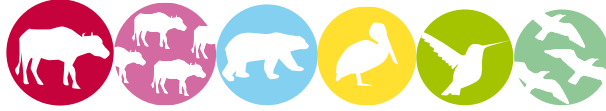


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SECTION A. Project Title

[See Toolkit 1.6]

Kolar Biogas Project Version: 4, Date:03/12/2015

SECTION B. Project description

[See Toolkit 1.6]

The project has been registered on 24th November 2011 with UNFCCC¹ and the project activity (installation of biogas units) has been started on 28-2-2012 This is the date on which the first upfront payment instalment has been received from the funder.

The proposed project will provide biogas units to households in rural areas of Kolar District in Karnataka State in India. The project will reduce the amount of fuel wood and kerosene used for cooking and heating water and will replace inefficient traditional cooking stoves with cleaner biogas stoves. The project will also reduce methane emissions from cattle manure and will contribute strongly to the sustainable development of the rural households involved in the project.

The biogas technology is tried and tested in rural India². SKG Sangha, an Indian non-governmental organisation (NGO), will implement the project. SKG Sangha has already successfully implemented over 50,000 biogas units in India over the last 15 years. Many of these biogas units were implemented with the help of government subsidies but the availability of these subsidies has reduced dramatically in recent years from around 250,000 units per year to around 5-10,000 units per year for the entire country. As there are over 600 districts in India, this equates to at best only tens of biogas units per District and an even smaller number at a Taluk level. Similarly, charity or donor financing has contributed to biogas units in the past but such financing is not able to cover the vast need for improving the energy supply to rural households in India. SKG Sangha therefore turned to the Clean Development Mechanism to provide biogas systems to rural households. SKG Sangha will try to cover 85% of the unit cost and 100% other monitoring and maintenance costs from the carbon revenues. As the situation of the carbon market is sure about the future the carbon prices have come down. The cost of ER under this project is very high when compared to the world ER sale prices as the project is a social developmental project. In these situations if the developer could not get good price for the ERs to cover 85% of the unit costs then may approach Government of India, through its Department of New and Renewable Energy (MNRE) declared assistance for CDM projects to lessen the beneficiary contribution burden. The amount available through this source is controlled by the department policies and regulations. If MNRE assistance is not available the SKG Sangha may approach any of the government departments for financial assistance.

The project encompasses 9,380 households in all five Taluks in Kolar District – Srinivasapur, Kolar, Mulbagal, Malur, and Bangarapet.¹

The Taluk is an Indian administrative unit. The Karnataka state is divided into several districts and each district is divided into taluks. Each taluk is subdivided into panchayaths for administrative purposes.

A taluk consists of several Panchayaths. Each taluk may have between 10 and 50 panchayaths. A Panchayath will have several hamlets or villages as part of it. A village is the bottom structure of

¹ <http://cdm.unfccc.int/Projects/DB/SGS-UKL1287587238.03/view>

² <http://www.mnre.gov.in/schemes/decentralized-systems/schems-2/>

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human settlement. Each village may have few to few hundred households.

Generally, a Taluk consists of a city or town that serves as its headquarters, possibly additional towns, and a number of villages. As an entity of local government, it exercises certain fiscal and administrative power over the villages and municipalities within its jurisdiction. It is the ultimate executive agency for land records and related administrative matters.

In each of the 9,380 households covered by the proposed project a family size biogas unit will be installed. The biogas unit will be of either 2m³ or 3m³ capacity depending on the number and type of cattle owned by the household and the number of people in the household. At least two cattle will be required for a household to be eligible for a 2m³ biogas unit and at least 3 cattle will be required for a household to be eligible for a 3m³ biogas unit³. (see Para 3. sub item ii) in the reference) Overall it is planned to install 2,814 units of 3 m³ capacity and 6,566 units of 2 m³ capacity.

The project will result in greenhouse gas (GHG) emission savings in the following ways:



- The biogas will displace GHG emissions from kerosene and fuel wood that are currently used for cooking. The biogas produced from cattle manure is a renewable source of energy as the CO₂ that is absorbed during the growth of the organic matter in the dung equals the CO₂ emitted when the biogas is burnt (see the introduction in chapter 10.1, Volume 4 of the Revised IPCC Guidelines 2006). In accordance with methodology AMS-IE, emission reductions are calculated for the non-renewable part of the fuel wood and for the share of kerosene that would be used for cooking without the proposed project activity.
- The biogas will displace GHG emissions from cattle manure that is currently dumped in pits near the household. The cattle manure is dumped along with other waste such as straw from the cow shed, some kitchen waste, crop residues and other organic matter and liquids in the pit. This organic waste is never dry and does not get mixed therefore animal waste is decaying anaerobically and emitting methane. When cattle manure is fed to the biogas reactor, the emissions (A 2 m³ single biogas system avoids annually 2.36 t CO₂e and a 3 m³ unit 3.54 t CO₂e due to this methane recovery) from the amount of manure that is added to the bioreactor will be avoided.

