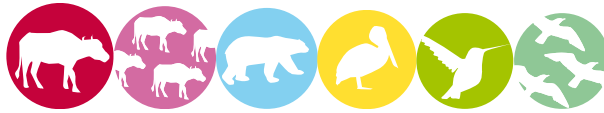


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SECTION A. Project Title

Accion Fraterna Biogas CDM project for rural communities in Anantapur, Andhra Pradesh

Version: 6

Dated: 6th July 2012

SECTION B. Project description

Accion Fraterna Ecology Centre (AF Ecology Centre) is a Non-Governmental Organization (NGO) working in Anantapur district of Andhra Pradesh, India. The guiding principle of AF Ecology Centre is concern for the poor and reaching out to as many needy people as possible. The main mission of the NGO is to organize and strengthen distressed farmers and farm labour for their empowerment, self-reliance, food and nutritional security; promote Integrated Sustainable Farming Systems and sustainable healthy environment. The NGO also works with women and youth and promote diversified livelihoods including agri-processing, marketing and non-farm skill based employment. They also work for gender and social equality and human dignity. AF Ecology Centre are always working for people's well being and strives to positively influence the society and adapt itself to be relevant to the changing contexts¹. Thus under the aegis of Clean Development Mechanism (CDM), AF Ecology Centre is taking up this project to provide biogas to the rural communities of the drought prone and biomass scarce Anantapur district of Andhra Pradesh, India.

The purpose of this Biogas CDM Project activity is to set up 15,000 biogas plants (digesters) of 2 m³ capacity each for single households in 15 Mandals² 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 water heating for bath. 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 water heating for bath.

By utilizing cattle dung in a controlled anaerobic digestion and combustion system, biogas will be available as thermal energy, which will be used for cooking and water heating for bath. The biogas will be used on a two-ring gas stove supplied as part of the project activity. Households having cattle or willing to collect cattle dung will participate in the project activity. 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

¹ <http://www.af-ecologycentre.org/aboutus3.htm>

² Mandal is an administrative unit below the district consisting of a group of villages with administrative and local government functions.

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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 indoor air pollution, thus eliminating health hazards.
- ✓ Security of energy supply
- ✓ Better management of dung and organic wastes
- ✓ Children will be able to attend school in time as food will be cooked in time.

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.

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 income generating activities.

Technological benefits:

- ✓ Better technology for cooking
- ✓ Better biogas digester models.
- ✓ Training in chemistry of biogas for masons and users leading to improved scientific temper in community and more jobs.

The estimated start date of construction as mentioned in the registered PDD is 01/01/2012.

The project with UNFCCC No. 3779 was registration on 10th April 2012 with effect from 20th January 2012. The project is fall under regular project activity. The start date of crediting period of the project activity is the same as that of CDM project activity i.e. 1st June 2012.

SECTION C. Proof of project eligibility

C.1. Scale of the Project

Please tick where applicable:

Project Type	Large	Small
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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?	☒	☐
Does your project activity classify as an End-use Energy Efficiency Improvement project?	☐	☒

Please justify the eligibility of your project activity:

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The chosen type and category is TYPE I - RENEWABLE ENERGY PROJECTS, I.E. Switch from Non-Renewable Biomass for Thermal Applications by the User, Version04, EB60. 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.

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 15,000 users to use cattle dung and organic wastes in individual household methane recovery systems of biogas for cooking and water heating. The 15,000 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?	☐	☒
Explain your statement on pre announcement		

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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 forward funded CER 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: _____

Start Date of the Project Activity:

- Likely start of the construction of bio-digesters will be after the project gets registered as a CDM project activity and carbon forward funding is available.
- Start of crediting period will be 01/06/2012 or the date of registration with UNFCCC whichever is later
- GS crediting period will be the same as CDM crediting period.

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SECTION D. Unique project identification

D.1. GPS-coordinates of project location

Mandals	Co-ordinates (Deg-Min-Sec)	
	Long-E	Lat-N
Anantapur	77-36 - 26.88	14-40-50
Atmakur	77-21-28.23	14-38-45
Bathalapalli	77-46-7.87	14-30-57.89
Beluguppa	77-8-16.83	14-42-45.79
Brahmasamudram	76-56-56.74	14-32-11.58
Dharmavaram	77-43-37.19	14-24-44.21
Garladinne	77-36-5.16	14-49-12.63
Kalyandurg	77-6-48.60	14-32-56.31
Kambadur	77-13-58.91	14-20-42.10
Kanekal	77-4-47.78	14-48-21.31
Kudair	77-25-48.87	14-43-48.95
Kundurpi	77-2-10.32	14-17-27.37
Raptadu	77-36-21.45	14-37-3.68
Rayadurg	76-51-5.16	14-41-58.42
Settur	76-58-56.20	14-26-50.53



Explain given coordinates

The project activity is located in 15 Mandals of Anantapur district covering 507 villages. The above co-ordinates are given Mandal-wise for the project geographic boundary.

