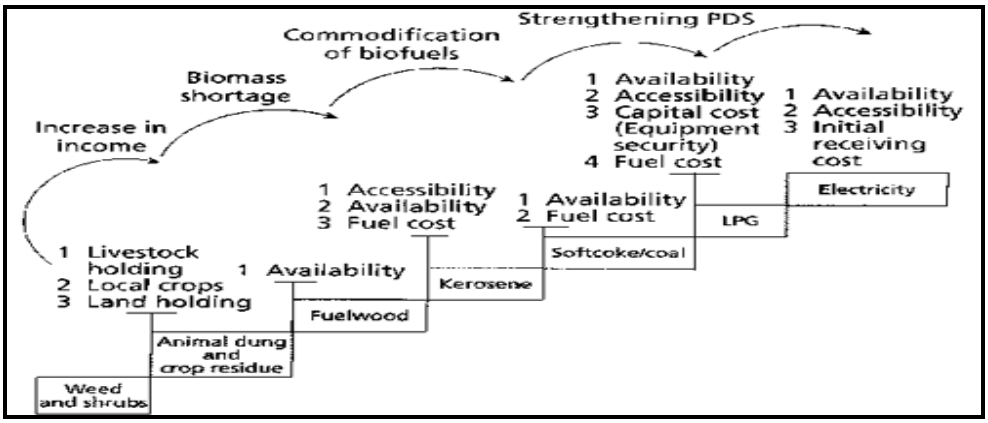

Fig 4: Environmental implications of the energy ladder in rural India. Boiling Point. Issue 42. Household energy and the environment[16]

As can be seen from the energy ladder for rural India (Fig 4), the mix of present and future fuels used would consist of a solid fossil fuel at the lowest in the ladder of fuel use choices, followed by liquid and gaseous fuel type in progression.

Thus $EF_{projected\_fossilfuel}$ is 81.6 tCO_2/TJ.

Thus the variables, parameters, data source to determine baseline emissions from the use of non-renewable biomass for thermal energy are as follows:

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http://mospi.nic.in/rept%20_%20pubn/ftest.asp?rept_id=454&type=NSSO (1999-2000) (Page no 52)
http://mospi.nic.in/rept%20_%20pubn/ftest.asp?rept_id=476&type=NSSO (2000-01) (Page no 22)http://mospi.nic.in/rept%20_%20pubn/ftest.asp?rept_id=484&type=NSSO (2002) (Page no 23)
http://mospi.nic.in/rept%20_%20pubn/ftest.asp?rept_id=490&type=NSSO (2003) (Page no 24)
http://mospi.nic.in/rept%20_%20pubn/ftest.asp?rept_id=509_P1&type=NSSO (2004-05) (Page no A-201)
http://mospi.nic.in/rept%20_%20pubn/ftest.asp?rept_id=523&type=NSSO (2005-06) (Page no A-8)
http://mospi.nic.in/rept%20_%20pubn/ftest.asp?rept_id=527&type=nsso (2006-07) (Page no A-8)
http://mospi.nic.in/Mospi_New/upload/530_final.pdf (2007-08) (Page no A-8)

[15] FSI, 1989. Report on wood consumption study in Kolar District, Karnataka. Forest Survey of India, Southern Zone, Bangalore, Ministry of Environment and Forests, Department of Environment, Forests and Wildlife. Government of India.

[16] http://www.hedon.info/BP42_EnvironmentalImplicationsOfTheEnergyLadderInRuralIndia

Parameters	Value	Source of Data
By – Quantity of biomass that is substituted (t/family/yr)	3.0733	Ramachandra, 2007
By - Quantity of Biomass that is substituted for 5,000 biogas units @ 3.0733 t/family/yr (t/yr)	16,903	3.0733 t/family/yr x 5,500 units
$f_{NRB, y}$ - Fraction of NRB	0.95	State of Forest Report. 2011. Forest Survey of India, Ministry of Environment and Forests, Government of India.
$NCV_{biomass}$ - NCV Biomass (TJ/t)	0.015	Methodology I.E. Version 5
$EF_{projected\_fossilfuel}$ - Emission factor (tCO_2/TJ)	81.6	Methodology I.E. Version 5

B.5. Demonstration of additionality

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According to the Guidelines for completing CDM SSC PDD, this section should provide a justification that the proposed project activity qualifies to use simplified methodologies and is additional using attachment A to Appendix B of the simplified modalities and procedures for small-scale CDM project activities.) National policies and circumstances relevant to the baseline of the proposed project activity can also be considered.

(a) Investment barrier: a financially more viable alternative to the project activity would have led to higher emissions;

Alternative 1) The commonly and widely used wood fired stoves or ovens ("traditional mud stoves" or "improved vented mud stoves") cost around 5 Euros, a basic "3-rock stove" almost zero. This the baseline scenario and represents 3.57 t CO_2 emission per family per year. The running costs of these systems are zero as the time a person spends is not counted as an opportunity cost, and the non-renewable biomass is collected from various open areas – Government Revenue, Forest Department, Panchayat lands, some farm field borders, and it is free. 5% of firewood is estimated to be renewable, with the balance 95% being non-renewable [Ref 3a].

Alternative 2) Kerosene is very expensive at around Rs 10.00 per litre in the fair price shop and around 20.00 Rs / litre in the open market if available. Around 1 kg would be needed per day, which is the equivalent of a daily labourer's daily salary. Thus it is not feasible for the target users in this project activity to use kerosene.

Alternative 3) LPG: The capital cost of a 2 m^3 biogas plant is about 6 times the cost of LPG. In cities and in rural municipalities with some level of income, LPG is the preferred cooking fuel of all the classes, upper, middle and lower middle class and working class. Running cost is around Rs 10.00 per day, again about half the daily wage of a agricultural labourer. To some extent this technology is also slowly penetrating the villages. But this is also beyond the reach of this project's target population, especially also considering the remoteness of the villages.

Taking all this information into account, it can be seen that Alternative 1) the continued combustion of non-renewable biomass fuel for cooking and water heating is the cheapest option, leading to higher emissions.

(b) Technological barrier: a less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions;

The commonly and widely used wood fired stoves or ovens ("traditional mud stoves" or "improved vented mud stoves") are very primitive, but anyone can build them. The basic "3-rock stove" requires practically no skill to construct, though it does take some skill to cook on such an awkward cooking arrangement. Biogas plants on the other hand have to be constructed very carefully. This takes skill, diligence, careful working, attention to detail, design care for each plant so that it is suited to the local conditions at each plot of land where it is to be constructed. There are not many good biogas gas manufacturers in India for the household user size plant, and thus the technology has low market share in the villages compared to the baseline cooking technology..