SECTION C. Proof of project eligibility

C.1. Scale of the Project

[See Toolkit 1.2.a]

Please tick where applicable:

Project Type	Large	Small
	<input type="checkbox"/>	√
	<input type="checkbox"/>	<input type="checkbox"/>

³ <http://www.mnre.gov.in/schemes/decentralized-systems/schems-2/>

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	<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

[See Toolkit 1.2.b]

India

C.3. Project Type

[See Toolkit 1.2.c and Toolkit Annex C]

Please tick where applicable:

Project type	Yes	No
Does your project activity classify as a Renewable Energy project?	x	<input type="checkbox"/>
Does your project activity classify as an End-use Energy Efficiency Improvement project?	<input type="checkbox"/>	x

Please justify the eligibility of your project activity:

The project activity is to install bio digesters which will be fed with cow dung to generate biogas (AMS III R under CDM). The generated biogas will be used as cooking fuel replacing the traditional wood fuel cook stove and some kerosene usage (AMS I C under CDM). The wood fuel used in the project area is coming from non-renewable (AMS I E under CDM) sources and the cow dung is a renewable source.

This project fall in the category “Biogas” and fulfils all the eligibility criteria as per the GS toolkit Annexes. The generated biogas will be used for cooking and if at all any biogas remains will be used for water heating purpose. The intended biogas plant is not replacing the entire fire wood used by the beneficiary households. It will replace 100% fire wood used for cooking and some portion to fulfil the

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water heating needs. Hence the 100% generated biogas in the project is utilized. This biogas generation and utilization will be monitored.

Pre-Announcement	Yes	No
Was your project previously announced?	<input type="checkbox"/>	x
Explain your statement on pre-announcement The project has not been announced previously. The project idea has been announced in the stake holder consultation meeting and explained in detail about the carbon markets and CER and VERs and the project developers explained in detail why it is not possible to implement the project without the CDM revenues. (please refer stake holder consultation meeting report)		

C.4. Greenhouse gas

[See Toolkit 1.2.d]

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

C.5. Project Registration Type

[See Toolkit 1.2.f]

Project Registration Type	
Regular	x

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)
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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SECTION D. Unique project identification

D.1. GPS-coordinates of project location

[See Toolkit 1.6]

Centre	Latitude ° N	Longitude, ° E
Kolar Taluk	13°08'12.04''	78°08'20.44''
Bangarapet Taluk	12°59'04.97''	78°10'42.40''
Malur Taluk	12°59'20.71''	77°55'42.12''
Mulbagal Taluk	13°09'39.22''	78°23'19.11''
Srinivaspur Taluk	13°20'19.13''	78°12'38.15''



Explain given coordinates

The project is to install 9,380 bio digesters one each in a household in Kolar district, Karnataka State, India. It is not practical to provide all 9,380 GPS coordinates here. So the project outer boundary coordinates has been given.

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D.2. Map

[See Toolkit 1.6]

