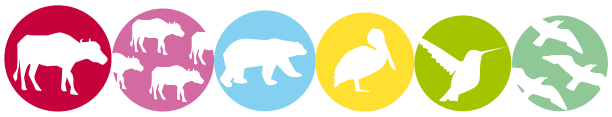
ANNEX R – PASSPORT TEMPLATE

CONTENTS



SECTION A. Project Title

Social Education and Development Society (SEDS) Biogas CDM project for the rural poor
Version: 9
Date: 08/08/2018

SECTION B. Project description

The project was registered as a GS CDM project under the Type I, Renewable energy projects, Category, AMS, I.E, Version 1, on 09/Sept/2010 and under GS Version 2.1 with a crediting period 01 Jan 2011 to 31st Dec 2017 (Renewable). The GS Project GS849 was registrated with the Gold Standard for the first crediting period on 15 Feb 2012. The details of the project is as follows:

UNFCCC Project Number: 3541
GS Project Number: GS849
UNFCCC Registration date: 09th Sept 2010
GS Registration Date: 15 Feb 2012
Crediting Type: Renewable
First Crediting Period: 01 Jan 11 - 31 Dec 17 (Renewable)
GS Labelling of CERs so far:
1st Monitoring Report from 1st Jan 2011 to 31st Dec 2012 – 6043 CERs;
2nd Monitoring Report from 1st Jan 2013 to 30th April 2014 – 9932 CERs;
3rd Monitoring Report from 1st May 2014 to 31st October 2015 – 17,443 CERs

The latest approved version of the baseline and monitoring methodology as follows has been applied:
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 07.

This revised Passport is for the first renewal of crediting period from 1st January 2018 to 31st December 2024, which is coinciding with the second crediting period of the CDM project activity.

Based on the Gold Standard Procedures for the renewal of crediting period Annex Z,

- Stakeholder Consultation: A stakeholder consultation was conducted on 9th May 2017. The details of the meeting is described in section E.2.

- Sustainable Development Assessment: The Sustainable Development Assessment

was conducted with respect to the validity of the updated baseline.

- Sustainable Development Monitoring Plan: The SD monitoring plan has been revisited to see if any changes need to be made based on local stakeholders comments

M/s Social Education and Development Society (SEDS) is a grass-root Non-Governmental Organization (NGO) working for the past 35 years in Anantapur District which is in South Western part of Andhra Pradesh, Southern India. The district is a drought-prone area. The main focus of SEDS is to help the poorest of the poor through integrated rural development activities with an emphasis on women's empowerment, watershed programmes, reforestation and natural resource management. SEDS is currently working in 287 villages, supporting 40,000 women and their families in 5 Mandal Mahila Samakhya. Through its sustained efforts, SEDS has made a significant impact on the lives of the people in the area and the local environment with a motive to make a greener tomorrow.

The purpose of this Biogas CDM Project activity is to set up 5,000 biogas plants (digesters) of 2 m^3 capacity each for single households in 5 Mandals of Anantapur District. Each household will install a 2 m^3 biogas plant and feed cattle dung and other organic waste into the anaerobic digester for the production of biogas for cooking purpose and heating of hot water. The aim of the project is to replace the commonly used inefficient wood fired mud stoves technology, with clean, sustainable and efficient biogas and in this way replace Non-Renewable Biomass with biogas for cooking and hot water heating.

Each biogas unit has a unique ID number which is marked on the biogas digester. The Unit ID number can be triangulated with the online biogas monitoring solution, which gives details of the Family, Village, Mandal and the District. Hence, there will not be double counting of emission reduction from the constructed biogas units.

By utilizing cattle dung in a controlled anaerobic digestion and combustion system, biogas will be available for cooking energy and heating hot water. The biogas will be used on a two-ring gas stove with a flame temperature of 870^{o}C, supplied as part of the project activity. Households having cattle or willing to collect cattle dung will participate in the project. The project would be implemented upon registration of the project as a CDM project activity, as the project will be financed completely from carbon revenues. The project contributes to social, environmental, economic and technological benefits which contribute to sustainable development of the local environment and the country as follows:

Social Benefits:

- Reduces drudgery to women who spend long hours and travel long distances in search of fuel wood.
- Increases women and children's overall health situation by reducing smoke in kitchen, thus eliminating health hazards from indoor air pollution.
- Energy supply security.
- Better management of dung and organic wastes
- Improves education of children as women have more time and resources to nurture their children and send them to school.

Environmental Benefits:

- Improves the local environment by reducing uncontrolled deforestation in the

project area.

- Avoids local environmental pollution through better waste management
- Will lead to soil improvement by providing high quality manure
- Avoided global and local environmental pollution and environmental degradation by switching from non-renewable biomass to renewable energy, leading to reduction of GHG emissions.
- Reduces deforestation, preservation of pasture land, reduced indoor pollution, increased use of manure rather than chemical fertilizers and reduced soil erosion.

Economic Benefits:

- Higher productivity of workers as they have adequate cooking fuel supply
- Will provide employment to local communities through construction and maintenance of biogas units.
- The project will reduce cooking time, thus providing women to take up other activities.

Technological Benefits:

- Better biogas digester models, thus improving biogas yield.
- Training in chemistry of biogas for masons and users leading to improved scientific temper in community and more jobs.