(c) Barrier due to prevailing practice: prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions;

The prevailing practice is for poor households to depend on free sources of firewood from the "commons" – either the Forest department (illegal collection is very common though under-reported), Panchayat Land, where the poor are entitled to collect firewood but there are no programmes for reforestation or replacement of biomass removed. Thus all these sources of biomass are non-renewable to large extent; yet this is the prevailing practice. See Refs [1,2,3,3a].

(d) Other barriers: without the project activity, for another specific reason identified by the project participant, such as institutional barriers or limited information, managerial resources, organizational capacity, financial resources, or capacity to absorb new technologies, emissions would have been higher.

It takes quite special organisational and management skills and coordination amongst various implementing agencies to organise decentralised supply of small cooking systems of the kind envisaged under this project activity. Not only do the plants have to be built to suit local soil conditions, but service and maintenance crews have to be trained and stationed in all the villages to ensure smooth running of the plants. Emissions from the combustion of non-renewable biomass fuel can only be avoided through efforts on the part of a supplier to give professional attention to this rural renewable energy technology and manage it efficiently with sufficient resource inputs on all fronts. As the local market is not willing to pay the additional cost of biogas plants compared to other forms of baseline activities, these barriers can only be overcome with CDM support. A biogas plant of 2 cubic metres capacity can be financed with a 5 year advance on CERs if the CER price is 15 Euros. This illustrates the win-win opportunity under CDM compared to the baseline situation.

Also:

According to "Guidelines on the demonstration of additionality of Small-Scale Project Activities, Version 9, EB 68[17]", Para 2, d*ocumentation of barriers, is not required for the positive list of technologies and project activity types that are defined as automatically additional for project sizes up to and including the small-scale CDM thresholds (e.g. installed capacity up to 15 MW).*

According to the guidelines, the positive list comprises of project activities solely composed of isolated units where the users of the technology/measure are households or communities or Small and Medium Enterprises (SMEs) and where the size of each unit is no larger than 5% of the small-scale CDM thresholds, i.e. the size of each unit is under 750 kW installed capacity or under 3000 MWh of energy savings per year or 3000 tonnes of emission reductions per year.

As demonstrated in section B.2.,

- The project comprises of the isolated biogas units of 5,500 each;
- Users of each of the biogas unit are 5,500 households

[17] https://cdm.unfccc.int/Reference/Guidclarif/meth/methSSC_guid05.pdf

- The size of each of the unit is 1.1 kW_{th} (section A.4.2), which is less than 5% of the small-scale CDM thresholds.
- The total capacity of the project activity is 9.31 MW_{th} and will remain under this limit during every year of the crediting period.

Considering the above, the project activity is eligible under the positive list of technologies and documentation of barriers is not required for positive list of technologies.

Thus, the project type is automatically additional.

B.6. Emission reductions

B.6.1. Explanation of methodological choices

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Sectoral Scope 01, TYPE I - RENEWABLE ENERGY PROJECTS, I.E. Thermal energy for the user, Version 05.0, EB 68.

Baseline emissions for the non-renewable biomass component are calculated based on the use of the biomass that is replaced, the fraction of the biomass that is non-renewable biomass, and the emission factor of projected fossil fuel according to AMS I.E "Switch from non-renewable biomass for thermal application by the user".

Equation used to calculate Emission reductions under this methodology is as follows:

$$ER_y = B_y * f_{NRB,y} * NCV_{biomass} * EF_{projected\_fossilfuel}$$

Where:

ER_y	Emission reductions during the year *y* in tCO_2e
B_y	Quantity of woody biomass that is substituted or displaced in tonnes
$f_{NRB,y}$	Fraction of woody biomass used in the absence of the project activity in year *y* that can be established as non renewable biomass using survey methods
$NCV_{biomass}$	Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonne)
$EF_{projected\_fossilfuel}$	Emission factor for the substitution of non-renewable woody biomass by similar consumers. Use a value of 81.6 tCO_2/TJ

Leakage

According to Para 10 and 11 of the methodology:

Leakage related to the non-renewable woody biomass saved by the project activity shall be assessed based on ex post surveys of users and the areas from which this woody biomass is sourced (using 90/30 precision for a selection of samples). The following potential source of leakage shall be considered:

(a) *The use/diversion of non-renewable woody biomass saved under the project activity by non-project households/users that previously used renewable energy sources. If this leakage assessment quantifies an increase in the use of non-renewable woody biomass used by the non-project households/users that is attributable to the project activity then B_y is adjusted to account for the quantified leakage. Alternatively, B_y is multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required.*

If the equipment currently being utilised is transferred from outside the boundary to the project boundary, leakage is to be considered.

There was no transfer of equipment being currently utilized transferred from outside the project boundary to the project boundary. All the biogas units were constructed at site. Thus leakage from equipment transfer need not be monitored.

Leakage relating to non-renewable biomass B_y will be addressed by multiplying net to gross adjustment factor of 0.95 to account for leakages, in which case surveys will not required as per the methodology AMS-I.E, Para 10.

According to the methodology, the baseline emission reductions and leakage emissions was calculated step-wise as described in section B.4.

B.6.2. Data and parameters fixed ex ante

Data / Parameter	**B_y**
Unit	Tonnes/year
Description	Quantity of woody biomass that is substituted or displaced in tonnes
Source of data	Field survey
Value(s) applied	3.0733 tonnes/year/family and 16,903 tonnes/year for 5500 families
Choice of data or Measurement methods and procedures	Based on a third party study conducted by Ramachandra, 2005.
Purpose of data	According to the "Guidelines for completing the project design document form for small scale CDM project activities ", Version 01.0, Annex 9, EB 66, the purpose of data needs to be in terms of calculation of baseline emissions, project emissions or leakage. But according to the methodology, the data is directly used to estimate emission reductions for the project activity.
Additional comment	This parameter is fixed for the entire crediting period