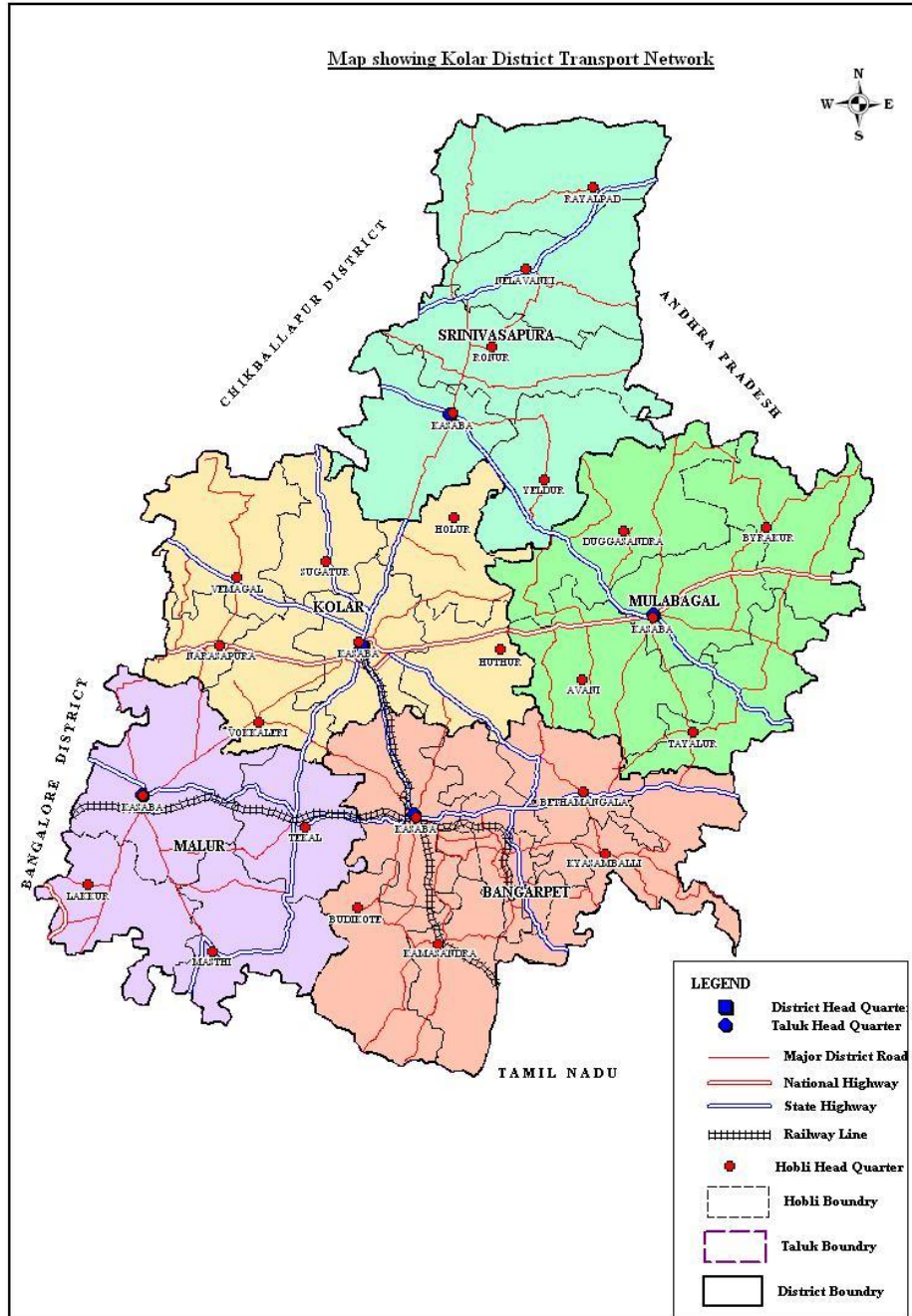


Fig.1. Project area, where the units will be installed

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SECTION E. Outcome stakeholder consultation process

E.1. Assessment of stakeholder comments

[See Toolkit Annex J]

[See Local Stakeholder Consultation Report B.5 and insert table from ii Assessment of comments. Insert a summary of alterations based on comments]

ii. Assessment of comments

Stakeholder Comment Assessment Response to comment

Explain better how the households contribute :

Beneficiaries contribute in labour or by purchasing some of the materials, e.g. manual work to build the plant together with the mason; getting sand; or purchasing bricks.

Why don't atmosphere spoilers bare the entire cost?

Explained about the Kyoto Mechanism, CDM Gold Standard methods and CER pricing. Organisers assured the participants that they will try their best to get the highest price for the CERs so that the stakeholders' contribution will be minimal.

Why not take up this programme in other taluks?

The present programme is meant for 5 taluks and SKG Sangha is looking for possibilities to do similar projects in other taluks

Why has the SKG Sangha not undertaken this programme earlier?

They were told that CDM EB approved the needed methodology during later period of 2007 and since then the SKG Sangha is collecting the baseline information required for the project and now it came to this stage.

Why not do something for the household who does not have cattle?

SKG Sangha is trying to take up the installation of improved cook stove programme in the near future to tackle the problem of indoor air pollution in the households who do not have cattle and bioreactor.

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.

[See Toolkit 2.11]

This is a community based project and the future beneficiaries are also part of the stake holder meeting. The feedback round has been carried out by sending the consultation meeting reports to the stake holders those who could not attend the meeting. The documents were made available to the public in general in the Panchayat offices and dairy societies. A public notice requesting the stakeholders for comments has been placed on the notice boards of these establishments. All the

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villagers have access to these documents and can submit the feedback forms available at these establishments and also can send their feedback directly to SKG Sangha office by post. So far we have not received any comments from the non-attendees. We have personally met some of the stake holders and they have supported the project and its activities.

The feedback round has been conducted again from 2-6-2013 to 2-8-2013 in 2 ways.

First an Email has been sent to all the GS supporting NGOs and local entities and NGOs along with a copy to the DNA, DOE and GS requesting their feedback on the documents provided through a link to GS registry. Again a reminder also has been sent to all these individuals and organizations requesting their feedback.

The second way of SFR has been conducted by made available the PDD, LSC report and Passport at the relevant gram panchayaths and requesting the public in general through a notice on those office boards to send their feedback. Prescribed feedback forms were also made available in those establishments for public consumption.

So far no comments were received.

Detailed information about the feedback round has been given in LSC report as Annex 3.

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SECTION F. Outcome Sustainability assessment

F.1. 'Do no harm' Assessment

[See Toolkit 2.4.1 and Toolkit Annex H]

Safeguarding principles	Description of relevance to my project	Assessment of my project risks breaching it (low/medium/high)	Mitigation measure
1. The project respects internationally proclaimed human rights including dignity, cultural property and uniqueness of indigenous people. The project is not complicit in Human Rights abuses.	Yes. The project respects human rights. The project units will be installed in any house hold without any discrimination those who are willing to have it and also have sufficient dung to feed the plant on daily basis.	Low	As there is no conflict with the principle since the project implementation promotes the human right to access to clean renewable energy source.
2. The project does not involve and is not complicit in involuntary resettlement	The project does not involve in involuntary resettlement. The biogas unit will be installed in the household back yards, owned by the beneficiary.	NIL	Nil as there is no conflict with the principle
3. The project does not involve and is not complicit in the alteration, damage or removal of any critical cultural heritage	The project does not involve in altering, damaging or removal of any cultural heritage. The biogas units and project technology is part of the rural areas in India. The project will reach more people in a short time. The project does not change any traditional or	NIL	Nil as there is no conflict with the principle

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	cultural heritage		
4. The project respects the employees' freedom of association and their right to collective bargaining and is not complicit in restrictions of these freedoms and rights	The project does not restrict employees rights and freedom	NIL	Nil as there is no conflict with the principle
5. The project does not involve and is not complicit in any form of forced or compulsory labour	The project does not involve in any form of forced labour. Any trained mason can install the units. The project is encouraging the local artisans to learn the technology and is providing trainings.	NIL	Nil as there is no conflict with the principle
6. The project does not employ and is not complicit in any form of child labour	The project does not encourage any form child labour and children are not employed by the project developer. More over the project frees children from the drudgery of fire wood collection and processing as there will not be any need to collect fire wood after installation of the project unit.	NIL	Nil as there is no conflict with the principle
7. 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.	The project is not in any way discriminate gender, race, religion etc. All the households and all people are eligible to have units provided they have sufficient space for the unit installation and sufficient animal excreta to feed the plant daily.	Low	The project beneficiaries are selected as per the availability of minimum number of cattle's required for enough production of biogas. And there is no form of discrimination based on gender, race, religion, sexual orientation or any other basis.
8. The project provides workers with a safe and healthy work environment and is not complicit in exposing workers to unsafe or unhealthy work environments	Biogas is the combination of methane, carbon dioxide and oxygen, hydrogen sulfide in minor quantity. Biogas plant stores a fixed amount of gas and any excess gas generated will be escaped. This will ensure the safety of the digester. If any crack developed in the	NIL	Nil as there is no conflict with the principle