SECTION C. Proof of project eligibility

C.1. Scale of the Project

Please tick where applicable:

Project Type	Large	Small
	☐	☑
	☐	☐
	☐	☐
	☐	☐
	☐	☐

	☐

C.2. Host Country

INDIA

C.3. Project Type

Please tick where applicable:

Project type	Yes	No
Does your project activity classify as a Renewable Energy project?	☑	☐
Does your project activity classify as an End-use Energy Efficiency Improvement project?	☐	☐
Does your project activity classify as waste handling and disposal project?	☑	☐

Please justify the eligibility of your project activity:

The chosen type and category is TYPE I - RENEWABLE ENERGY PROJECTS, AMS I.E. Switch from Non-Renewable Biomass for Thermal Applications by the User, version 07, . 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 dung and converting it into renewable energy by means of a digester in which the substrate undergoes acidification and methanation. This end-user technology involves the switch from non-renewable biomass to a renewable source of energy. Biogas is included in the specified methodology as an example of a suitable end user technology: biogas stoves are deemed a measure that involves the switch to renewable energy sources from non-renewable biomass in the baseline. The AMS I.E, Version 07 is the version of the methodology applicable for the project and this is valid till 28 Jun 2018..

Technology/measure:

Biogas is a mixture of methane and carbon dioxide. It also has traces of hydrogen sulphide, ammonia, oxygen, hydrogen, water vapour etc., depending upon feed materials and other conditions. Biogas is generated by fermentation of cellulose rich organic matter under anaerobic conditions. In anaerobic conditions, the methane-producing bacteria become more active. Thus, the gas produced becomes rich in methane. The optimum utilization depends upon the successful physical installations, which in turn depend upon plant design and its selection. The basic conversion principle is that when a non-ligneous biomass is kept in a closed chamber for a few days, it ferments and produces an inflammable gas. The anaerobic digestion consists of three stages: I Hydrolysis; II Acid formation and III Methane fermentation.

The processes are carried out by two sets of bacteria namely acid forming bacteria and

methane formers. The acidogenic phase I is the combined hydrolysis and acid formation stages in which the organic wastes are converted mainly into acetate, and phase II is the methanogenic phase in which methane and carbon dioxide are formed. The better the three stages merge with each other, the shorter the digestion process.

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 slurry may be re-used in the process. 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. The project activity will organize the 5,000 users to use cattle dung and organic wastes in individual household methane recovery systems of biogas for cooking and water heating. The 5,000 individual plants consist of a mixing chamber where waste water and cow dung are mixed, 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) Scale of project activity: It is a small scale GS CER project activity.

b) Host country or state: The project is in Non-Annex I Country, India.

c) Type of project activity: The project activity falls under Renewable Energy Supply with thermal energy services for cooking and heating water. Biogas provides renewable energy that generates and delivers heat from animal dung which is non-fossil and non-depletable energy sources.

d) Greenhouse gases: The emission reduction is CO_2 and thus eligible under the Gold Standard.

e) Financial Plan: The project activity is not using ODA funding. The project implementation is only through carbon credit forward funding.

f) Previous announcement check: The project was not previously announced to be going ahead without the revenues from carbon credits It is a project that is conceived by the SEDS to implement with GS CER revenues.

g) Other Certification Schemes: The project will not claim any other certificate and thus there is no double counting that would arise from the issuance of Gold Standard carbon credits. The project that is conceived exclusively by SEDS to implement with GS CER revenues.

h) Transfer of Credits: The project was implemented only after successful validation and registration as a GS VER project. During implementation of the project activity, after construction of biogas and satisfactory functioning, an end user agreement was signed with the end user, wherein the beneficiary is aware and willing to give up their rights on emission reductions to PP, who transfers the credits to the carbon investor, which is verified during issuance by the DOE.

Pre Announcement	Yes	No
Was your project previously announced?	☐	☑
Explain your statement on pre announcement		

The project was not previously announced to go ahead without the revenues from carbon credits. The project is in fact going to be implemented only with CER revenue.

The start date of the project activity is 01/07/2010 as the CDM PDD is published in the UNFCCC website for public comments but the start of construction of the first biogas unit is 16/12/2010. after procuring forward funding of carbon revenue..

C.4. Greenhouse gas

Greenhouse Gas	
Carbon dioxide	☑
Methane	☐
Nitrous oxide	☐

C.5. Project Registration Type

Project Registration Type	
Regular	☑

Pre-feasibility assessment	Retroactive projects (T.2.5.1)	Preliminary evaluation (eg: Large Hydro or palm oil-related project) (T.2.5.2)	Rejected by UNFCCC (T2.5.3)
	☐	☐	☐

If Retroactive, please indicate Start Date of Construction dd/mm/yyyy:_____

SECTION D. Unique project identification

D.1. GPS-coordinates of project location

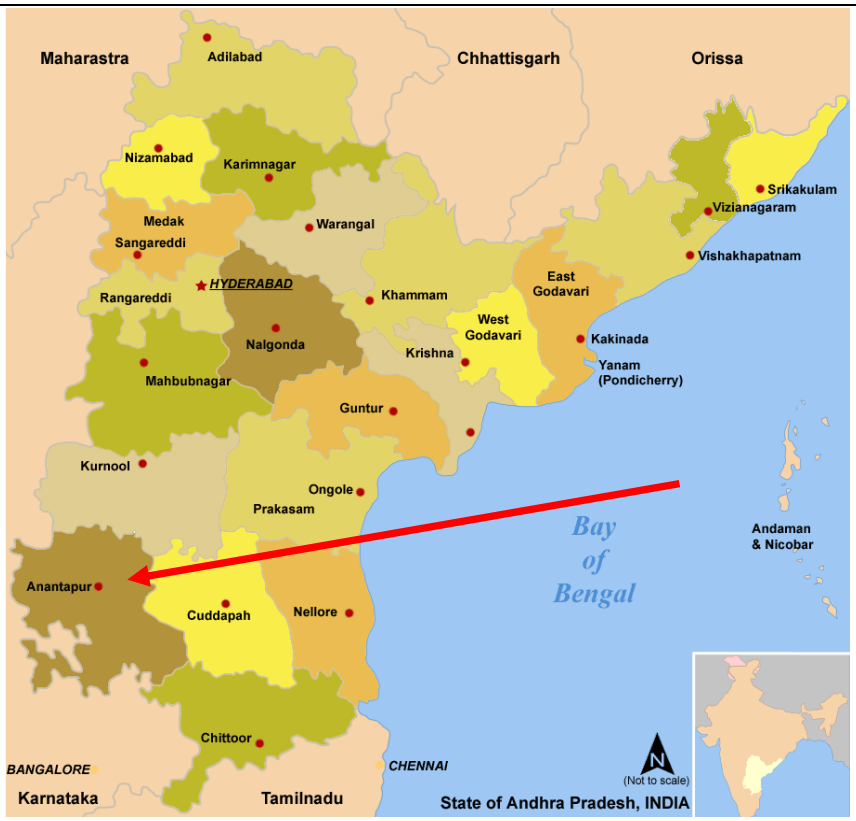
Mandals	Coordinates
Penukonda	14° 05' 00" North, 77° 35' 00" East
Roddam	14° 06' 00" North, 77° 26' 00" East
Somandepalli	14° 00' 44" North, 77° 36' 30" East

