

GOLD STANDARD PASSPORT

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SECTION A. Project Title

Social Education and Development Society (SEDS) Biogas CDM project for the rural poor

SECTION B. Project description

The Social Education and Development Society (SEDS) is a grass-root Non-Governmental Organization (NGO) working for the past 28 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 128 villages, supporting 12,000 women and their families, 980 Self Help Groups, 120 Village Organizations & 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 m³ capacity each for single households in 5 Mandals of Anantapur District. Each household will install a 2 m³ 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.

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°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.

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- 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
	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	

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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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Does your project activity classify as an End-use Energy Efficiency Improvement project?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Please justify the eligibility of your project activity:

The chosen type and category is TYPE I - RENEWABLE ENERGY PROJECTS, I.E. Switch from Non-Renewable Biomass for Thermal Applications by the User, version 01, EB 37. 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.

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.

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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.

Pre Announcement	Yes	No
Was your project previously announced?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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.		

C.4. Greenhouse gas

Greenhouse Gas	
Carbon dioxide	<input checked="" type="checkbox"/>
Methane	<input type="checkbox"/>
Nitrous oxide	<input type="checkbox"/>

C.5. Project Registration Type

Project Registration Type	
Regular	<input checked="" type="checkbox"/>

	Retroactive	Preliminary	Rejected by
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Pre-feasibility assessment	projects (T.2.5.1)	evaluation (eg: Large Hydro or palm oil-related project) (T.2.5.2)	UNFCCC (T2.5.3)
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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" N 77° 35' 00" E
Roddam	14° 06' 00" N 77° 26' 00" E
Somandepalli	14° 00' 44" N 77° 36' 30" E
Gorantla	13° 59' 21" N 77° 46' 13" E
Chilamathur	13° 34' 25" N 80° 00' 12" E

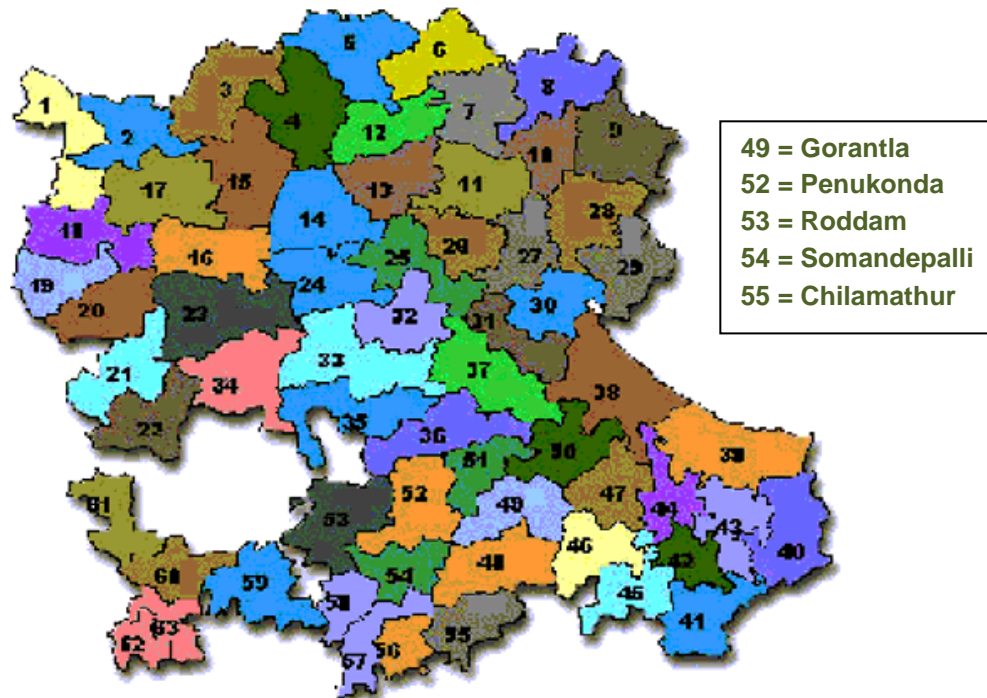


Explain given coordinates

The project activity is located in 5 mandals of Anantapur district covering 121 villages. The above co-ordinates are given as per mandal wise for the project geography.

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D.2. Map



Map of Andhra Pradesh with an arrow indicating the location of Anantapur district showing the Mandals in which the project will be implemented.

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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.

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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.