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	<p>digester no biogas will be generated as biogas generation happens in anaerobic condition (without free air). The generated biogas will be carried from the digester to the utilization point, burner through a seamless pipe continuous pipe. This pipe is tested for any leaks prior to installation thus assuring the leak proof continuous flow of gas. The biogas will not explode as it does not have hydrogen. The specific gravity of biogas is about 0.6, much lighter than the air. Any leakage of biogas in the kitchen will be mixed with air easily. This biogas cannot be lighted with a spark as it contains about 35% carbon dioxide (fire inhibitor gas) and needs flame to light the biogas. If the biogas is mixed with outside air then its concentration further weakens and makes it practically impossible to inflame it. The risk level at biogas cooking is very little. Certain precautionary measures will be taken while selecting the space for the gas burner. Room with ventilation, space under existing chimney is some of these precautions. All the joints (5 in total) of gas carrying line will be checked periodically by the monitoring persons. Any leakage in the pipeline leads to no gas at the burner. As the household depends on the gas for daily cooking, no gas situation will be reported immediately because the gas cooking is much easier than the cooking on fire wood. This leakage will be curtailed by the plant owner when they identified it or the monitoring and maintenance people will do the necessary steps to</p>		
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	ensure gas supply. All the beneficiaries will be trained on all aspects of operation and maintenance of the unit.		
9. The project takes a precautionary approach in regard to environmental challenges and is not complicit in practices contrary to the precautionary principle	The project is to save the environmental pollutants and to safe guard the biosphere. The project replaces the non renewable biomass used by households for their cooking needs. The biogas unit also saves the emissions arising out of the unmanaged animal dung thus protects the biosphere and environment	NIL	Nil as there is no conflict with the principle
10. The project does not involve and is not 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	The project does not involve in degradation of natural habitats. More over it improves conditions in the natural habitats. The project unit, a biogas plant will be installed in the back yard of the household.	NIL	Nil as there is no conflict with the principle
11. The project does not involve and is not complicit in corruption	The project does not involve or encourage corruption. Selecting the families for the biogas units depends on the availability of the animals (min 2 cows) and this selection process is not based on any kind of corruption activity.	NIL	Nil as there is no conflict with the principle

Additional relevant critical issues for my project type	Description of relevance to my project	Assessment of relevance to my project (low/medium/high)	Mitigation measure
1 NA			
2 NA			

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F.2. Sustainable Development matrix

[See Toolkit 2.4.2 and Toolkit Annex I]

Insert table in section C3 from your Stakeholder Consultation report (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 ‘-‘	<p>Check www.undp.or/mdg and www.mdgmonitor.org</p> <p>Describe how your indicator is related to local MDG goals</p>	Defined by project developer	<p>Negative impact: score ‘-‘ in case negative impact is not fully mitigated</p> <p>score 0 in case impact is planned to be fully mitigated</p> <p>No change in impact: score 0</p> <p>Positive impact: score ‘+’</p>
Air quality	n/a	<p>Goal 4 – reduce child mortality.</p> <p>Goal 6 – combat</p>	<p>Annual hours of operation of an average system (hours of burner functioning) and Quantity of Fuel wood saved</p> <p>The project activity will result in a reduction in indoor air pollution</p>	+

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		other diseases.	<p>especially smoke and particulate matter from inefficient traditional cook stoves which are replaced by cleaner burning biogas stoves. This will help to reduce childhood mortality and combat respiratory and other diseases linked to indoor air pollution. The incidence of hospitalization can be monitored yearly.</p> <p>Reference: http://www.ashdenawards.org/winners/skgsangha</p> <p>See Advantages of Using Biogas as a Fuel Source in the introduction</p>	
Water quality and quantity	n/a		<p>Average amount of animal manure fed into a biogas digester per year.</p> <p>A slight improvement of water quality is expected due to reduced levels of leakage from animal waste and household waste water, which instead of being dumped in a pit will be added to the biodigester. The accumulated dung, urine and waste water will overflow during the rainy season and contaminate the nearby water bodies. In other days the leaching of the pits will percolate into aquifers and contaminate underground water. To some extent this can be avoided as the dung and waste water is fed to the biogas plant and the slurry coming out is either dried or used to convert other organic residues into compost. This process avoids the contamination of water. But effect is indirect.</p> <p>Reference: http://www.ashdenawards.org/winners/skgsangha</p>	0
Soil condition	n/a	Goal 7 – ensure environmental sustainability.	<p>Application of the sludge from the biogas unit.</p> <p>Previous SKG Sangha experience with similar biogas unit projects suggests the project activity will help to improve soil condition due to the application of the slurry from the biodigester. This slurry is a valuable organic fertilizers which can improve crop yields and reduce the use of chemical fertilizers. The biogas spent slurry is rich in humus and if applied to the soils retains water for longer time. As the slurry is already fermented it carries all the micro and macro nutrients. By applying this to agricultural soils chemical fertiliser application can be reduced and SKG Sangha found in its previous</p>	+