D.2. Map

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		provide labour for construction of biogas units.
We have 12 constructed plants in our village. We are aware of repairs and maintenance so all the 12 units are not working now. Can you help us to get the units repaired?	Clarification	The units constructed are by the Government under the NPBD central government scheme. This project is under CDM and we will ensure that biogas units built under this project will function smoothly. We will have trained personnel to repair them in case of major repairs to the units.
Is it safe to use biogas?	Clarification	The entire unit will be constructed outside of the house. Only the gas will be supplied to the kitchen through pipes. It won't harm in any way. They may become non-functional if you did not maintain them properly, but surely no danger will occur either from the tank or from the stove.
If you do 40/50 units per village, it covers many people. Can't you establish more than 15,000 units?	Clarification	Right now we have planned for only 15,000 units. After constructing all of them and observing their functioning and maintenance, we could think of constructing more units.
Many of our villagers are interested in having biogas units but we don't have cattle. Can you promote cattle to us, so that we too can construct the units?	Clarification	No, at present we are not working on the promotion of cattle/livestock. We planned to work with only those families, which have at least 2 cattle with them currently. We can show you the ways to obtain loans to purchase cattle.
Whether the biogas is produced only with dung of the cattle or we can use the other waste material also?	Clarification	Cattle dung is easily diluted in the water and produces gas in a short time. It is advisable to use only cattle dung in order to avoid any complications. Other agro residues along with the dung will enrich the gas.
Can we built the unit within 80 yards from my house or it should be extremely far away from it?	Clarification	It can be constructed 60 yards/300 feet away from the house.

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.

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- The report was webhosted at <https://gs1.apx.com/mymodule/ProjectDoc/EditProjectDoc.asp?id1=980> for a period of 2 months from to 21st January 2011 to 22nd March 2011. Supportive emails from GS Registry to DOE have been submitted for assessment.
- Emails were sent to local NGOs and GS-NGO supporters for their comments.
- The Stakeholder Consultation Report with draft Passport and PDD was made available in the Accion Fraterna library and District library for local people without Internet access. The communities were informed for the availability of the reports.
- No comments were received during the feedback round from any of the stakeholders.

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 - India has signed the Universal Declaration of Human Rights (UDHR) ³ . There are no risks that the project will breach the safeguarding principles as discussed below.		
The project activity involves construction of 2m³ domestic biogas units in the proposed project area, who want to replace their traditional inefficient cook stoves. The project beneficiaries who are dependent on traditional cook stoves will have access to clean renewable cooking biogas. Households that have enough cattle and space to build biogas near their home will be the criteria for selection of beneficiaries and will not be based on caste, creed, gender or any other bias. Project proponent being a NGO believes in social equity, economic security, gender equity and human dignity in an atmosphere of democracy, peace, cooperation and community support⁴. In the same spirit with which the Accion Fraterna is being working since 30 years, the CDM project of biogas will address social justice including gender justice by serving as a vital entry point for improving the position of women in the household and society, irrespective caste and creed.⁵ 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
The project involves construction of domestic biogas units in each willing household area where biogas units will be installed near their homes. Biogas is considered as one of the most useful decentralized sources of energy⁵. This decentralized biogas systems allow waste to be treated near the production source and sludge to be reused locally⁶. Thus the project does not require relocation of families or home. In fact, thermal	Low	N/A

³ http://mha.nic.in/uniquepage.asp?Id_Pk=235

⁴ www.af-ecologycentre.org/dharma-vision-mission.asp

⁵ Khoiyangbam, R.S., Navindu Gupta, Sushil Kumar. 2011. Biogas Technology, Towards Sustainable Development, The Energy and Resource Institute (TERI). New Delhi.