Gorantla	13° 59' 21" North, 77° 46' 13" East
Chilamathur	13° 34' 25" North, 80° 00' 12" East

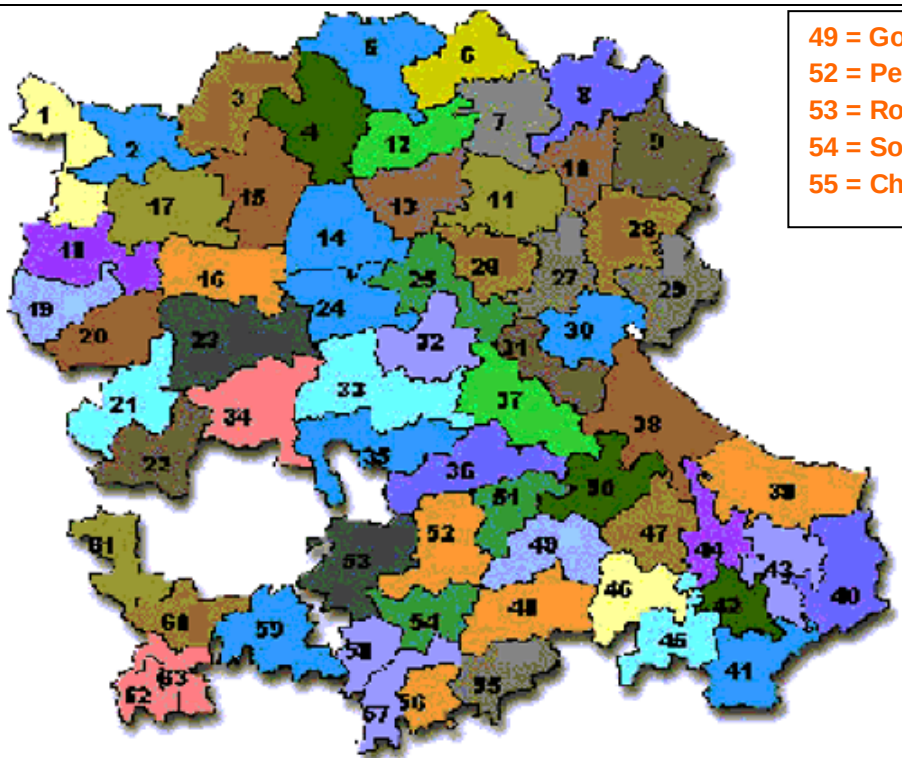
Explain given coordinates

The project has been implemented in 5000 households spread over broader areas, the Mandals. Thus the coordinates are provided for the Mandals in which the project will be implemented. The project activity is located in 5 mandals of Anantapur district covering 287 villages. The above co-ordinates are given as per mandal wise for the project geography.

D.2. Map



Map of Andhra Pradesh with an arrow indicating the location of Anantapur district



Map showing Anantapur district with Mandals in which the project will be implemented.

SECTION E. Outcome stakeholder consultation process

E.1. Assessment of stakeholder comments

Stakeholder comment	Was comment taken into account (Yes/ No)?	Explanation (Why? How?)
I have 3 cattle heads. We would like to implement biogas but, we do not have enough space to build it.	Yes	We will assess the situation and if it is feasible, we will provide you with biogas.
Do we need to clean the digester regularly?	Clarification	Only if there is blockage and there is no flow of biogas, it needs to be cleaned. Otherwise, regular cleaning is not required.
A survey was conducted a year back, but so far, no biogas units have been installed. When will it be installed?	Clarification	This was the survey done to collect the demographic data of family members and conduct a baseline survey. The process of installation of biogas units is not so simple. We need to get the project registered as a UNFCCC project. After the project gets registered, an ERPA is signed after which finance is provided to build the biogas plants.

		Hopefully it will take about 6 months to implement the project.
There are a lot of boulders in our village. Is it possible to construct biogas units in this terrain?	Clarification	If we can make a pit in the form of the Deenabhandu model and give adequate support so that it does not crack, then we can construct the biogas units even amongst boulders.

E.2. Stakeholder Feedback Round

Please describe report how the feedback round was organised, what the outcomes were and how you followed up on the feedback.

- The report was webhosted at https://gs1.apx.com/mymodule/ProjectDoc/EditProjectDoc.asp?id1=849 for a period of 2 months from 5th October 2010 to 5th December 2010.
- Emails were sent to local NGOs and GS-NGO supporters for their comments.
- No comments were received during the feedback round.

A stakeholder meeting was conducted for the renewal of the crediting period to discuss the project implemented so far and their views on the Sustainable development impacts of the project. There was no need to conduct the stakeholder's meeting as the project has been implemented and there are no further changes in the technology or end users. But a face to face physical meeting was conducted with the stakeholders to get their views on the project and what can be done better to provide energy services to the communities. The meeting was conducted on 09/05/2017 at VTC Campus, Penukonda District, Andhra Pradesh State. It was attended by 90 end-users from the 5 Mandals in which the project is implemented.