Data / Parameter	$f_{NRB, y}$
Unit	-
Description	Fraction of woody biomass used in the absence of the project activity in year y that can be established as non-renewable biomass
Source of data	Assessment of Non Renewable Biomass based on data provided by Forest Survey of India, 2011, Ministry of Environment and Forests, Govt of India.
Value(s) applied	0.95
Choice of data or Measurement methods and procedures	Based on data from State of Forest Report, 2011. Forest Survey of India, Ministry of Environment and Forests, Government of India. The data gives the consumption of fuel wood and production of fuel wood from forests and from trees outside forests. This data is assessed at the state level. Thus the f_{NRB} for Karnataka is applied for the project activity.
Purpose of data	According to the "Guidelines for completing the project design document form for small scale CDM project activities ", Version 01.0, Annex 9, EB 66, the purpose of data needs to be in terms of calculation of baseline emissions, project emissions or leakage. But according to the methodology, the data is directly used to estimate emission reductions for the project activity.
Additional comment	This parameter is fixed for the entire crediting period

Data / Parameter	$NCV_{biomass}$
Unit	TJ/tonne
Description	Net Calorific Value of Biomass
Source of data	AMS-I.E., Version 5 methodology
Value(s) applied	0.015
Choice of data or Measurement methods and procedures	-
Purpose of data	According to the "Guidelines for completing the project design document form for small scale CDM project activities ", Version 01.0, Annex 9, EB 66, the purpose of data needs to be in terms of calculation of baseline emissions, project emissions or leakage. But according to the methodology, the data is directly used to estimate emission reductions for the project activity.
Additional comment	This parameter is fixed for the entire crediting period

Data / Parameter	$EF_{projected\_fossilfuel}$
Unit	tCO_2/TJ
Description	Emission Factor for fossil fuel. Emission factor for substitution of non-renewable woody biomass by similar consumers.
Source of data	AMS-I.E., Version 5 methodology
Value(s) applied	81.6
Choice of data or Measurement methods and procedures	Based on the methodology, this value represents the emission factor of the substitution fuels likely to be used by similar users on a weighted average basis. It is assumed that the mix of present and future fuels would consist of a solid, liquid and gaseous fossil fuel.
Purpose of data	According to the "Guidelines for completing the project design document form for small scale CDM project activities ", Version 01.0, Annex 9, EB 66, the purpose of data needs to be in terms of calculation of baseline emissions, project emissions or leakage. But according to the methodology, the data is directly used to estimate emission reductions for the project activity.
Additional comment	This parameter is fixed for the entire crediting period

Data / Parameter	**Diversion of non-renewable biomass saved under the project activity by non-project households**
Unit	tonnes / year
Description	Diversion of non-renewable biomass saved under the project activity by non-project households
Source of data	Based on the methodology B_y will be multiplied by a net to gross adjustment factor of 0.95 to account for leakages.
Value(s) applied	Biomass (t) – 3.0733 x 0.95 = 2.9196 t/yr. The biomass diversion is 3.0733 – 2.92 = 0.15 t/family/yr or 845 t/yr for 5,500 families.
Choice of data or Measurement methods and procedures	According to I.E, Version 5, B_y can be multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required. 3.0733 x 0.95 = 2.92 t/Household/yr. Thus the diversion is 3.0733 – 2.92 = 0.15 t/family/yr or 845 t/yr for 5500 families. In terms of leakage of emissions, 3.57 – 0.18 = 3.39 tCO_2/family/yr and 0.18 x 5,500 = 990 tCO_2/year.
Purpose of data	Calculation of leakage
Additional comment	This parameter is fixed for the entire crediting period. Surveys will not be conducted to determine leakage

B.6.3. Ex ante calculation of emission reductions

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The ex-ante calculations of emission reductions are from emission reductions calculations from I.E. Switch from non-renewable biomass from thermal applications by the user.

Emission Reductions (tCO_2) = Baseline Emissions – Project Activity Emission – Leakage

According to the methodology, there are no project emissions. According to the methodology, Para 4, the specific equations for calculations of Baseline emissions and Project emissions is not provided, but only for Emissions Reductions as follows:

$$ER_y = B_y * f_{NRB,y} * NCV_{biomass} * EF_{projected\_fossilfuel}$$

Baseline Emissions

The parameters and values for baseline emissions are explained in Section B.4.

Emissions from the use of fossil fuels for meeting similar thermal energy needs		
Activity Data	**Value**	**ID Ref**
Quantity of Biomass that is substituted (t/yr) per family	3.0733	B_y
Fraction of NRB	0.95	$f_{NRB, y}$
NCV Biomass (TJ/t)	0.015	$NCV_{biomass}$
Emission factor (tCO_2/TJ)	81.6	$EF_{projected\_fossilfuel}$
Emission Reductions (tCO_2/yr/family)	**3.57**	$\boldsymbol{ER_y}$
Emission Reductions (tCO_2 for 5,500 families)	**19,635**	

Leakage

According to Para 10 and 11 of the methodology:

Leakage related to the non-renewable woody biomass saved by the project activity shall be assessed based on ex post surveys of users and the areas from which this woody biomass is sourced (using 90/30 precision for a selection of samples). The following potential source of leakage shall be considered:

(b) *The use/diversion of non-renewable woody biomass saved under the project activity by non-project households/users that previously used renewable energy sources. If this leakage assessment quantifies an increase in the use of non-renewable woody biomass used by the non-project households/users that is attributable to the project activity then* B_y *is adjusted to account for the quantified leakage. Alternatively,* B_y *is multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required.*

If the equipment currently being utilised is transferred from outside the boundary to the project boundary, leakage is to be considered.

There will not be any transfer of equipment being currently utilized transferred from outside the project boundary to the project boundary. All the biogas units will be constructed at site. Thus leakage from equipment transfer need not be monitored.

B_y will be multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys will not required.

Thus B_y is considered as 3.0733x 0.95 = 2.92 t/family/yr taking into account leakage factor. Thus survey will not be conducted to account for leakage.

According to the methodology, Version 5, after considering leakage, the emission reduction calculations are as follows:

Activity Data	**Value**
B_y (t/family/yr)	3.0733
B_y adjusted for leakage (B_y x 0.95) (t/family/yr)	2.92
f_{NRBy}	0.95
$NCV_{biomass}$ (TJ/tonne)	0.015
$EF_{projected\ fossilfuel}$ (tCO_2/TJ)	81.6
ER generated/year/household	**3.39**

Emission Reductions (tCO_2 for 5,500 families)	18,645

Thus, emission reduction calculations from I.E. Switch from Non-Renewable Biomass for Thermal Applications by the User is 3.39 tCO_2/year/family or 18,645 tCO_2/year for 5,500 households.