SECTION F. Outcome Sustainability assessment

F.1. 'Do no harm' Assessment

Description of relevance to my project	Assessment of my project risks breaching it (low, medium, high)	Mitigation measure
Human Rights		
<ul style="list-style-type: none"> The project activity involves construction of 2m³ 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. 	<ul style="list-style-type: none"> Low 	N/A
<ul style="list-style-type: none"> The project involves construction of domestic biogas units in each willing household area where biogas units will installed. Therefore this project does 	<ul style="list-style-type: none"> Low 	N/A

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<p>not involve and is not complicit in involuntary resettlement.</p>		
<ul style="list-style-type: none"> The biogas units are fixed dooms built underground. The biogas units improve air quality and living standards of the rural communities. Hence, this project does not involve and is not complicit in the alteration, damage or removal of any critical cultural heritage 	<ul style="list-style-type: none"> Low 	<p>N/A</p>
Labour Standards		
<ul style="list-style-type: none"> The project activity does not deal with setting up a factory and recruiting employees. Thus the project activity does not involve employees' freedom of association and their rights. 	<ul style="list-style-type: none"> Low 	<p>N/A</p>
<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Low 	<p>N/A</p>
<ul style="list-style-type: none"> The project does not involve and is not complicit in any form of discrimination based on gender, 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 m³ domestic biogas unit are part of this project activity. 	<ul style="list-style-type: none"> Low 	<p>N/A</p>
<ul style="list-style-type: none"> The biogas units are fixed dooms built underground. The use of 2m³ 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 	<ul style="list-style-type: none"> Low 	<p>N/A</p>

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<p>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.</p>		
Environment Protection		
<ul style="list-style-type: none"> The project will take a precautionary approach in regard to environmental challenges and is not complicit in practices contrary to the precautionary principle. 	<ul style="list-style-type: none"> Low 	<p>N/A</p>
<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Low 	<p>N/A</p>
Anti-Corruption		
<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Low 	<p>N/A</p>

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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	- Quantity of water saved	- Water saved compared to baseline as perceived by the communities	+
Soil condition	No mitigation measures required	-Application of slurry to the fields -Decrease in use of chemical fertilizer	-Comparison of NPK content of soil treated with	+

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			<p>slurry and dung</p> <p>-Community's response to the use of chemical fertilizer after slurry application to fields</p>	
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	<p>-Due to less dependence on fuelwood, there would be better regeneration of trees, shrubs and herbs in the forests and non-forest areas.</p> <p>But it would be very difficult to assess the impact of the project activity alone on biodiversity.</p>	<p>-Though there would be a definite positive impact, it would be difficult to assess quantitatively.</p> <p>Thus this indicator is not considered.</p>	0
Quality of employment	No mitigation measures required	<p>MGD No.1</p> <p>- Creation of new business venture especially for supply of material to the project activity.</p> <p>- Employment for masons and helpers</p> <p>- Better quality of work to the local communities.</p> <p>-Involvement of SHG/ VO/VHW members in daily monitoring</p>	-Improvement in quality of jobs compared to baseline.	+

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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	+

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			volunteers. Temporary jobs include 50 masons to construct biogas units and other operational jobs created during the project lifetime.	
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	+
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,			

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	lung cancer, pulmonary tuberculosis, cataract and also adverse pregnancy outcome ^{1,2} . According to WHO and Smith <i>et al.</i> , 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 .
Water quality and quantity	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" ⁵
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 ⁶ . The application of slurry improves the physical, chemical, and biological characters of the soil ⁷ . 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 .
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 ⁸ . There is reduction of pathogens after digestion ^{9,9} . Mosquitoes and flies do not breed in digested slurry and thus biogas improves sanitation.
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 ¹⁰ .

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

² <http://ehs.sph.berkeley.edu/krsmith/publications/2009%20pubs/Smith-Sivertsen%20et%20al.%20AJ%20Epi%202009.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://bioenergyindia.kar.nic.in/NewsItr_2\(pg%205-8\).pdf](http://bioenergyindia.kar.nic.in/NewsItr_2(pg%205-8).pdf)