S.no	Mandal	No. of Members
1	Roddam	37
2	Penukonda	10
3	Somandepalli	15
4	Gorantla	12
5	Chilamathur	16
	Total	**90**

Meeting with the end users during renewal of the crediting period.

The meeting was to get a feedback on the impacts of the project and issues that need to be addressed to make it better. Evaluation Forms were filled in by the beneficiaries as to the positive benefit of the project and what can be done better. Based on the responses by 55 beneficiaries, the responses were as follows:

Question	Responses	No. of stakeholders' responses
What is your Impression about the project? / Do you think needs to be addressed to make the project better?		
	- Meeting was very useful to the biogas beneficiaries	5
	- Information by Sudha from FCN was very useful	3
	- The objective of this Project was explained in detail to the women	6
	- We have learnt a lot on the biogas project, which we did not know earlier	5
	- The project reduces carbon in the environment and reduces health problems of women	14
	- The CDM program is very good	9
	- This is a good opportunity for the rural poor	5
	- The women can cook happily	8
What do you like about the Project?		

- The house surroundings will be clean	4
- No smoke, No Soot on vessels	10
- Women develop socially and economically	6
- Saving environment and women will get CER money	5
- Will reduce tree felling that will result in rainfall	8
- Reduces pollution, time Saving, good health to women and easy to cook	13
- Women empowerment	3
What do you not like about the Project?	
- No comments	23
- Supply of extra Gas pipe and stove items at free of cost	19
- Need VLV's to monitor and small repairs	1
- Waiting for 7 years to get CER money	2
- Need good quality of pipe	1

The women were glad that the meeting was held and the project was discussed for their benefit, which reiterated their role in climate change. The beneficiaries expressed their happiness for implementation of this project in this region. The positive impacts of the project as expressed by the users are better health, reduction in drudgery, clean kitchen and vessels, ease of cooking and women empowerment.

Some of the responses to make the project better is supply of gas pipe, stove items for repair free of cost, replacement of pipe and stove parts.

The registration forms of the stakeholders meeting and the evaluation is provided to the DOE during the Audit Site Visit.

E. 3. Discussion on continuous input / grievance mechanism

Discuss the Continuous input / grievance mechanism expression method and details, as discussed with local stakeholders.

	Method Chosen (include all known details e.g. location of book, phone, number, identity of mediator)	Justification
Continuous Input / Grievance Expression Process Book	Village level monitoring books	All the villages have a book maintained by the Village Level Volunteers and fill in the grievances
Telephone access	Telephone number of village level volunteers/biogas case workers are given to	They are the first contact to the households to address their grievances

	the households	
Internet/email access	sedsngo@gmail.com info@goldstandard.org	Email ID of the NGO Email ID of Gold Standard
Nominated Independent Mediator (optional)	Village level volunteers and biogas case workers are the nominated independent mediators	They are the first contact to the households to address their grievances

SECTION F. Outcome Sustainability assessment

F.1. 'Do no harm' Assessment

Safeguarding principles	Description of relevance to my project	Assessment of my project risks breaching it (low/medium/high)	Mitigation measure
1. The project respects internationally proclaimed human rights including dignity, cultural property and uniqueness of indigenous people. The project is not complicit in Human Right Abuses	The project activity involves construction of 2m^3 domestic biogas units in the proposed project area, who want to replace their traditional inefficient cookstoves. The project beneficiaries who were dependent on traditional cookstoves will now have access to clean renewable cooking biogas Thus the project does not involve issues of human rights including dignity, cultural property and uniqueness of indigenous people. The project is also not complicit in Human Rights abuses.	Low	N/A
2. The project does not involve and is not complicit in involuntary resettlement	The project involves construction of domestic biogas units in each willing household area where biogas units will installed. Therefore this project does not involve and is not complicit in involuntary resettlement.	Low	N/A
3. The project does not involve and is not complicit in the alteration, damage or removal of any critical cultural	The biogas units are fixed dooms built underground. The biogas units improve air quality and living standards of the rural	Low	N/A

heritage	communities. Hence, this project does not involve and is not complicit in the alteration, damage or removal of any critical cultural heritage		
4. The project respects the employees freedom of association and their right to collective bargaining and is not complicit in restrictions of these freedoms and rights	The project activity does not deal with setting up a factory and recruiting employees. The biogas units will be built by local masons in association with the beneficiary family members. The masons are daily wagers. They are being trained and are working voluntarily. When any dome falls to despair due to cracks, the masons will redo the construction. Thus they are not regular employees for the project activity. They are working voluntarily and thus in true spirit of freedom of association and rights. Thus the project activity does not impinge on employees' freedom of association and their rights.	Low	N/A
5. The project does not involve and is not complicit in any form of forced or compulsory labour	The masons worked in the project area voluntarily and were no involved in forced or compulsory labour. Construction was completed during the first crediting period and	Low	N/A

	does not involve any more construction work in the second crediting period.		
6. The project does not employ and is not complicit in any form of child labour	The project will be owned by the communities through day to day involvement who will assist in monitoring the project activity. They will be adults and will be involved in monitoring voluntarily and does not involve and is not complicit in any form of forced or compulsory labour or even child labour. The online monitoring database for the project activity has the database of masons who are involved in construction of biogas units. The online monitoring database has the details of all masons who are in charge of building the biogas units. Each unit built by the masons are identified and entered into the online database for the project activity. SEDS as an NGO promotes education to rural children and is against their policy to forced or compulsory labour work from children.	Low	N/A
7. The project does not involve and is not in complicit in any form of discrimination based on gender,	The project does not involve and is not complicit in any form of discrimination based on gender,	Low	N/A