⁶ http://climatelab.org/Domestic_Biogas_Plant

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energy system is being provided to their existing kitchens. Therefore this project does not involve and is not complicit in involuntary resettlement.		
The beneficiaries reside in rural areas, which are recognised settlements by the government. These regions do not have critical cultural heritage sites. Based on Archaeological Survey of India, the project boundary does not fall under any of the critical cultural heritage sites of India⁷. The biogas units are fixed dooms built underground near to their homes. 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.	• Low	N/A
Labour Standards – India has signed the International Labour Standard Convention and is a member of ILO⁸.		
The Indian Government has not ratified the ILO Convention 87 and 98⁹. The project activity does not involve production, trade or other commercial activity requiring large labour force. The project activity does not deal with setting up a factory and recruiting employees. The project activity will employ masons on daily wages for construction of biogas units. They are at free will to participate in construction. So also, the village level volunteers will participate voluntarily and their freedom of association and their rights to collective bargaining will be respected. Thus the project activity does not limit employees' freedom of association and their right to collective bargaining.	• Low	N/A
India has ratified ILO convention 29 and 105 on elimination of forced and compulsory labour⁹. The project will be owned by the communities through day to day involvement who will assist in monitoring the project activity. As specified in the PDD, end user groups will be formed of 30 families in a village, which will function in lines of self help groups. They will create an environment of transparency, trust, and feelings of belonging and solidarity. The scope of these Groups go beyond biogas, into fostering and managing cooperation in agriculture, timely credit, better bargaining with Government agencies, traders, etc. Thus the project will not involve and is not complicit in any form of forced or compulsory labour.	• Low	N/A
India is not ratified ILO convention 138 (minimum age) and convention 182 (worst form of child labour). But India has its own Child Labour (Prohibition & Regulation) Act, which prohibits employment of children in certain specified hazardous occupations and processes and regulates the working conditions in others¹⁰. The NGO does not believe in child labour and one of its programme priorities is promotion of skill training among rural youth for entrepreneurship¹¹. The project activity, will on the contrary, rid children, especially the girl child, the drudgery of collecting fuelwood. By introducing biogas time is saved in collecting firewood and women can devote more time in upbringing their children. Children can attend school regularly.⁵ The NGO works for the welfare of children in	• Low	N/A

⁷ asi.nic.in/asi_monu_whs.asp

⁸ http://www.ilo.org/dyn/normlex/en/f?p=1000:11110:3115744615707331::NO:11110:P11110_COUNTRY_ID:102691

⁹ labour.nic.in/ilas/convention.htm

¹⁰ labour.nic.in/cwl/ChildLabour.htm

¹¹ <http://www.af-ecologycentre.org/target-communities-outreach.asp>

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the region and will not indulge in child labour in any way.		
India has ratified ILO Convention 100 (equal remuneration) and Convention 111 (discrimination in employment/occupation)⁹. 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. In fact, the project will benefit rural poor, especially, women. All the families in the project area who are willing to replace their traditional cook stove with 2 m³ domestic biogas unit and have cattle and space to build biogas unit near their home are part of this project activity. From a simple equity point of view, biogas not only rids the environment from air pollutants but saves women from hard labour involved in the collection of fuelwood in the field and in the kitchen, as it is easier and quicker to cook and clean utensils. Thus, biogas can serve as a vital entry point or “lever” for improving the position of women in household and in society.⁵ Easy availability of a certain amount of clean energy that is required to maintain life should be considered as a basic necessity. Biogas is one such energy source which helps in achieving universal primary education for girls, promote gender equality and empower women.¹²	• Low	N/A
- India has its National Policy on safety, health and environment at work place under the Ministry of Labour and Employment¹³. The biogas units are fixed domes built underground. No hazardous materials are used in the construction of biogas units. Biogas units are constructed using cement, bricks, PVC pipe, metallic fittings to control the flow of gas from dome to stove and ISI approved stove. The masons along with the daily labourers usually spend 4-5 days for construction of a biogas unit and not exposed to any hazardous materials during construction. 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. The families have been piling or putting the dung into a pit, which is later used as manure for their fields. Now under the project, the dung will be put into the digester for production of biogas. 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 biogas as clean cooking fuel will provide safe and healthy work environment to biogas users. The project is not complicit in exposing workers to unsafe or unhealthy work environments. - The impact of unsafe handling of biogas while working in the kitchen or through the bio-digester is very low. The bio-digester will be constructed outdoors, thus eliminating any leakage causing explosion or other health hazards indoors to the residents. Also, a gate valve will be provided at biogas exit point of the digester dome. This gate valve can be closed during night or while the family is away or if there is leakage, which will prevent any leakage indoors. Even if the gate valve is not closed during	• Low	N/A