The biogas plants will be monitored continuously for non-usage. The emission reduction will be calculated only for usage days of all the constructed and operational units. The emission reduction ex-post will be as follows:

$$ERy = \sum_{n=1}^{5500} \left(\frac{B_{y(adjustedfor\ leakage)}}{365} * N_{days}\right) * f_{NRB,y} * NCV_{biomass} * EF_{projected\_fossilfuel}$$

Where:
N_{days} = operational days of installed biogas units for the monitoring period
n = biogas units installed

B.6.4. Summary of ex ante estimates of emission reductions

Year	Baseline emissions (tCO_2 e)	Project emissions (tCO_2 e)	Leakage (tCO_2 e)	Emission reductions (tCO_2 e)
2013-14	0	19,635	990	18,645
2014-15	0	19,635	990	18,645
2015-16	0	19,635	990	18,645
2016-17	0	19,635	990	18,645
2017-18	0	19,635	990	18,645
2018-19	0	19,635	990	18,645
2019-20	0	19,635	990	18,645
Total	**0**	**1,37,445**	**6,930**	**1,30,515**
Total number of crediting years				7
Annual average over the crediting period	**0**	**19,635**	**990**	**18,645**

B.7. Monitoring plan

B.7.1. Data and parameters to be monitored

Data / Parameter	Number of installed 2 m^3 systems
Unit	Units
Description	Number of biogas units installed under the project activity
Source of data	Monitored on a daily basis and entered into the monitoring database. The units have been constructed during the first crediting period.
Value(s) applied	5,500

Measurement methods and procedures	The construction processes were monitored on a day to day basis and database maintained from its initiation to completion dates for each of the biogas unit. Thus the start date of each of the unit installed in fixed for each of the unit. In case of replacement of any unit due to demolition will be recorded and the loss days accounted for. This could be for the same user or new users, in which case the baseline is the users were using fuel wood. A new end user agreement will signed with them and recorded.
Monitoring frequency	All the units have been installed for the project activity during the first crediting period.
QA/QC procedures	All activity processes, including financial transactions for construction of biogas units, are digitally monitored using the online intranet solution that is integrated into ADATS's intranet based monitoring system InfoNeeds. This provides verification for the construction of biogas units. All data will be archived and stored throughout the crediting period and an additional 2 years.
Purpose of data	The data will be used to estimate the emission reduction for the project activity.
Additional comment	ERs are calculated for only the installed and operational biogas units.

Data / Parameter	**Number of biogas plants operating**
Unit	Number
Description	Number of plants operating in year
Source of data	Log books maintained and entered in the digitized monitoring database for biogas units operating
Value(s) applied	5,500
Measurement methods and procedures	In every village, the women Volunteer will monitor the biogas units that are non-operational. The days other than that non-operational will determine the biogas units which are operational.
Monitoring frequency	The data of non-operational units are done on a regular basis as and when a unit is dysfunctional. As and when biogas units are not operational, it is recorded. The remaining days are considered operational.
QA/QC procedures	Log books and digitized database will be checked regularly by project staff and CDM coordinator.
Purpose of data	According to the "Guidelines for completing the project design document form for small scale CDM project activities ", Version 01.0, Annex 9, EB 66, the purpose of data needs to be in terms of calculation of baseline emissions, project emissions or leakage. But according to the methodology, the data is directly used to estimate emission reductions for the project activity. All data will be archived and stored throughout the crediting period and an additional 2 years.
Additional comment	Though the methodology requires monitoring this parameter biennially, it will be done on a day to day basis. This is to ensure regular energy supply to the rural households through continuous monitoring and immediate repairs to decrease downtime.

Data / Parameter	Confirmation that non-renewable biomass has been substituted
Unit	-
Description	Confirmation that non-renewable biomass has been substituted
Source of data	Sample survey
Value(s) applied	95% of 3.0733 t/family/year i.e. 2.92 t/family/year is substituted
Measurement methods and procedures	A household level sample survey will be conducted to confirm that non-renewable biomass has been substituted.
Monitoring frequency	Annual Stratified Sample Survey
QA/QC procedures	This survey will be done annually for a statistically determined number of households at 90/10 precision confidence level. All data will be archived and stored throughout the crediting period and an additional 2 years.
Purpose of data	Not used for Emission Reduction calculations Confirmation of replacement of non-renewable biomass
Additional comment	-

Data / Parameter	Non-usage days of installed and operational biogas plants
Unit	Days
Description	Usage of non-renewable biomass in case of non-performance of biogas units
Source of data	The days not used from the daily monitoring report for each of the unit done at the village level and data maintained on the digitized monitoring database.
Value(s) applied	Dependent on the number of days the biogas units are under repair
Measurement methods and procedures	As and when the biogas units are not functional, the beneficiaries will report to the village level women volunteer, who in turn will report to the Case Worker of the project for the repair of the unit. A log book will be maintained for the reason of non-function and days under repair. The data will be entered into the monitoring solution for each of the unit. For the monitoring period, the N_{days} (operational days of installed biogas units) will be calculated by subtracting the non usage days. The emission reduction will be estimated only for operational days.
Monitoring frequency	It will be monitored on a day to day basis by the Balakendra/Village Health Workers, which is entered into the monitoring solution for all the biogas units.
QA/QC procedures	CERs will be reduced for the non-functional days of the units. All data will be archived and stored throughout the crediting period and an additional 2 years.
Purpose of data	To calculate emission reductions for only the operational days for each biogas unit. According to the "Guidelines for completing the project design document form for small scale CDM project activities ", Version 01.0, Annex 9, EB 66, the purpose of data needs to be in terms of calculation of baseline emissions, project emissions or leakage. But according to the methodology, the data is directly used to estimate emission reductions for the project activity.
Additional comment	The objective to monitor the non-functional days is to ensure prompt operation and maintenance of the units so that the rural communities can continuous use biogas and are rid of drudgery they are facing using traditional biomass cook stove.

B.7.2. Sampling plan

>>

The monitoring details for the project activity are given in the monitoring section. The sampling plan to monitor the parameters is described here based on Annex 5, EB 70, "Guidelines for sampling and surveys for CDM project activities and programme of activities", which details information relating to: (a) sampling design; (b) data that will be collected; and (c) implementation plan.

The various parameters that need to be monitored as described in section B.7 are:

(i) Biogas units constructed
(ii) Number of biogas plants operating
(iii) Non-usage days of biogas plants
(iv) Confirmation that non-renewable biomass has been substituted

The parametes (i), (ii) and (iii) will be monitored for all the biogas plants constructed and in operation. Parameters (iv) will be monitored based on sample survey.