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			<p>projects that actual reductions of chemical fertiliser use. The project does not account emission reductions due to avoidance of chemical fertilizer. Even though this parameter will be monitored to have the data for future use</p> <p>Reference: See case study PDF file at http://www.ashdenawards.org/winners/skgsangha</p>	
Other pollutants	n/a		<p>No significant change due to the project activity.</p> <p>Reference: :http://www.ashdenawards.org/winners/skgsangha</p>	0
Biodiversity	n/a	Goal 7 – ensure environmental sustainability.	<p>Amount of non-renewable fuel wood saved by the project.</p> <p>The reduction in the consumption of fuel wood will reduce pressure on scarce forest resources and will help to stop the depletion of renewable forest stocks.</p> <p>Reference: http://resources.metapress.com/pdf-preview.axd?code=br68457w2216t668&size=largest</p>	+
Quality of employment	n/a		<p>Number of training programmes conducted and number of people participated</p> <p>SKG Sangha will train all beneficiaries on monitoring and maintenance of the units and proper handling of the spent slurry and its application. All supervisors are trained and refresher courses will be conducted to them. The masons also will be given refresher courses and on job trainings on new construction methods and techniques.</p> <p>Reference: http://www.ashdenawards.org/winners/skgsangha</p>	+
Livelihood of the poor	n/a	<p>Goal 1 – Eradicate extreme poverty and hunger</p> <p>Goal 4 – Reduce childhood Mortality</p>	<p>Amount of dung fed to the biogas plant and number of households having effective sanitary systems (biogas plants) and how the biogas plant spent slurry is used in the agricultural soils will be the monitoring parameters.</p> <p>Amount of kerosene consumed by household after installation of biogas unit and consumption of fuel wood in households participating in the project activity.</p>	+

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		Goal 6 – Combat other diseases	<p>Reduction in amount of money spent on kerosene, fuel wood, fertilisers and health, as well as reduction of time for collection of fuel wood.</p> <p>The project activity will alleviate poverty by reducing the need to buy kerosene, fuel wood and chemical fertilisers. The project activity will also help to prevent diseases caused by indoor air pollution as described for the air quality indicator above. The project activity will improve waste management facilities as animal manure and household waste water will be disposed of in a more sanitary manner (i.e. in the biogas unit). The project activity will also improve access to an appropriate quantity, quality and variety of food as the biogas unit and stove make it easier to cook meals (as the biogas stove produces instant heat when lit and burns cleanly) and also as more money will be available for spending on food as less will be spent buying kerosene, fuel wood and chemical fertilisers. The project will also free up time that women now use for collecting fuel wood and the women will instead be able to use time for income generating activities.</p> <p>Reference: Ravindranath, N.H and Hall, 1995. Biomass, Energy and Environment: A developing country perspective from India. 376 pp. New York: Oxford University Press</p>	
Access to affordable and clean energy services	n/a	<p>Goal 1 – eradicate extreme poverty and hunger</p> <p>Goal 4 – reduce childhood Mortality</p> <p>Goal 6 – combat other</p>	<p>Annual hours of operation of an average system (hours of burner functioning), amount of kerosene consumed by household after installation of biogas unit and consumption of fuel wood in households participating in the project activity.</p> <p>The project activity will improve access to clean energy supplies as it replaces inefficient traditional cook stoves that burn fuel wood and kerosene with clean burning renewable biogas. The biogas units are affordable as families make a small in kind contribution of labor and materials (as they are unable to afford the full costs of the unit).</p> <p>The indoor air pollution caused by the traditional cook stoves will be</p>	+

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		diseases	<p>avoided with clean biogas cooking thus creating healthy conditions in the household. The accumulated waste in the traditional compost pits is the breeding ground for mosquitoes and flies thus creating un sanitary and un healthy environment at the household, this will be reduced with the use of dung and waste water in the biogas plant and the spent slurry does not attract any mosquitoes or flies as it is a completely fermented material.</p> <p>Reference : http://www.indg.in/rural- energy/schemes/rural- energy/re-women-energy/</p>	
Human and institutional capacity	n/a	MDG- End poverty and hunger, Gender equality and universal education.	<p>In the baseline scenario there is no training to the women. I the project scenario all the plant owners will be exposed to the new technology, educated on this technology, trained on operation and maintenance of plants. During the monitoring of plants SKGS personnel will guide and train the beneficiary on whichever aspect of operation and maintenance they are lacking.</p> <p>Number of trainings the beneficiary attended and CERs ownership agreements will be the monitoring parameters.</p> <p>In the absence of project activity i.e in the baseline case households depends on the Fuel wood and kerosene for meeting their cooking needs. But after the implementation of the biogas digesters Women need not spent much time for cooking as it takes less time rather than the time taken with fuel wood.</p> <p>SKG Sangha provides training to all the beneficiaries especially women to assure an efficient use of the biogas units. This will leads to the empowerment of women. This enables women to obtain opportunities for social and economic activities leading to fulfilling their needs and enhancing their self-confidence and empowerment.</p> <p>Reference: http://community.eldis.org/.59c2a4be/txFilenameDownload/f.59c2a4be/n.empowerment.doc</p>	+
Quantitative employment and	n/a		<p>Number of people employed by the project activity.</p> <p>Wages existing in the project area and the wages paid by the project</p>	+