race, religion, sexual orientation or any other basis	race, religion, sexual orientation or any other basis. All the families in the project area who are willing to replace their traditional cookstove with 2 m^3 domestic biogas unit are part of this project activity.		
8. The project provides workers with a safe and healthy work environment and is not complicit in exposing workers to unsafe or unhealthy work environments	The biogas units are fixed dooms built underground. The use of 2m^3 biogas units with availability of cow dung will help reduce pressure on forest resources by complete elimination of the use of firewood. The project will improve health conditions and save time for the beneficiaries. The use of biogas as clean cooking fuel will provide safe and healthy work environment and is not complicit in exposing workers to unsafe or unhealthy work environments. Training will be provided to users to ensure that the dung is prepared property and fed into the digester. The removal of sand and other dirt that would settle in the bucket after dung preparation will be ensured before feeding into the digester. Any floating matter will also be scooped off the top of the slurry.	Low	N/A

	This will ensure minimal desilting of the biogas unit. Training will also be provided for proper and safe de-silting of the biogas unit.		

9. The project takes a precautionary approach in regard to environmental challenges and is not complicit in practices contrary to the precautionary principle.	The project will take a precautionary approach in regard to environmental challenges and is not complicit in practices contrary to the precautionary principle.	Low	N/A
10. The project does not involve or complicit in significant conversion or degradation of critical natural habitats including those that are (a) legally protected, (b) officially proposed for protection, (c) identified by authoritative sources for their high conservation value or (d) recognised as protected by traditional local communities	The project helps in reducing deforestation and improving biodiversity by reducing the quantity of fuelwood. The project boundary is confined to existing houses. Thus it does not involve and will not be complicit in significant conversion or degradation of critical natural habitats, including those that are (a) legally protected, (b) officially proposed for protection, (c) identified by authoritative sources for their high conservation value, or (d) recognized as protected by traditional local communities.	Low	N/A
11. The project does not involve and is not in complicit in corruption	The project does not involve and is not complicit in corruption. The project will not have any element of corruption as it will be handled by SEDS, the project proponent. All the project financials will be available for the project beneficiaries and legal authorities.	Low	N/A

F.2. Sustainable Development matrix

Indicator	Mitigation measure	Relevance to achieving MDG	Chosen parameter and explanation	Preliminary score
Gold Standard indicators of sustainable development.	If relevant copy mitigation measure from "do no harm" – table, or include mitigation measure used to neutralise a score of '–'	Check www.undp.or/mdg and www.mdgmonitor.org Describe how your indicator is related to local MDG goals	Defined by project developer	Negative impact: score '–' in case negative impact is not fully mitigated score 0 in case impact is planned to be fully mitigated No change in impact: score 0 Positive impact: score '+'
Air quality	No mitigation measures required	**MGD No.7** -Reduction in indoor air pollution -Improvement in health of women	- No. of biogas units constructed and operating - Reduction in incidence of health problems due to better indoor air quality	+
Water quality and quantity	No mitigation measures required	- Lesser quantity of water would be required compared to baseline as there is no soot on the vessels. But water would now be required for preparing the dung substrate for biogas. Thus there in no net impact.	- No impact	0
Soil condition	No mitigation measures required	-Application of slurry to the fields -Decrease in use of chemical fertilizer	In view of the fact that the status of NPK in soil is influenced by	0

		It would be difficult to analyse the status of NPK is soil influenced by application of slurry or dung	many factors including application of slurry or dung, the laboratory tests and evaluation may not prove the impact on the chosen parameter. Thus the parameter has been excluded from the sustainability assessment.	
Other pollutants	No mitigation measures required	- Decrease in pathogens due to conversion of dung to slurry	-Quantity of pathogens in slurry compared to that of dung	+
Biodiversity	No mitigation measures required	-Due to less dependence on fuelwood, there would be better regeneration of trees, shrubs and herbs in the forests and non-forest areas. But it would be very difficult to assess the impact of the project activity alone on biodiversity.	-Though there would be a definite positive impact, it would be difficult to assess quantitatively. Thus this indicator is not considered.	0
Quality of employment	No mitigation measures required	**MGD No.1** - Creation of new business venture especially for supply of material to the project activity. - Employment for masons and helpers - Better quality of work to the local communities. -Involvement of	-Improvement in quality of jobs compared to baseline. As construction phase is completed, this SD Indicator is	0

		SHG/ VO/VHW members in daily monitoring	scored as neutral	
Livelihood of the poor	No mitigation measures required	**MGD No.3** - Avoidance of drudgery -Convenience to the family -Better social environment at home	-Improvement in living conditions especially of women in the family as perceived by the communities	+
Access to affordable and clean energy services	No mitigation measures required	-Presence, affordability of services and reliability of services of biogas units -Reducing dependence on biomass	-No. of biogas units constructed and operating	+
Human and institutional capacity	No mitigation measures required	**MGD No. 2** -Empowerment of women and the Village Organisation (VO) members - Children can attend school in time - Increased institutional capacity	-Improvement in human and institutional capacity as perceived by the communities	+
Quantitative employment and income generation		**MGD No.1** - Employment generated in the informal sector -Income from CERs	- Income generation at family level due to the project activity, as perceived by the communities. On full time basis 1 CDM coordinator, 1 online database manager & 121 village level volunteers. Temporary jobs include 50 masons to construct	0

			biogas units and other operational jobs created during the project lifetime. As construction phase is completed, this SD Indicator is scored as neutral	
Balance of payments and investment	No mitigation measures required	**MGD No.8** -Investment to the project through forward funding of CERs -Decrease in use of kerosene	-Foreign revenue for the project As construction phase is completed, this SD Indicator is scored as neutral	0
Technology transfer and technological self-reliance	No mitigation measures required	-Technical and awareness training programs will be conducted for the communities in proper operation and management of the biogas digester, system as well as correct methods and timing of biogas liquid and residue application in agricultural fields.	-However, there is no technology transfer.	0