(a) Sampling Design

(i) Objectives and Reliability Requirements: The objective of the sampling effort is to determine or confirm that non-renewable biomass has been substituted with 90/10 confidence/precision during the crediting period

The survey will be conducted yearly once through stratified random sample survey. The population is homogeneous in terms of cooking patterns and socio-economic strata. The biogas units implemented in the region is also of single type – 2 cum deenabhandu model. But to capture the data from all the taluks in which the project has been implemented, stratified random sample survey will be conducted. Here each of the taluks, Bagepalli, Chintamani, Chickballapur, Gudibanda and Sidlaghatta are the strata.

(ii) Target Population: The target population is the rural households for which biogas will be constructed and operational in the 5 taluks of Chickballapur District, Karnataka, India.

(iii) Sampling Method: The sampling method chosen for the project area will be stratified random sampling, wherein each of the 5 taluks are a strata.

(iv) Sample Size: The sample size will be determined use the equation

$$n \geq \frac{1.645^2 NV}{(N-1)\times 0.1^2 + 1.645^2 V}$$

Where:

$$V = \frac{p(1-p)}{p^2}$$

n	Sample size
N	Total number of households (5,500)
p	Our expected proportion (0.75)
1.645	Represents the 90% confidence required
0.1	Represents the 10% relative precision

Substituting the values for the project activity,

$$V = \frac{0.75\times(1-0.75)}{0.75^2} = 0.33$$

$$n \geq \frac{1.645^2 \times 5500 \times 0.33}{(5500-1) \times 0.1^2 + 1.645^2 \times 0.33} = 87.8 \approx 88$$

Therefore the required sample size is at least 88 households. This is assuming that 75% of the biogas units would be operating. This assumption is conservative as the monitoring system will be robust to ensure that all the systems are immediately repaired and operational. Assuming a response rate of only 80%, the number of households will be scaled up to 89/0.8 = 110 households. The sample will be drawn at random from the sampling frame. This will be done using random number tables or using the random number generator of appropriate software. The number of households sampled will be apportioned accordingly to the 5 taluks of Chickballapur District. Based EB 74, "Guidelines for sampling and surveys for CDM project activities and programme of activities" the larger of the two proportions in the sample size calculation, that is p or (1-p) will be used for the monitoring periods during the crediting period. So the check on meeting the reliability requirement too should be based on the larger of the two proportions. A precision of 10 per cent i.e. ±10% is taken as a relative unit when the parameter of interest is a proportion.

(***v) Sampling Frame:*** The sampling frame to be used is the complete listing of all the rural households for which biogas has been built under the project activity in the 5 taluks, Chickballapur District, Karnataka State. Each of the household will have a unique identify number with all the required details of the family.

(b) Data:

(i) Field Measurements: The variable to be recorded/measured on field is Confirmation that non-renewable biomass has been substituted

A household level questionnaire will be designed to collect information for the parameter of interest. The frequency of measurement will be once a year during the monitoring period.

(ii) Quality Assurance/Quality Control: The QA/QC procedure will be to achieve good quality data through field measurements. The household level questionnaire will be designed and field tested before administering the actual questionnaire survey. Oversampling will be done to replace non-respondents, if any. The data collected will be entered, checked and verified further for any typographic mistakes.

(iii) Analysis: The data entry will be done in Microsoft excel sheet. The data will be cross checked with the filled in questionnaire as QA/QC procedure. The data will be analyzed for the parameter.

(c) Implementation:

(i) Implementation Plan: The implementation of sampling effort will be done by the NGO in consultation with CDM Team of Fair Climate Network (FCN). The FCN has the skill and resources to implement the sampling procedure. The team is experienced with rural energy CDM projects implemented for the rural poor for more than 5 years. The collected data will be analysed by the FCN for inclusion in the monitoring report.

B.7.3. Other elements of monitoring plan

>>

Management

ADATS is in charge of the Programme overall. ADATS is in charge of construction, service and maintenance, and data collection for preparation of monitoring reports. ADATS will provide support in the villages through the Bagepalli Coolie Sangha Units and coordinate for training users.

Suitable project data collection methods:

ADATS is the project implementing agency and manufacturers of the biogas plants. They bring 300 masons and supervisors to the consortium activities, who will be responsible for plant supervision, maintenance, and monitoring.

Users are also part of the local management of this project. By being given user education which imparts a sense of pride and responsibility in the users, they will understand the need for perfect plant operation on a daily basis.

The users will be firmly told that they must keep their plants 100% operational, and make use of the provisions under the service and maintenance contract for any support.

ADATS maintains a list of all the users who have installed plants under this project activity on their InfoNeeds Database. In this database every household with a biogas plant has a unique identifier and updated information taken from the individual plant logbooks concerning parameters listed below. The number of installed and operating systems is updated monthly at the ADATS office. The differentiation between installed and operating systems is made to control the over-all performance of the project activity. ADATS will have trained the family members of the households as above. In addition, ADATS will run internal training programmes for supervisors and masons to ensure that both the service and maintenance procedures, and the collection of monitoring data described below is understood by all, and is reliable and transparent. There will be a supervisor for every 50 plants or so, or at least for every village. This system is already in place and is simple and cost effective. The reports on the problems of the biogas plants are passed on by the local supervisor to the office team and other masons at the ADATS office in case the local supervisor cannot rectify the fault within 24 hours on his own. The service contract obliges the office to respond to complaints within 24 hours and rectify any problems within 1 week. ADATS provides normative operation and maintenance procedures which must be adopted by families after installation. ADATS will ensure that the service contract provisions are used by the users – thus ensuring that all the biogas plants installed under this project activity are guaranteed to be operational.

All information is recorded on paper and electronically. Once a year all reported information will be compiled for the detailed annual monitoring report, which will be sent to the DOE verification team.

Data: The data to be collected in addition to the project specific standards data referred to above, consist of the monitoring data listed Number of installed 2 m^3 systems, Number of operating 2 m^3 systems, non-usage days. ADATS has a system in place which builds on the current practice already in place and supplements and strengthens it as required.

Number of installed systems: Survey sheet “Installed systems” will list name of householder, date of installation and supervisor responsible for plant service and maintenance.

Number of operating systems: Survey sheet “operating systems” will list name of householder, date of installation, dates of supervisor visit and maintenance activities if any. It will cross reference to the plant log book being maintained for each plant by the supervisor in charge. Non usage days will be recorded to estimate ERs only for days the systems were operational.

Project performance review:

This will be carried out on a monthly basis on the basis of the review of the performance standard tests and the monthly aggregated logbooks from all the plants.