⁶ http://planningcommission.gov.in/reports/peoreport/peoevalu/peo_npb.pdf

⁷ <http://www.ias.ac.in/currsci/jul10/articles13.htm>

⁸ http://www.greenpowerindia.org/biogas_benefits.htm

⁹ <http://unesdoc.unesco.org/images/0005/000528/052857eb.pdf>

¹⁰ <http://www.jstor.org/pss/3147225>

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	<p>A single biogas system with a volume of 2.8 m³ can save as much as 0.12 ha woodland each year¹¹.</p> <p>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 assessment of baseline biodiversity status is undertaken. Thus this indicator is not considered.</p>
Quality of employment	<p>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.</p>
Livelihood of the poor	<p>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 baseline¹². 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 fuel⁴.</p>
Access to affordable and clean energy services	<p>Women will have better and cleaner access to energy for cooking and heating water⁷. 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.</p>
Human and institutional capacity	<p>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</p>

¹¹ <http://www.gtz.de/de/dokumente/en-biogas-volume1.pdf>

¹² Ravindranath, N.H and Hall, 1995. Biomass, Energy and Environment: A developing country perspective from India. 376 pp. New York: Oxford University Press - http://books.google.com/books?id=ARms6L3xklEC&printsec=frontcover&dq=ravindranath+and+hall&source=bl&ots=HI2iRVcW-H&sig=BL9VpbsdGUj7ZJmveV0pWx1DDns&hl=en&ei=R8qQTKr5Jo_CrAevttXNBA&sa=X&oi=book_result&ct=result&resnum=5&ved=0CCAQ6AEwBA#v=onepage&q&f=false

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	opportunities for social and economic activities leading to fulfilling their strategic needs and enhancing their self-confidence and empowerment ¹³ . Children can attend school in time as food can be cooked in time for them and girls do not have to collect fuelwood anymore ¹⁴ .
Quantitative employment and income generation	Construction of Biogas Units would create good employment opportunities in rural areas. It will provide regular means of 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).¹⁵

SECTION G. Sustainability Monitoring Plan

No	01
Indicator	Air Quality
Mitigation measure	N/A
<i>Repeat for each parameter</i>	
Chosen parameter	<ul style="list-style-type: none"> 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

¹³ community.eldis.org/txFileDownload/f.59c2a4be/n.empowerment.doc

¹⁴ 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

¹⁵ <http://www.envfor.nic.in/legis/eia/so1533.pdf>

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		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 3.37 t/family/yr with a negligible kerosene usage of 0.93 ltrs/family/yr.
Future target for parameter		<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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.
	When	Annually
	By who	SEDS Staff

No		02
Indicator		Water Quality and Quantity
Mitigation measure		N/A
<i>Repeat for each parameter</i>		
Chosen parameter		<ul style="list-style-type: none"> Water saved compared to baseline as perceived by the communities.
Current situation of parameter		Traditional fuelwood stoves results in blackening of pots and results in settling of soot on other household goods. This requires more water to scrub and clean household vessels.
Estimation of baseline situation of parameter		Excessive scrubbing of blackened vessels requires substantial amount of time and water to clean vessels.
Future target for parameter		Reduce usage of water for cleaning of vessels as compared to the baseline.
Way of monitoring	How	Community experience with biogas units as compared to baseline through focused group discussions
	When	Annual stratified sample survey
	By who	SEDS staff

No		03
Indicator		Soil condition
Mitigation measure		N/A
<i>Repeat for each parameter</i>		

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Chosen parameter		<ul style="list-style-type: none"> • Comparison of NPK content of soil treated with slurry and dung • Community's response to the use of chemical fertilizer after slurry application to fields
Current situation of parameter		<ul style="list-style-type: none"> • Dung is used as manure, whenever available. • Use on chemical fertilizers and pesticides is high.
Estimation of baseline situation of parameter		<ul style="list-style-type: none"> • Will be assessed during periodic testing of soil treated with dung. • Chemical fertilizers are used to increase NPK (Nitrogen, Phosphorous and Potassium) content of soil for better yield.
Future target for parameter		<ul style="list-style-type: none"> • Application of biogas slurry to increase the NPK content of soil. • Community's response to decrease in use of chemical fertilizer after slurry application to soil.
Way of monitoring	How	<ul style="list-style-type: none"> • Laboratory test of soil treated with slurry and dung • Community experience with biogas units as compared to baseline application through focused group discussions
	When	<ul style="list-style-type: none"> • Once in two years through laboratory test • Annual stratified sample survey
	By who	<ul style="list-style-type: none"> • Certified laboratory • SEDS staff

No	04	
Indicator	Other Pollutants	
Mitigation measure	N/A	
<i>Repeat for each parameter</i>		
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	Once in two years
	By who	Certified Laboratory

No	05	
Indicator	Quality of Employment	
Mitigation measure	N/A	
<i>Repeat for each parameter</i>		
Chosen parameter	Improvement in quality of jobs compared to baseline.	
Current situation of parameter	<ul style="list-style-type: none"> • Women spend lot of time in search and collection of firewood. 	