¹² http://planningcommission.gov.in/reports/genrep/rep_intengy.pdf Chapter VIII: Household Energy Security: Electricity and Clean Fuels for All

¹³ labour.nic.in/policy/OSH-Policy.pdf

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leakage, the danger of explosion of biogas is less as it contains CO ₂ which acts as a fire extinguisher. ¹⁴		
Environment Protection		
There are no conventions relevant to this project with regard to environmental challenges. The project activity does not raise threats of harm to human health or the environment. On the contrary, the project will reduce indoor pollution, decrease deforestation and provide organic manure for agricultural fields. Apart from the direct benefits gleaned from biogas systems, there are others, perhaps less tangible benefits associated with this renewable technology. By providing an alternative source of fuel, biogas can replace the traditional biomass based fuels, notably wood. Introduced on a significant scale, biogas may reduce the dependence of wood from forest and create a vacuum in the market, at least for firewood.¹⁵ The project does not involve planting agricultural or similar activities and invasive species. It also does not involve producing chemicals, hazardous wastes, use of deliberately genetically modified organisms which are likely to harm the environment and mono-culture plantations. Thus the project activity is not complicit in practice contrary to the precautionary principle.	Low	N/A
India has various Acts that safeguard wild life, forests, biological diversity and environment. Of them the most significant are The Forest Conservation Act, Wildlife Protection Act, Biological Diversity Act. The project activity involves building biogas plants in the vicinity of homes, which do not fall under legally protected, high conservation value regions or protected regions by traditional local communities such as sacred grooves, community forests, etc. There has no critical natural habitats near the project area, does not displace activity or introduce invasive species. The project helps in reducing deforestation and improving biodiversity by reducing the quantity of fuelwood. The project boundary is in and around the existing houses or private property. Thus it does not involve and will not be complicit in 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
Anti-Corruption		
India has ratified the UN Convention against Corruption¹⁶ and also has it National Prevention of Corruption Act, 1988¹⁷. The project does not involve and will not be complicit in corruption. The project will not have any element of corruption as it will be handled by Accion Fraterna (AF), the project proponent with the involvement of end users groups. All the project financials will be available for the project beneficiaries and legal authorities.	Low	N/A

¹⁴ B.T. Nijaguna. 2002. Biogas Technology. New Age International Publishers, New Delhi. Page No. 4.

¹⁵ <http://www.ganesh.co.uk/Articles/Biogas%20Technology%20in%20India.htm>

¹⁶ <http://www.unodc.org/southasia/frontpage/2011/may/indian-govt-ratifies-two-un-conventions.html>

¹⁷ http://www.cbi.nic.in/rt_infoact/rti.php

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F.2. Sustainable Development matrix

Indicator	Mitigation measure	Relevance to achieving MDG	Chosen parameter and explanation	Preliminary score
Air quality	No mitigation measures required	(MDG)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	No change in water quality and quantity	- No change in water quality and quantity	0
Soil condition	No mitigation measures required		- Reduced demand for wood leading to slowing deforestation and soil erosion. Other advantage is use of biogas slurry for soil enrichment. However, monitoring of this indicator is beyond the project scope and dependent on other external factors. Hence was rated as neutral.	0
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 fuel wood, there would be better regeneration of trees, shrubs and herbs in the forests and non-forest	-Though there would be a definite positive impact, it would be difficult to assess quantitatively. Thus this indicator is not considered.	0

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		areas. But it would be very difficult to assess the impact of the project activity alone on biodiversity.		
Quality of employment	No mitigation measures required	(MDG)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 village level federations / SHGs and Village volunteer members in daily monitoring. At the village, and Mandal level, dedicated employment gain to monitor the project activity. Training will be conducted which will include i. proper use of biogas at the village level; ii. Training to the village volunteers for monitoring iii. Training to Accion Fraterna CDM staff for monitoring.	Improvement in quality of jobs compared to baseline. The minutes of the meeting, with participant list will be maintained for each of the trainings/ seminars/workshops conducted.	+
Livelihood of the poor	No mitigation measures required	(MDG)No.3 - Avoidance of drudgery	Improvement in living conditions especially of women	+

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		-Convenience to the family -Better social environment at home	- in the family as perceived by the communities - Type of income generation activities that is taken up to alleviate poverty.	
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	(MDG)No. 2 -Empowerment of women and the village federation members - Children can attend school in time -Skill development and institutional capacity	- Change in number of jobs for the rural people - Women in monitoring of the project activity	+
Quantitative employment and income generation		(MDG) No.1 - Employment generated in the project monitoring, informal sector -Income from CERs	- Employment generated due to the project activity. - Income from CERs -Daily wages paid	+
Balance of payments and investment	No mitigation measures required	(MDG) No.8 -Investment to the project through forward funding of CERs	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,	- Log of all the technical/awareness programs conducted for the operation and maintenance of bio-digester systems. - Workshops and	+