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income generation			<p>also will be monitored.</p> <p>Masons and others involved in the construction of the biogas units will be employed to implement the project. After implementation village representatives will be required to ensure the functionality of the biogas units on an ongoing basis.</p> <p>The households will save money spent on fire wood and chemical fertilisers. Women can also take up some other income generation SHG activities as they are getting time due to the implementation of project activity.</p> <p>Reference: http://envfor.nic.in/divisions/ic/wssd/doc2/ch4_anx.pdf</p>	
Balance of payments and investment	n/a		<p>Use of kerosene and reduction in chemical fertilizers use</p> <p>The project will however reduce the need to buy kerosene and chemical fertilizers by the households and improve their economical position. India is importing liquid fossil fuels. Reduction in consumption of kerosene and chemical fertilizers may lead to a reduction in the import of these commodities, although effect on the national level would be very small.</p> <p>Reference : http://mnre.gov.in/schemes/decentralized-systems/schems-2/ (Programmes/Schemes – Renewable energy for rural applications - Family Type Biogas Plants)</p>	0
Technology transfer and technological self-reliance	Regular check of the biogas plant for an assurance of the working condition.	<p>MDG 7- ensure environmental sustainability</p> <p>MDG Goal 1 – End poverty and hunger, universal education.</p>	<p>Training – the beneficiaries are being trained about the functioning of the biogas and about the precautionary actions needed. A number of training programmes are also carried out by the SKGS team both for the technical and the monitoring team. A regular field training programmes are carried out for the beneficiaries and supervisors on the production construction of biogas and units.</p> <p>Reference: http://www.ashdenawards.org/winners/skgsangha</p>	+
Justification choices, data source and provision of references				

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Air quality	The indoor air quality improves due to the project as unlike firewood biogas produces no smoke ⁴ . The project reduces the methane emissions that would have occurred if the cow-dung is left to decay in the compost pits. The foul smell of the cow-dung is also reduced making sure a hygienic environment for the beneficiaries in the project area ⁵ .
Water quality and quantity	<p>Quantity of cow dung fed into the biogas plant - In the base line scenario the cow dung mixed with urine and kitchen waste water were dumped in the traditional compost pits and during the year it leeches pollutants and spoils the ground and surface waters. When the cow dung is fed to the biogas plant this problem can be reduced. Biogas plant is fed with kitchen waste waters and cow dung mixed homogeneously and no fresh water is required. During the rainy season the compost pits will overflow and polluted water bodies and sometimes the wells. This can be avoided with the project activity. The project uses not only the cow dung but also the animal urine as feed material for the biodigester unit.</p> <p>It is difficult to monitor the aspects suggested by the GS tool kit V.2.1. Monitoring of suggested aspects involves huge expenditure for analysis of feed material and engaging high technology equipment. The project is a small scale project and more over it is a charity work does not have funds to engage costly equipment. More over the aspect sustainable score is mentioned as '0' in the passport.</p> <p>Ref: The Ashden Awards report*</p>
Soil condition	Although the slurry from the biogas unit is a valuable organic fertiliser which can improve soil condition by displacing chemical fertilisers, monitoring soil quality would be too complicated and costly for this type of project. A monitoring parameter of the application of the sludge from the biodigester is proposed and also the chemical fertiliser use per year by the households will be monitored. As there is no collected data in the baseline survey is available the first year chemical fertiliser can be taken as the base data for the next coming years. Ref: The Ashden Awards report*
Other pollutants	No significant change due to the project activity. Although the project will reduce considerably the wood consumption, the avoidance of wood smoke is a huge benefit to health and welfare, with decreased incidence of respiratory and eye problems, Ref: The Ashden Awards report*
Biodiversity	The amount of non-renewable fuel wood saved by the project is the most practical parameter to monitor the biodiversity benefits from the project as it will show how well the project is able to promote sustainable use of forest resources and contributes to reducing forest degradation. Ref: PDD references and The Ashden Awards report*. The saved forests will help in improvement of biodiversity ⁶ .
Quality of	Project engages local masons for construction of biogas plants. Before engagement they will be trained on techniques of leak proof digester construction. Local youth will be trained and after engaged for supervision, monitoring and maintenance of the units

⁴ <http://www.who.int/heli/risks/indoorair/indoorair/en/index.html>

⁵ http://www.ehow.com/list_7459711_uses-biogas-plant.html

⁶ http://www.daily-sun.com/details_yes_09-12-2010_renewable-energy-can-help-save-biodiversity_62_1_8_1_0.html