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		<ul style="list-style-type: none"> No such volumes of biogas construction activity in the baseline scenario.
Estimation of baseline situation of parameter		<ul style="list-style-type: none"> Considerable time spent on collection of firewood, cooking food and cleaning of vessels.
Future target for parameter		<ul style="list-style-type: none"> Jobs created due to the 5000 biogas project construction and maintenance activity. Income generation activities promoted due to time saved for women.
Way of monitoring	How	<ul style="list-style-type: none"> Track of wages paid for the biogas project activity through the digitized monitoring database. Income generation activities taken up by women compared to baseline situation.
	When	<ul style="list-style-type: none"> Reports generated from digitized monitoring database which is updated on a daily basis. Annual stratified sample survey
	By who	SEDS staff

No	06	
Indicator	Livelihood of the Poor	
Mitigation measure	N/A	
<i>Repeat for each parameter</i>		
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, water heating and washing blackened utensils is relentless life.	
Estimation of baseline situation of parameter	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	07	
Indicator	Access to affordable and clean energy services	

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Mitigation measure	No mitigation measures required	
<i>Repeat for each parameter</i>		
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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	08	
Indicator	Human and institutional capacity	
Mitigation measure	No mitigation measures required	
<i>Repeat for each parameter</i>		
Chosen parameter	Improvement in human and institutional capacity as perceived by the communities	
Current situation of parameter	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	Community experience with biogas units as compared to baseline through focused group discussions
	When	Annually
	By who	SEDS staff

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No		09
Indicator		Quantitative employment and income generation
Mitigation measure		No mitigation measures required
<i>Repeat for each parameter</i>		
Chosen parameter		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 biogas units and other operational jobs created during the project lifetime.
Current situation of parameter		Fuelwood collection takes majority of the domestic time each day for the women in terms of collection, processing and storing. Apart from that cleaning of blackened vessels is a strenuous task. These activities leave very less time for other activities.
Estimation of baseline situation of parameter		Time spent on fuelwood procurement, cooking, cleaning vessels and other domestic work leaves minimal scope of time availability for any other social or economic activity.
Future target for parameter		<ul style="list-style-type: none"> • Income and other value added activities taken up by women. • Periodical CER income to women as recognition of their efforts for cooking.
Way of monitoring	How	Stratified sample survey
	When	Annually
	By who	SEDS staff

No		10
Indicator		Balance of Payments and investment
Mitigation measure		No mitigation measures required
<i>Repeat for each parameter</i>		
Chosen parameter		<ul style="list-style-type: none"> • Access to International funding to build domestic biogas units through carbon investors. • Money saved at household level on cooking energy fuels like firewood, kerosene, etc.
Current situation of parameter		<ul style="list-style-type: none"> • Currently, only minimal government support is available to meet the biogas cost with no access to international funding for such programmes. • Kerosene is purchased at subsidised rates and in many places households are forced to purchase firewood due to scarcity.
Estimation of baseline situation of parameter		<ul style="list-style-type: none"> • Minimal financial support reaches to limited households. There is no 100% investment

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		<p>dedicated energy programme in the project area.</p> <ul style="list-style-type: none"> • Kerosene and firewood dependency encourages black marketing and increases economical burden.
Future target for parameter		<ul style="list-style-type: none"> • Sale of certified emission reductions (CERs) to access international funding to construct 5000 biogas units. • Replacement of baseline cooking energy fuels with biogas.
Way of monitoring	How	<ul style="list-style-type: none"> • Audited account statements for the project activity • Stratified sample survey
	When	Annually
	By who	<ul style="list-style-type: none"> • Chartered Accountant • 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.

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, I.E. Switch from

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Non-Renewable Biomass for Thermal Applications by the User, version 03, EB 56". This is the latest version of the methodology.

The baseline calculations are conservative and transparent as can be seen from the PDD. The version used for emission reduction calculations was 01, however no impact on baseline and emission reductions when compared to the new version 03. Therefore, the non-renewable biomass and fuelwood use for emission reduction calculation is conservative and real, which has also been validated by the DOE.

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ANNEX 1 ODA declaration

[See Toolkit Annex D]