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		system as well as correct methods and timing of biogas liquid and residue application in agricultural fields.	trainings conducted for participants outside the project boundary	
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 ^{18,19} . According to WHO and Smith <i>et al.</i> , 2004 study, indoor smoke is the third health risk factor among Indians ²⁰ . 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 ²¹ .			
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" ²² . This will be compensated by water that is required to mix with dung to prepare the substratum and pour it into the digester. 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 ²³ . The application of slurry improves the physical, chemical, and biological characters of the soil ²⁴ . 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 . However, monitoring of this indicator is beyond dependent on other external factors. Hence is rated as neutral.			

¹⁸ <http://www.icmr.nic.in/bumay01.pdf>

¹⁹ <http://ehs.sph.berkeley.edu/krsmith/publications/2009%20pubs/Smith-Sivertsen%20et%20al.%20AJ%20Epi%2009.pdf>

²⁰ http://whqlibdoc.who.int/hq/2002/WHO_WHR_02.1.pdf

²¹ <http://practicalaction.org/docs/energy/docs50/bp50-nepal-biogas.pdf>

²² [http://bioenergyindia.kar.nic.in/Newsltr_2\(pg%205-8\).pdf](http://bioenergyindia.kar.nic.in/Newsltr_2(pg%205-8).pdf)

²³ http://planningcommission.gov.in/reports/peoreport/peoevalu/peo_npbpd.pdf

²⁴ <http://www.iisc.ernet.in/currsci/jul10/articles13.htm>

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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 ²⁵ . There is reduction of pathogens after digestion ²⁶ . 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 ²⁷ . A single biogas system with a volume of 2.8 m ³ can save as much as 0.12 ha woodland each year ²⁸ . 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.
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 GSSs will be involved in day to day monitoring of biogas units, thus providing them with good quality jobs.
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 ²⁹ . 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 Village level federations / GSSs will be involved in maintenance and monitoring of biogas units. This will lead to empowerment of women and the village federation 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

²⁵ http://www.greenpowerindia.org/biogas_benefits.htm

²⁶ <http://unesdoc.unesco.org/images/0005/000528/052857eb.pdf>

²⁷ <http://www.jstor.org/pss/3147225>

²⁸ <http://www.gtz.de/de/dokumente/en-biogas-volume1.pdf>

²⁹ 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=ARms6L3xkIEC&printsec=frontcover&dq=ravindranath+and+hall&source=bl&ots=HI2iRVcW-H&sig=BL9VpbsdGUj7ZJmveV0pWx1DDns&hl=en&ei=R8gQTKr5Jo_CrAevttXNBA&sa=X&oi=book_result&ct=result&resnum=5&ved=0CCAQ6AEwBA#v=onepage&q&f=false

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	social and economic activities leading to fulfilling their strategic needs and enhancing their self-confidence and empowerment ³⁰ . Children can attend school in time as food can be cooked in time for them and girls do not have to collect fuel wood anymore ³¹ .
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.

According to the EIA notification issued by the Ministry of Environment and Forests (MoEF, 2006), the project does not require Environment Impact Assessment (EIA)³².

According to the EIA notification issued by the Ministry of Environment and Forests (MoEF, 2006), the project does not require Environment Impact Assessment (EIA)³³.

SECTION G. Sustainability Monitoring Plan

No	01
Indicator	Air Quality
Mitigation measure	N/A
<i>Repeat for each parameter</i>	
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

³⁰ community.eldis.org/txFilenameDownload/f.59c2a4be/n.empowerment.doc

³¹

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

³² <http://www.envfor.nic.in/legis/eia/so1533.pdf>

³³ <http://www.envfor.nic.in/legis/eia/so1533.pdf>

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		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 3.57 t/family/yr.
Future target for parameter		- Construct 15,000 biogas units by 3rd 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.
	When	Annually
	By who	Accion Fraterna Staff

No		02
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 ex. Research organization, university, certified scientific laboratories, etc.