Justification choices, data source and provision of references A justification paragraph and reference source is required for each indicator, regardless of score	
Air quality	In the baseline, cooking from the unprocessed solid fuels release at least 50 times more noxious pollutants than gas. The incomplete combustion of biomass releases complex mixture of organic compounds, which include suspended particulate matter, carbon monoxide, poly organic material, poly aromatic hydrocarbons, formaldehyde, sulphur, trace metals etc. that cause many health hazards such as respiratory infections, eye

	infections, otitis media, chronic obstructive pulmonary diseases, lung cancer, pulmonary tuberculosis, cataract and also adverse pregnancy outcome[1,2]. According to WHO and Smith *et al.*, 2004 study, indoor smoke is the third health risk factor among Indians[3]. Implementation of the project will eliminate indoor air pollution, as biogas is colourless and burns with a clean blue flame similar to that of liquid petroleum gas allowing for virtually smoke free combustion, thus reducing health hazards considerably[4]. The methane from biogas is also not hazardous compared to LPG. For methane to be explosive, the lower explosive limit (LEL) for methane is 5.4% and upper explosive limit (UEL) is 13.9%. Methane content in biogas is about 60% and it forms a LEL of 9% and its UEL is 23%. With proper ventilation, biogas quickly dilutes with air and is not explosive in nature (Biogas Technology, 2002, B.T. Nijaguna). Thus biogas is considered much more safer than even LPG. (Biogas Technology, 2002, B.T. Nijaguna). Biogas is a clean fuel and does not cause air pollution. It is considered as a better fuel than natural gas and liquefied petroleum gas, because it does not contain sulphur. Sulphur on burning, gets converted to sulphur clioxide which is responsible for many lung diseases. The danger of explosion of biogas is less as it contains carbon dioxide which acts as a fire extinguisher (Biogas Technology, 2002, B.T. Nijaguna). A safety valve has been provided near the dome, at the beginning of the pipe. This also provides additional safety to turn it off. Also a biogas leak can be smelled as the hydrogen sulfide has not been removed from the biogas. It smells like rotten eggs5. Thus precaution can be taken in this regard. Also training will be provided to the people to have proper ventilation so that even if any leakage is there it gets diluted as it mixes with air.
Water quality and quantity	There will be no change in water quality due to the project activity. There will be a decrease in the quantity of water used for washing vessels after implementation of the project. The vessels will not be covered with soot like in the baseline when fuel wood is used for cooking purposes, requiring more water to scrub and clear the vessels. As mentioned by Mahadevamma, Chickkannanahalli in Tumkur district of Karnataka, “Now the vessels do not get blackened due to cooking, leading to savings in time and requirement of less water in cleaning of vessels”[6]

1 http://www.icmr.nic.in/bumay01.pdf

2 http://ehs.sph.berkeley.edu/krsmith/publications/2009%20pubs/Smith-Sivertsen%20et%20al.%20AJ%20Epi%2009.pdf

3 http://whqlibdoc.who.int/hq/2002/WHO_WHR_02.1.pdf

4 http://practicalaction.org/docs/energy/docs50/bp50-nepal-biogas.pdf

5 http://werkgroepterlinden.be/Biogas.html

6 http://bioenergyindia.kar.nic.in/Newsltr_2(pg%205-8).pdf

	Water is used to prepare a substrate at 1:3 ratio to feed into the biogas digester. This will nullify the effect of reduced water use. Thus this indicator is not considered.
Soil condition	The slurry manure is considered far more superior to farm yard manure in respect of NPK content. It will reduce the use of chemical fertilizers to a certain extent. A Government of India study showed that over 70% households perceived an improvement in crop production as a result of applying slurry manure in the fields and savings by reduced fertilizer usage @Rs.185/month[7]. The application of slurry improves the physical, chemical, and biological characters of the soil[8]. Balasubramanian and Kasturi Bai[9] evaluated nutrient status of slurry and observed a 70% increase compared to the influent and observed an increase in biomass production after application[9.] But the status of NPK in soil is influenced by many factors including application of the kind of manure (slurry or dung). The laboratory tests and evaluation may not prove the impact on only the chosen parameter. Thus the parameter has been excluded from the sustainability assessment.
Other pollutants	The slurry has lesser number of pathogens compared to dung. Most of the disease-causing organisms are killed. This serves as an effective control of parasitic diseases, hookworm, roundworm, etc[9]. There is reduction of pathogens after digestion[9,10]. Mosquitoes and flies do not breed in digested slurry and thus biogas improves sanitation. Compost pits will be an integral part of the biogas plant which will be dug near the outlet overflow in such a way that the slurry can run freely into the pits. To make a potent and easy to use as fertilizer, the compost pits should be filled with agricultural residues together with the slurry from the plant. The earth coming from digging the compost pits can be used for backfilling of the inlet and outlet chamber and for top filling on the dome. This can be trasported as manure for the fields without any health hazards.
Biodiversity	Fuel wood collection and consumption are intricately linked to degradation of natural resource management. Demand for fuel wood from commons and forests cause resource degradation[11]. A single biogas system with a volume of 2.8 m^3 can save as much as 0.12 ha woodland each year[12]. Though empirical evidences show an improvement in biodiversity due to implementation of the project, this has not been considered. It will be difficult to assess quantitatively the direct impact of the project on biodiversity, unless a thorough