Techniques for data interpretation for monitoring and verifying GHG emission reductions with specific focus on technical/efficiency/performance parameters:

ADATS will maintain the Bagepalli CDM Biogas Programme project activity in such a way as to eliminate variance in terms of GHG reductions between plants. The aim is to establish accurate average values for a) non-renewable biomass fuel combustion in the baseline case and b)

eliminate all together non-renewable biomass consumption in the project case. This will be done by ensuring correct assessment of needs and management practices prior to installation of plant.

Review, scrutiny and benchmarking against established norms for monitoring and verification – internal audit for GHG compliance:

This refers mainly to service and maintenance norms: it will be ADATS's task to ensure that every plant owner is fully aware of their rights and obligations under this project activity in terms of ensuring 100% functioning of their plant. Intensive user education is the first step, followed by education and training of supervisors, and rigorous checking of follow-up action at the ADATS office to ensure immediate rectification of faults. A system of rewards for efficiency will be introduced, and owners, supervisors, and office staff will be given incentives to meet the 100% success target. Random checking of operating plants will be a key internal quality assurance measure to ensuring the veracity of the monitoring data, and to ensure that there are no surprises during verification. The CERs will be computed from this value.

All monitoring and control functions will be thus be done as per the internal standards and norms of ADATS. There are no instruments that need calibrating**.**

B.8. Date of completion of application of methodology and standardized baseline and contact information of responsible persons/ entities

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SECTION C. Duration and crediting period

C.1. Duration of project activity

C.1.1. Start date of project activity

>>
18/12/2005

C.1.2. Expected operational lifetime of project activity

>>
25y-0m[18]

C.2. Crediting period of project activity

C.2.1. Type of crediting period

>>
Renewable Crediting period

C.2.2. Start date of crediting period

>>
Start date of first crediting period: 01/09/2006
Start date of second crediting period: 01/09/2013

[18] Dheenabandhu Model 2000 Biogas Units, developed by AFPRO, Action For Food Production, New Delhi

C.2.3. Length of crediting period

>>
First crediting period: 7 years, 0 months - 01/09/2006 to 31/08/2013
Second crediting period: 7 years, 0 months - 01/09/2013 to 31/08/2020

SECTION D. Environmental impacts

D.1. Analysis of environmental impacts

>>
Not Applicable.

SECTION E. Local stakeholder consultation

E.1. Solicitation of comments from local stakeholders

>>
ADATS has 15 000 members in 800 villages in Kolar District who have suffered from acute shortage of biomass fuel for combustion over the years. ADATS and WSD carried out a improved cookstove programme to address the issues in a partial manner. SKGS has built 100 000 plants all over South India to address this problem. Interviews with 1000s of families have been conducted over the years by WSD and ADATS and SKGS, including a fuelwood and kerosene consumption survey of 200 households on a random basis to ascertain the interest level in Kolar District.

The project participants are active members of the local community with in depth knowledge of the cooking problems faced in drought prone villages. The stakeholders were consulted in the following way: Families: All 5500 families in Kolar in this programme area experience at first hand the conditions in their own homes. ADATS has 29 years of interaction with members of the local community in Kolar District and have been dealing with the fuelwood crisis for many years. SKGS have conducted numerous camps to educate the public on the benefits of biogas. WSD have participated actively in CDM in order to bring the problem of non-renewable biomass fuel combustion dependence to the attention of the international community. Numerous women and children have been to hospital with respiratory illnesses such as coughs, bronchial illness and other illnesses and weaknesses due to smoke exposure. Hundreds of papers have been published on this problem in India. The Ministry of Non-Conventional Energy representatives attended the DNA meeting during the host country approval process and praised the project participants for their initiative. The Karnataka State Government representatives welcome the project and attended various meetings at which the project proponents presented the project activity idea and the concept. The Kolar District administration welcomes the project and provided letters of support at the time when the Central Government Letter of Approval was being sought. The Taluk level government machinery has extended all support. The Gram Panchayat Secretaries and elected members in the participating villages have extended all support. Thus all levels of the government are actively welcoming this project and extending as much support as they can.

E.2. Summary of comments received

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The pre-project phase has showed that there is a high interest of the families and that the project is realised as fast as possible. The project participants have been flooded with requests to supply plants. Various NGOs have asked for the project to be run in their areas of operation. Thousands of families have asked for plants to be built in their homes. There is a high level of knowledge of the benefits of these systems, and there is absolutely no hesitation by any of the families participating in the scheme.

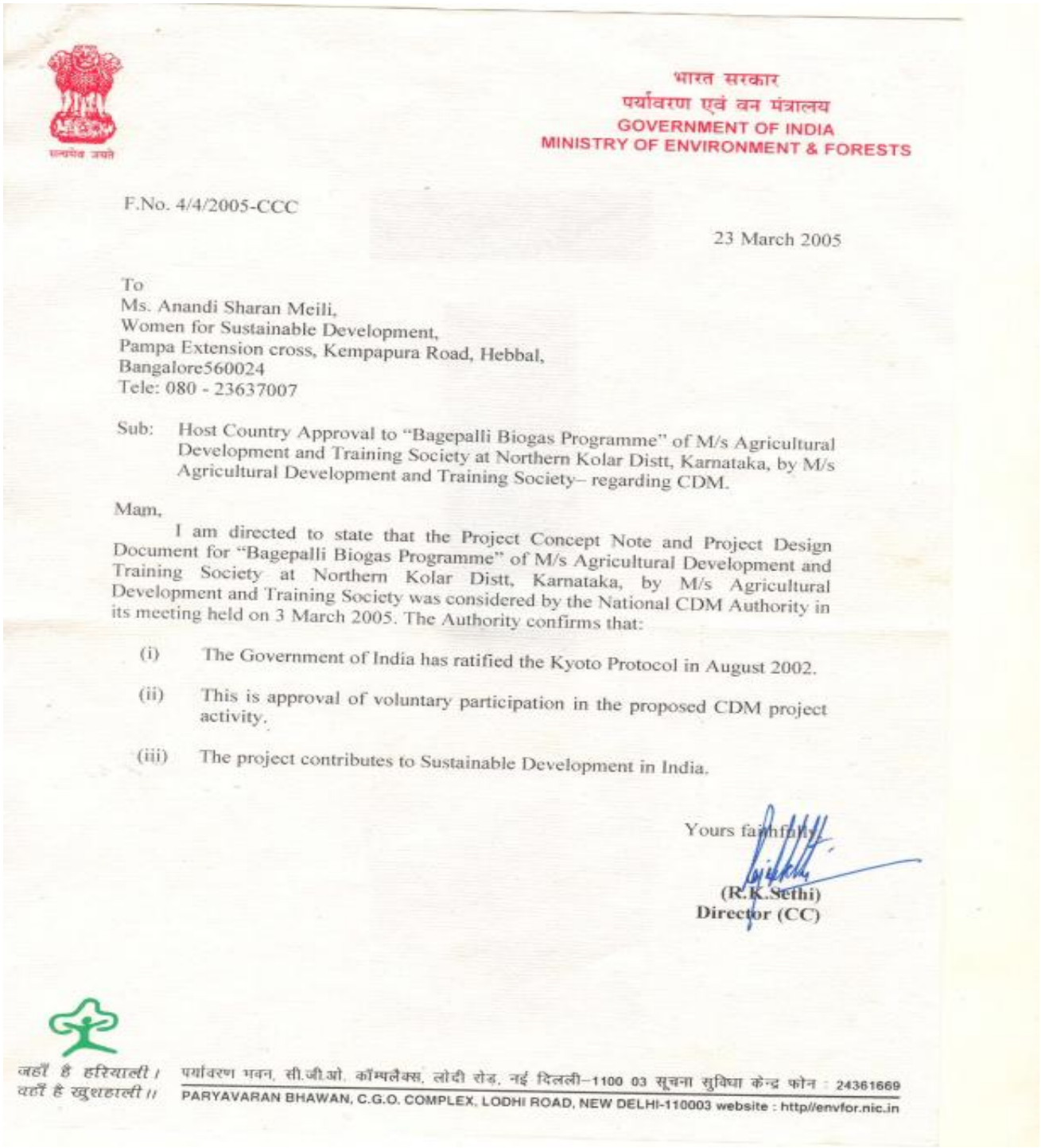
E.3. Report on consideration of comments received