No	03
Indicator	Quality of Employment
Mitigation measure	N/A
<i>Repeat for each parameter</i>	
Chosen parameter	Improvement in quality of jobs compared to baseline. Number and type of training sessions, workshops and seminars.
Current situation of parameter	There are no large scale construction of biogas units in the Mandals prompting trainings and workshops
Estimation of baseline situation	No biogas related activities of this scale. Only

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of parameter		government promoted limited subsidy scheme. Capacity building programs for Biogas is not prevalent.
Future target for parameter		At the village, and Mandal level, dedicated employment gain to monitor the project activity. Training will be conducted which will include i. proper use of biogas at the village level; ii. Training to the village volunteers for monitoring iii. Training to Accion Fraterna CDM staff for monitoring. The minutes of the meeting, with participant list will be maintained for each of the trainings/seminars/workshops conducted. •
Way of monitoring	How	• Number of training sessions, workshops and seminars in the project area for the personnel. At least two training workshops will be conducted annually for all the personnel during implementation phase.
	When	• Annually
	By who	Accion Fraterna staff along with village level volunteers

No		04
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		• Women and girl children are mainly responsible for preparing and cooking food for the entire family • Long hours for cooking on traditional cook stove 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. Type of income generation activities that is taken up to alleviate poverty. • 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	Accion Fraterna staff

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No		05
Indicator		Access to affordable and clean energy services
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 cook stove 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.
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	Accion Fraterna staff

No		06
Indicator		Human and institutional capacity
Mitigation measure		No mitigation measures required
Repeat for each parameter		
Chosen parameter		• Job opportunity for the rural people • Women in monitoring of the project activity
Current situation of parameter		• Limited biogas related activities through government scheme. Will not generate any employment to the rural women
Estimation of baseline situation of parameter		• No biogas related activities that will give jobs to the rural people.
Future target for parameter		• CDM related jobs to the rural people • Number of women involved in the CDM activity
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	Accion Fraterna staff

No	07
Indicator	Quantitative employment and income generation
Mitigation measure	No mitigation measures required

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<i>Repeat for each parameter</i>		
Chosen parameter		• Employment generated due to the project activity. • Income from CERs
Current situation of parameter		• Limited biogas related activities through government scheme. Will not generate any employment to the rural women
Estimation of baseline situation of parameter		• No biogas related activities that will give jobs to the rural people.
Future target for parameter		• Income and other value added activities taken up by women. • Periodical CER income to women as recognition of their efforts for cooking. • Wages paid vis-a-vis local average wage paid or minimal wage.
Way of monitoring	How	Stratified sample survey
	When	Annually
	By who	Accion Fraterna staff

No		08
Indicator		Balance of Payments and investment
Mitigation measure		No mitigation measures required
<i>Repeat for each parameter</i>		
Chosen parameter		• Access to International funding to build domestic biogas units through carbon investors.
Current situation of parameter		• 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		• Minimal financial support reaches to limited households. There is no 100% investment dedicated energy programme in the project area. • Kerosene and firewood dependency encourages black marketing and increases economical burden.
Future target for parameter		• Sale of certified emission reductions (CERs) to access international funding to construct 15,000 biogas units. • Replacement of baseline cooking energy fuels with biogas.
Way of monitoring	How	• Audited account statements for the project activity • Number of biogas units being used

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	When	Annually
	By who	- Chartered Accountant - Accion Fraterna staff

No		09
Indicator		Technology transfer and technological self-reliance
Mitigation measure		No mitigation measures required
<i>Repeat for each parameter</i>		
Chosen parameter		Log of all the technical/awareness programs conducted for the operation and maintenance of bio-digester systems.
Current situation of parameter		No biogas units, use of traditional cook stoves
Estimation of baseline situation of parameter		No awareness programmes on biogas
Future target for parameter		Conduct of technical/awareness programs for awareness, operation and maintenance of biogas digester systems.
Way of monitoring	How	- Workshops and trainings conducted for participants outside the project boundary - Log of all the technical, awareness and operation and maintenance programs maintained for the project activity.
	When	Annually
	By who	Accion Fraterna 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

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The additionality assessment of the project is based on the UNFCCC approved additionality tool “Appendix B of the simplified modalities and procedures for small-scale CDM project activities; Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories”

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 Non-Renewable Biomass for Thermal Applications by the User, version04, EB60”.

The baseline calculations are conservative and transparent as can be seen from the PDD. Therefore, the non-renewable biomass and fuelwood use for emission reduction calculation is conservative and real, which can also be validated by the DOE.

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ANNEX 1 ODA declaration

The separate ODA declaration as per GS toolkit annex D has been enclosed separately for validation and uploaded on GS registry.