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employment	<p>installed. Trained masons will be provided with work in this project and other ongoing projects. The trained supervisory personal will be engaged as long as the project period. If they improve their capacities they will be absorbed in the SKGS. All the training programmes will be documented with a register of attendees, photos and these will be available for the verification at the SKGS office. Apart from the trainings to masons and local youth all the beneficiaries also will be trained on operation and maintenance of the unit. These trainings also will be documented and will be available for verification.</p> <p>Ref: S K G Sangha records and The Ashden Awards report*</p>
Livelihood of the poor	<p>Access to sanitation including toilets/washrooms. Waste management facilities that offer the possibility of disposing waste in a sanitary way is the more relevant parameter for the project. In the baseline scenario the animal dung, urine and kitchen waste water is dumped in traditional compost pits. The rains and deliberate water introduction to maintain moisture in the pits to compost material leads to moist organic material thus becoming a breeding ground for mosquitoes and flies and also leads to emitting bad odor. In the project scenario animal dung, urine and kitchen waste water will be fed to the biodigester. Biodigester is an anaerobic structure and non smelling well fermented material will exit from this plant. The exited material is organic fertiliser and if applied will improve the soil fertility. This the amount of dung fed to the biogas plant and also the number of households having effective sanitary systems (biogas plants) and how the spent slurry is used in the agricultural soils will be the monitoring parameters.</p> <p>Ref: PDD references and The Ashden Awards report*</p>
Access to affordable and clean energy services	<p>The functionality of the biogas units is the most practical way to demonstrate access to clean and affordable energy services. Other clean energy services or biogas units without the benefit of CDM are too expensive for the participating households to afford. Ref: The Ashden Awards report*</p>
Human and institutional capacity	<p>Addressing the issue of gender in India is one of the key drivers in SKGS' development model. All installations are contracted to the senior women in the family, giving them the property rights to what is likely to be a large source of income and value to the family. This move is intended to address the standing of women in rural household in India, giving them executive powers and restoring an element of independence and dignity. All the CER ownership rights were with women with whom the contracts were made. All the beneficiaries, women were trained number of times on the technology, operation and maintenance of the project unit. This leads to the tempering of their technical knowledge. Priory and importance will be given to ensure women's attendance to the stake holder meetings. Even before giving the unit, existing women self help groups will be contacted for listing likely beneficiaries in their area. The project unit will save time for women spent for collecting fire wood and also on cooking. This saved time can be used for income generation activities or to concentrate on children's education. Hence the time saved per day will be the monitoring parameter as CER rights agreements were already collected when the unit is under construction from the women of the household and will be available for verification.</p> <p>In the beeline scenario there is no training to the women. In the project scenario all the plant owners will be exposed to the new technology, educated on this technology, trained on operation and maintenance of plants. During the monitoring of plants SKGS personnel will guide and train the beneficiary on whichever aspect of operation and maintenance they are lacking.</p>

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	Ref: The Ashden Awards report*
Quantitative employment and income generation	<p>As well as creating more time for income generation through the displacement of fuel wood for cooking, the project unit also displaces the other major cooking fuels, kerosene or LPG. LPG and kerosene are expensive sources of energy. The fact that biogas can replace this expenditure means it can not only improve household savings, but also reduce their dependence on a volatile market. The project will create job opportunities in the project area as it requires about 50 man days of direct labour for each plant installation. The project trains and engages masons for installation of units. The project will train and engage local youth for monitoring and maintenance of units as supervisors. Thus the number of units installed and wages existing in the project area and wages paid by the project are the monitoring parameters.</p> <p>Ref: S K G Sangha records and The Ashden Awards report* The saved time of the women in fire wood collection and cooking can be invested in income generation activities.</p>
Balance of payments and investment	<p>The project activity promotes the use of the existing biogas technology in the country and also reduces the additional expenses and dependency of the beneficiaries on chemical fertilisers⁷. A successful implementation of this project will also help to promote future investments for similar large-scale projects in the region.</p>
Technology transfer and technological self-reliance	<p>Even though the biogas technology available locally its operation and maintenance (O&M) techniques were not familiar to many of the people. Apart from the units installation the O&M techniques will be taught to the beneficiaries in specially conducted training courses. All the data in relation to these training programmes conducted for local youth, masons and beneficiaries will be documented and are available for verification. Hence number of people participated in the training programmes is the monitoring parameter.</p>

* The Ashden Awards bring to light inspiring sustainable energy solutions in the UK and developing world and help ensure that they are spread more widely. SKG Sangha won the Ashden Award in 2007; the report is based on information provided to the Ashden Awards judges by SKG Sangha and findings from a visit by one of the judges to see their work in Karnataka, India. A detailed case study for the project is posted on the Ashden Awards website. For further information please see:

<http://www.ashdenawards.org/winners/skgsangha>

⁷ <http://www.efreshindia.com/eFresh/Content/Free.aspx?u=chftr>

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The project is to provide sustainable energy to households in Kolar district. The energy provided by the project activity will eliminate the use of fire wood sourced from depleting bio-resources accounting to about 78% non-renewable biomass. The district is already a draught prone area with a meager rain fall of 600mm and having no irrigation facilities. The ever depleting forest tree cover cannot be controlled without drastic and immediate action. The project is such a step in controlling the biodiversity and the forests in the district. More over cooking with fire wood in traditional inefficient cook stoves makes the problem of biomass scarcity ever worse. The indoor air pollution caused by fire wood use in inefficient cook stoves makes the household members unhealthy and involves lot of drudgery and time in procuring and processing of fire wood. The project unit, a biogas plant will eliminate many of these problems and more over saves the emissions. The animal dung fed into the biogas plant will come out after proper fermentation and will be used as fertiliser in the soils, which maintains the soil humus and makes the soils more fertile. The time saved in fire wood collection and cooking can be used for any income generation activities or provides the more needed rest time for the rural women. The project is having many environmental and social benefits apart from emission savings.

All the sustainable benefits and environmental impacts of the project have been discussed in the local stake holder consultation meeting in the local language. All parameters were explained and the participants' feedback is recorded (please refer stakeholder consultation report for more details on this subject).

The project has been approved by the host country through their letter, Host country Approval stating that the project is meant for sustainable development.