>>

This project activity itself was launched in response to popular demand for clean and efficient cooking facilities. The project participants have been waiting for the methodologies for Small Scale CDM projects to become available and for the Kyoto Protocol, to come into force for many years. There is an urgent need to approve this project so that it can be replicated in many more Districts and States.

SECTION F. Approval and authorization

>>



भारत सरकार
पर्यावरण एवं वन मंत्रालय
GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT & FORESTS

F.No. 4/4/2005-CCC

23 March 2005

To
Ms. Anandi Sharan Meili,
Women for Sustainable Development,
Pampa Extension cross, Kempapura Road, Hebbal,
Bangalore560024
Tele: 080 - 23637007

Sub: Host Country Approval to "Bagepalli Biogas Programme" of M/s Agricultural Development and Training Society at Northern Kolar Distt, Karnataka, by M/s Agricultural Development and Training Society– regarding CDM.

Mam,

I am directed to state that the Project Concept Note and Project Design Document for "Bagepalli Biogas Programme" of M/s Agricultural Development and Training Society at Northern Kolar Distt, Karnataka, by M/s Agricultural Development and Training Society was considered by the National CDM Authority in its meeting held on 3 March 2005. The Authority confirms that:

(i) The Government of India has ratified the Kyoto Protocol in August 2002.

(ii) This is approval of voluntary participation in the proposed CDM project activity.

(iii) The project contributes to Sustainable Development in India.

Yours faithfully,

(R.K.Sethi)
Director (CC)

जहाँ है हरियाली। वहाँ है खुशहाली।।

पर्यावरण भवन, सी.जी.ओ. कॉम्पलेक्स, लोदी रोड, नई दिल्ली–1100 03 सूचना सुविधा केन्द्र फोन : 24361669
PARYAVARAN BHAWAN, C.G.O. COMPLEX, LODHI ROAD, NEW DELHI-110003 website : http//envfor.nic.in

Appendix 1. Contact information of project participants and responsible persons/ entities

Project participant and/or responsible person/ entity	☒ Project participant ☐ Responsible person/ entity for application of the selected methodology (ies) and, where applicable, the selected standardized baselines to the project activity
Organization name	**Agricultural Development and Training Society**
Street/P.O. Box	ADATS Campus
Building	Bagepalli
City	Kolar District
State/Region	Karnataka
Postcode	561207
Country	INDIA
Telephone	+91 8150282175
Fax	+91 8150282376
E-mail	ram@adats.com
Website	www.adats.com
Contact person	
Title	Project Director
Salutation	Mr
Last name	Esteves
Middle name	-
First name	Ram
Department	-
Mobile	+91 9448524696
Direct fax	+91 8150282376
Direct tel.	+91 8150282175
Personal e-mail	adats@vsnl.com

Appendix 2. Affirmation regarding public funding

There is no public funding for the project activity.

Appendix 3. Applicability of methodology and standardized baseline

The applicability of selected methodology is described in section B.2

Appendix 4. Further background information on ex ante calculation of emission reductions

The ex-ante calculations are described in section B.6.3.

Appendix 5. Further background information on monitoring plan

The project is being monitored continuously for various processes.

Monitoring during pre-commission and commission of biogas units: The construction of biogas plants was done in a phased manner. The various processes involved in the implementation of the technology as shown below were monitored for all the units which were commissioned during the first crediting period.

1. Selection of participating families
2. Defining Masons
3. Defining Material Suppliers
4. Monitoring Construction Progress
    - Marking
    - Excavation
    - Supplying crushed stone Jelly
    - Supplying Sand
    - Supplying Bricks
    - Supplying Cement
    - Supplying Hardware
    - Concreting
    - Brick work
    - Plastering
    - Filling Gobar (Dung)
    - Supplying Stove
    - Fixing Pipe & Stove
    - Fixing Safety Grill
5. Commissioning
6. Generating End User Agreements