[7] http://planningcommission.gov.in/reports/peoreport/peoevalu/peo_npbd.pdf

[8] http://www.ias.ac.in/currsci/jul10/articles13.htm

[9] http://www.greenpowerindia.org/biogas_benefits.htm

[10] http://unesdoc.unesco.org/images/0005/000528/052857eb.pdf

[11] http://www.jstor.org/pss/3147225

[12] http://www.gtz.de/de/dokumente/en-biogas-volume1.pdf

	assessment of baseline biodiversity status is undertaken. Thus this indicator is not considered.
Quality of employment	The project will create additional business opportunities to the local communities. Employment for masons will be created with a high sense of ownership. At the village level, the SHGs will be involved in day to day monitoring of biogas units, thus providing them with good quality jobs. For the second crediting period, as all the construction activities is completed, the SD indicator is considered neutral.
Livelihood of the poor	The project would also lead to improvement in the quality of life due to reduced drudgery and time spent for women and children in fuel procurement, transporting, processing, storing and cooking time. Approximately two hours are spent in gathering biomass per day per household in the baseline[13]. Women can take up income generation activities thus alleviating poverty. Children can attend school as women are able to cook and serve breakfast to the children in time to attend school. There is also more time for leisure at homes. The national level evaluation studies also show that communities benefit from clean fuel for cooking, cleanliness of environment, improvement in the health of women, saving in manure cost, employment generation, saving in cooking time and traditional fuel[4].
Access to affordable and clean energy services	Women will have better and cleaner access to energy for cooking and heating water[7]. Fuelwood is being replaced by biogas which is clean, healthy and is easy access to energy. At the turn of a knob, they will have access to energy for cooking. While in the baseline they face hardship to collect fuel wood.
Human and institutional capacity	The Biogas CDM Project involves implementation of the technology, maintenance and monitoring emission reduction. The SHGs and the VO will be involved in maintenance and monitoring of biogas units. This will lead to empowerment of women and the VO members. A study in Nepal shows that in terms of rural energy, women's practical needs of basic energy demands is met thus reducing their workloads and saving time in managing household energy requirements. This enables women to obtain opportunities for social and economic activities leading to fulfilling their strategic needs and enhancing their self-confidence and empowerment[14]. Children can attend school in time as food can be cooked in time for them and girls do not have to collect fuelwood anymore[15].
Quantitative employment and	Construction of Biogas Units would create good employment opportunities in rural areas. It will provide regular means of

[13] Dinesh K Marothia. 2002. Institutionalizing common pool resources. http://books.google.co.in/books?id=X_z4vcGrGmwC&pg=PA384&lpg=PA384&dq=Approximately+two+hours+are+spent+in+gathering+biomass+per+day+per+household&source=bl&ots=ewPQunMAdv&sig=IimMLkEz2vAbgt8ep4nUHxriF5Q&hl=en&ei=U33fTpivOczjrAfC_YX7BA&sa=X&oi=book_result&ct=result&resnum=1&sqi=2&ved=0CBwQ6AEwAA#v=onepage&q=Approximately%20two%20hours%20are%20spent%20in%20gathering%20biomass%20per%20day%20per%20household&f=false

[14] community.eldis.org/txFileDownload/f.59c2a4be/n.empowerment.doc

[15] http://www.iitr.ernet.in/departments/AH/uploads/File/hshs/Presentations/Links/Technical%20Papers/Community%20Participation%20&%20SHP/Mr%20Mahendra%20Neupane_Community%20Based%20RE%20Dev.pdf

income generation	livelihood to a large number of entrepreneurs and turnkey operators and provide employment to masons and daily-wage labourers. Monetary benefits from CERs will accrue to the women of the house after the initial years to the carbon investor. Women can take up income generation activities as they have time available to them[7].
Balance of payments and investment	The biogas units will be constructed from the forward CER funding. Thus there is going to be foreign direct investment into the region. The project will also reduce use of kerosene, which is currently imported into the country.
Technology transfer and technological self-reliance	Technical and awareness training programs will be conducted for the communities in proper operation and management of the biogas digester, system as well as correct methods and timing of biogas liquid and residue application in agricultural fields. However, there is no any technology transfer. Thus there is no change in impact and this indicator is not considered.

According to the EIA notification issued by the Ministry of Environment and Forests (MoEF, 2006), the project does not require Environment Impact Assessment (EIA).[16]

SECTION G. Sustainability Monitoring Plan

No		01
Indicator		Air Quality
Mitigation measure		N/A
Repeat for each parameter		
Chosen parameter		• No. of biogas units constructed and operating • Reduction in incidence of health problems due to better indoor air quality
Current situation of parameter		There are no biogas plants and households mainly use traditional 3 stone mud stove which is inefficient and results in extreme indoor air pollution causing health problems.
Estimation of baseline situation of parameter		As mentioned in the PDD, the baseline of the project is the usage of fuel wood. As per the survey done in the project area, the annual firewood consumption per appliance is expected to be .2.85 t/family/year.
Future target for parameter		• Construct 5000 biogas units by 2nd year and eliminate use of firewood. • Improve indoor air conditions and reduce respiratory problems especially for women and children.
Way of monitoring	How	• Monitor the number of biogas operating through the digitized monitoring database which will generate real time progress reports. • Sample survey and record the experience by the communities for reduction in health problems compared to baselines.