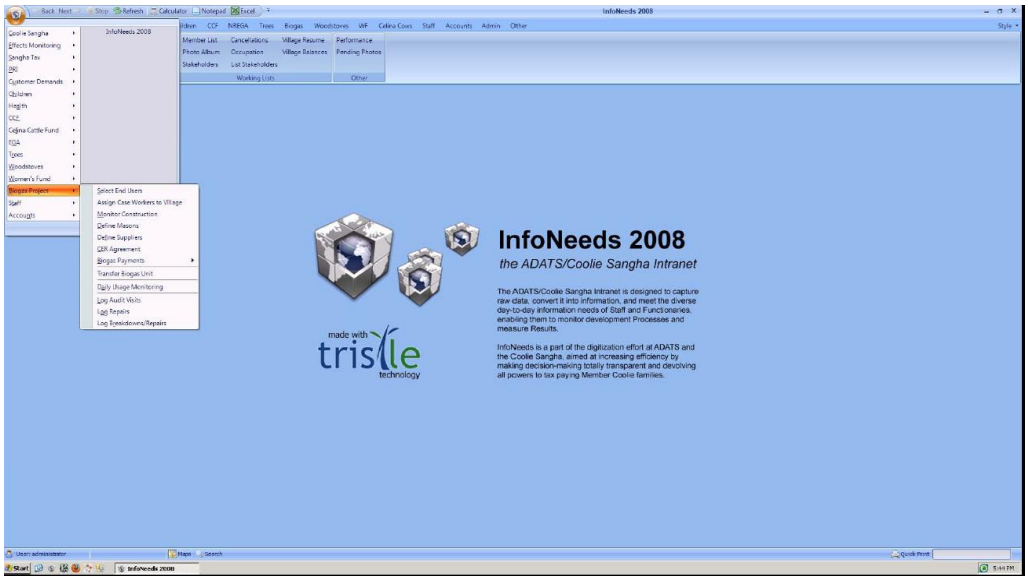
These processes were monitored on a day to day basis and database maintained from its initiation to completion dates for each of the biogas unit. Quality Control Supervisors comprising of the Audit team and the case worker of ADATS, the key persons to conduct the overall supervision of installed plants, checked the quality of installed biogas plants to ensure that the required materials were used for the construction of biogas units. All payments for construction of biogas units were made by cheque and suppliers were identified with personal data and digital photographs fed into the computerized databank for verification.

Statutory reports, including Trial Balance, Receipts & Payments statement, Income & Expenditure statement and Balance Sheet, are generated for the project activity. The books of accounts are audited by a certified Chartered Accountant. This financial accounting system gives proof of the construction of these biogas plants under the CDM project activity. Each of the biogas unit has been marked as "ADATS-VELCAN" and the date of construction on the doom, which makes it distinct. The Unit ID numbers are also marked on the biogas units. These evidences validate the construction and commission of the biogas plants built in the project area.

The list of biogas users are identified by a User ID, the name of the beneficiary, the CSU membership number, the village and taluk, and other details such as family strength, land holding, caste, etc. Other information includes the start date of construction and the date of commissioning.

All activity processes, including financial transactions for construction of biogas units, were digitally monitored using an online intranet solution that is integrated into ADATS's intranet based monitoring system InfoNeeds that tracks various Coolie Sangha activities. Reports can be generated at all levels i.e. Project, Taluk, Area, Cluster, Village and individual Family level. The database is updated on a daily basis, as and when Field Staff return from their respective villages.

The information on the daily operating units is gathered by the village health worker or Balakendra teacher from its users on a day to day basis or during the weekly Mahila meetings[19] held in every village. The information is updated to the individual biogas user's monitoring database maintained by ADATS by the case worker on monthly basis. All activity processes, including financial transactions for construction of biogas units, are digitally monitored using an online intranet solution that is integrated into intranet based monitoring system InfoNeeds that tracks various tasks that is under this project.



Monitoring of Non-Usage Days: After commission of biogas plants, the staffs also log-in the repairs required and the dates from when the units were not operational. The day the unit is attended of the problem, the person attending to it and date is logged-in. These in between days

[19] These Mahila meetings have been held regularly since many years to discuss all issues of coolie sangha

are the non-operational days for the units. The information on biogas non-usage days are recorded either by the Balakendra or Village Health worker from its users on a day to day basis or during the weekly Mahila meetings[20] held in every village. The information is updated to the individual biogas user's data base InfoNeeds by the case worker on regular basis. The end users also communicate through mobile phones to the Balakendra or Village Health workers. Thus there is a continuous database maintained of all the biogas units.

Appendix 6. Summary of post registration changes

Post Registration Changes - 1

During the first crediting period, there were post registration changes with regard to Monitoring Plan. The monitoring plan was revised by which it was not necessary to conduct annual surveys for energy output from biogas and to determine the average dung input into biogas. Surveying these parameters involved high transaction costs and, these calculations are not used in emission reduction calculations. These surveys were conducted for 3 consecutive years of the monitoring period and surveys showed enough dung availability and energy generation to replace non-renewable biomass used in the baseline. Also, further, if there is non-availability of dung, biogas is not used, these days will be recorded and emission reductions reduced for those days.

According to the methodology applied for the second crediting period, i.e. AMS I.E. Version 5, these parameters are anyway not required to be monitored.

Post Registration Changes – II dated

This post registration changes (PRC) is done during the second crediting period. The nature of the PRC is correction in the PDD.

There is a typographic correction to the registered PDD. In the section B.7.1., and for the monitoring parameter, "Confirmation that non-renewable biomass has been substituted", the statistically determined number of households is mentioned at 90/30 confidence/precision level, while according to the methodology and the calculations in section B.7.2. "Sampling plan" is correctly done at 90/10 confidence/precision level.

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Document information

Version	*Date*	*Description*
08.0	22 July 2016	EB 90, Annex 2 Revision to include provisions related to automatically additional project activities.
07.0	15 April 2016	Revision to ensure consistency with the "Standard: Applicability of sectoral scopes" (CDM-EB88-A04-STAN) (version 01.0).

[20] These Mahila meetings have been held regularly since many years to discuss all issues of coolie sangha

Version	*Date*	*Description*
06.0	9 March 2015	Revisions to: • Include provisions related to statement on erroneous inclusion of a CPA; • Include provisions related to delayed submission of a monitoring plan; • Provisions related to local stakeholder consultation; • Provisions related to the Host Party; • Editorial improvement.
05.0	25 June 2014	Revisions to: • Include the Attachment: Instructions for filling out the project design document form for small-scale CDM project activities (these instructions supersede the "Guidelines for completing the project design document form for small-scale CDM project activities" (Version 01.1)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for the application of the methodology (ies) to the project activity in B.7.4 and **Error! Reference source not found.**; • Change the reference number from *F-CDM-SSC-PDD* to *CDM-SSC-PDD-FORM*; • Editorial improvement.
04.1	11 April 2012	Editorial revision to change history box by adding EB meeting and annex numbers in the Date column.
04.0	13 March 2012	EB 66, Annex 9 Revision required to ensure consistency with the “Guidelines for completing the project design document form for small-scale CDM project activities”
03.0	15 December 2006	EB 28, Annex 34 • 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.
02.0	08 July 2005	EB 20, Annex 14 • 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>.
01.0	21 January 2003	EB 07, Annex 05 Initial adoption.

Decision Class: Regulatory
Document Type: Form
Business Function: Registration
Keywords: project design document, SSC project activities