[16] http://www.envfor.nic.in/legis/eia/so1533.pdf

	When	Annually
	By who	SEDS Staff

No		02
Indicator		Other Pollutants
Mitigation measure		N/A
Repeat for each parameter		
Chosen parameter		Quantity of pathogens in slurry compared to that of dung
Current situation of parameter		Dung is left in the open which breeds a lot of pathogens
Estimation of baseline situation of parameter		Will be assessed during periodic testing of dung for load of pathogens
Future target for parameter		The pathogen load will get reduced in the slurry
Way of monitoring	How	Laboratory test of pathogen load in slurry and dung
	When	At the beginning of the crediting period
	By who	Certified Laboratory

No		03
Indicator		Livelihood of the Poor
Mitigation measure		N/A
Repeat for each parameter		
Chosen parameter		Improvement in living conditions especially of women in the family as perceived by the communities
Current situation of parameter		Routine drudgery and burden of firewood gathering, cooking and water heating and washing blackened utensils is relentless life.
Estimation of baseline situation of parameter		• Women and girl children are mainly responsible for preparing and cooking food for the entire family • Long hours for cooking on traditional cookstove and frequent visits for firewood collection, often first thing in the morning
Future target for parameter		• Reduce women's domestic cooking workload activities considerably as compared to baseline scenario. • Better social environment at home due to reduced drudgery especially for women.
Way of monitoring	How	Parameters will be monitored through a sample survey to analyse the cooking time saved and how biogas has benefitted the family compared to baselines.
	When	Annual stratified sample survey
	By who	SEDS staff

No		04
Indicator		Access to affordable and clean energy services
Mitigation measure		No mitigation measures required
Repeat for each parameter		
Chosen parameter		No. of biogas units constructed and operating
Current situation of parameter		Traditional cookstove is used for cooking and hot water Bath
Estimation of baseline situation of parameter		• Women are forced to spend much of their time and physical energy to ensure firewood availability

		for cooking and hot water bath purposes. • Distance for firewood is increasing and is available in scanty. This is resulting in even black market sales of firewood in areas far from forest
Future target for parameter		• Construction and functioning of biogas plants under the CDM project activity. • Eliminate dependency on firewood and use biogas as a reliable and easy access for cooking fuel.
Way of monitoring	How	Extraction from digitized monitoring system which will be updated on a daily basis.
	When	During preparation of GS monitoring report from online monitoring system which will be updated on daily basis
	By who	SEDS staff

No		05
Indicator		Human and institutional capacity
Mitigation measure		No mitigation measures required
Repeat for each parameter		
Chosen parameter		Improvement in human and institutional capacity as perceived by the communities
Current situation of parameter		• Drudgery and burden of firewood gathering especially women and girl child. • Cooking, water heating and washing blackened utensils is relentless; all their working life • Children either get late to school as food is not ready in time or lack time to attend regularly.
Estimation of baseline situation of parameter		Large part of the time is spend going to the forests and other lands for fuelwood collection, processing them and storing them for daily use in cooking and hot water bath. Cooking takes a lot of time, especially in the morning resulting in delay of preparing food in time for the children to attend school in time.
Future target for parameter		• Empowerment of women as they have more time now to take up other activities • Children can attend school regularly and in time
Way of monitoring	How	Through documentation of community experience with biogas units as compared to baseline through focused group discussions
	When	Annually
	By who	SEDS staff

Additional remarks monitoring

The stratified sample survey will be done on a statistically significant sample size. Questionnaires will be designed, field tested and implemented to collect information.

The Sustainable Development Indicators and Monitoring Parameters were revisited to see if there needs to be changed based on the stakeholders comments and based on the baseline situation. Accordingly, below is the reasoning for each of the SD Parameter.

Air quality: As can be seen from the PDD, the baseline continues to be use of fuelwood on traditional cook stove. Hence the chosen parameters for monitoring are still valid.

Other Pollutants: The baseline for this parameter also remains the same with the dung left in the open, before it is applied to the fields yearly once. Hence the chosen parameter chosen is still valid.

Quality of employment: As the construction of the 5,000 biogas units are completed this parameter will not be monitored anymore.

Livelihood of the poor: As the baseline is still the use of fuel wood for cooking on traditional cook stove, the project will continue to improve the livelihood of the poor. Hence the chosen parameter chosen is still valid.

Access to affordable and clean energy services: As there is no change in the baseline which is the use of fuelwood, the access to affordable and clean energy services is still valid. Also, continuous repair and maintenance of the constructed units are required to provide the clean energy services, this chosen parameter is still valid.

Human and institutional capacity: The baseline remains the same as when the project was registered, which is use of fuelwood. Hence the empowerment of women due to the project, skill development and institutional capacity of the community members will continue. Formation of a producer company has been envisaged, which will further build institutional capacity of the communities. Hence the chosen parameter is still valid.

Quantitative employment and income generation: As the construction of the 5,000 biogas units are completed this parameter will not be monitored anymore.

Balance of payments and investment: As the construction phase is completed, upfront carbon money will now only being repaid to the investor as carbon credits. Hence this parameter will not be monitored during this crediting period.

Based on the response from the communities during the stakeholders' meeting, there is no change in the sustainable development assessment and the sustainable development monitoring plan.

Hence there is not additional mitigation plan that is required for the project activity.

SECTION H. Additionality and conservativeness

This section is only applicable if the section on additionality and/or your choice of baseline does not follow Gold Standard guidance

H.1. Additionality

The additionality assessment of the project is based on the UNFCCC approved additionality tool "Tool for the demonstration and assessment of additionality". The project got registered as a CDM project with reference number 3541 on 9th September 2010. Kindly view the additionality section B.5 of the registered Project Document Design.

H.2. Conservativeness

The baseline of the project is the usage of fuel wood. The project activity will replace the usage of non-renewable biomass. The emission reductions calculated are real, measurable and verifiable as it is based on approved baseline and monitoring methodology "Scope 1; TYPE I - RENEWABLE ENERGY PROJECTS, AMS I.E. Switch from Non-Renewable Biomass for Thermal Applications by the User, version 07,". This is the latest version of the methodology applicable at the time of submission for the renewal of crediting period.

The baseline calculations are conservative and transparent as can be seen from the PDD. The f_{NRB} calculations is applied as per the calculations at the State level, while the district level f_{NRB} is much higher. Therefore, the non-renewable biomass and fuelwood use for emission reduction calculation is conservative and real, which has also been validated by the DOE.

ANNEX 1 ODA declaration

The ODA Declaration statement from the Project Proponent and the Financier is uploaded to the GS Registry.