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SECTION G. Sustainability Monitoring Plan

[See Toolkit 2.4.3 and Toolkit Annex I]

No	1	
Indicator	Air Quality	
Mitigation measure	Since it is a positive impact it does not require any mitigation measure	
Chosen parameter	<ul style="list-style-type: none"> a) How many days in a year and how many hours a single burner is used per day the plant is functioning b) Reduction in incidence of hospitalization of any family member in a year. 	
Current situation of parameter	<ul style="list-style-type: none"> a) Plants not yet installed/ Beneficiaries are using firewood and kerosene for their daily cooking needs. b) Indoor air pollution causing health problems 	
Estimation of baseline situation of parameter	Beneficiaries are using firewood and kerosene for their daily cooking needs causing health problems for women and children	
Future target for parameter	<ul style="list-style-type: none"> a) 4 and 6 hours of one burner use per day for 2 & 3 size plant respectively b) Reduction in incidence of hospitalization will in a form of a question in the monitoring sheet. 	
Way of monitoring	How	Random survey of 469 units (5% of total units installed) includes <ul style="list-style-type: none"> a) Question on no of hours and days of operation of burners in a year b) Question on response to reduction in health problems after using the biogas plants.
	When	Yearly once
	By who	SKG Sangha

No	2	
Indicator	Water quality and quantity	
Mitigation measure	Since it is a positive impact no mitigation measure is required.	
Chosen parameter	How much dung is fed to the biogas plant daily	
Current situation of parameter	The cow dung is collected to the traditional compost pit.	
Estimation of baseline situation of parameter	The cow dung is collected to the traditional compost pit.	
Future target for parameter	A 2 cubic meter plant requires 50 kg and a 3 cubic meter	

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		plant requires 75kg animal dung per day for the plat to function at 100% capacity. As there are 30% 3 cubic meter biogas generation plants and 70% 2 cubic meter plants the average animal dung required per day will be 57.5 kg. 57.5 kg/day
Way of monitoring	How	Random survey of 469 households (or 5% of total units installed) includes the question on a) How much dung is fed to the biogas plant daily
	When	Yearly once
	By who	SKG Sangha

No	3	
Indicator	Soil condition	
Mitigation measure	Since it is a positive impact no mitigation measure is required	
Chosen parameter	a) Quantity of spent slurry disposed in the crop fields b) Reduction in quantity of chemical fertilisers used in the agricultural soils	
Current situation of parameter	Since the Biogas units are not yet constructed Cow dung is fermenting in traditional compost pit and chemical fertilisers are used in agricultural soils	
Estimation of baseline situation of parameter	Cow dung is fermenting in traditional compost pit and chemical fertilisers are used in agricultural soils	
Future target for parameter	a) 1150 l/of slurry per day b) Quantity of reduction in fertiliser use in the first year of the project activity by the household for the coming years.	
Way of monitoring	How	Random survey of 469 households (or 5% of total units installed)
	When	Yearly
	By who	SKG Sangha

No	4	
Indicator	Biodiversity	
Mitigation measure	Since it is a positive impact no mitigation measure is required	
Chosen parameter	The amount of non-renewable fuel wood saved by the project.How much quantity of fire wood is used for cooking needs by the project participants per day and 78% of it will be the non-renewable biomass	
Current situation of parameter	Since the biogas units are not yet constructed households	

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		are using the fuel wood for cooking and heating of water which is estimated as 9.706 kg/day from the baseline survey out of which 78% is the non-renewable biomass
Estimation of baseline situation of parameter		Baseline scenario is the same as the current scenario
Future target for parameter		0 kg/day
Way of monitoring	How	Random survey of 469 households (or 5% of total units installed)
	When	Yearly
	By who	SKG Sangha

No		5
Indicator		Quality of employment
Mitigation measure		Since it is a positive impact no mitigation measure is required
Chosen parameter		Total number of trainings given to different types of people involved in different activities and number of people trained
Current situation of parameter		nil
Estimation of baseline situation of parameter		9,380 beneficiaries and 500 others including masons and supervisors for the entire project period
Future target for parameter		9,380 for the entire project period
Way of monitoring	How	SKG Sangha data
	When	Yearly
	By who	SKG Sangha

No		6
Indicator		Livelihood of the poor
Mitigation measure		No mitigation measure required.
Chosen parameter		Money spent on fire wood and kerosene and any additional income generation by the women through the saved time would have spent on fuel wood collection
Current situation of parameter		Some of the baseline households are purchasing the fire wood and almost all of them are purchasing kerosene. Some of them are collecting the firewood from the forests by going to forests twice or thrice a week.
Estimation of baseline situation of parameter		Expenditure on kerosene 344 rupees/year and fire wood price @ 1.48/kg
Future target for parameter		Nil for fire wood and kerosene expenditure based on govt. pricing
Way of monitoring	How	Random survey of 469 households (or 5% of total units installed)
	When	Yearly

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	By who	SKG Sangha
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No	7	
Indicator	Access to affordable and clean energy services	
Mitigation measure	No mitigation measure is required	
Chosen parameter	How many hours each beneficiary is using biogas stove per day	
Current situation of parameter	Nothing as households are using traditional cook stoves for cooking and heating	
Estimation of baseline situation of parameter	Baseline situation is same as the current situation	
Future target for parameter	-4 - 6 hours/day/one burner	
Way of monitoring	How	Random survey of 469 households (or 5% of total units installed)
	When	continuous
	By who	SKG Sangha

No	8	
Indicator	Human and institutional capacity	
Mitigation measure	No mitigation measure is required	
Chosen parameter	How many people were trained on construction, monitoring, maintenance of biogas plant	
Current situation of parameter	Women are spending more time for collection of fuel wood and cooking by using the traditional cook stoves. They are not getting time for other activities to empower themselves in the society.	
Estimation of baseline situation of parameter	Same as above	
Future target for parameter	9,380 beneficiaries and 500 masons, supervisors and relevant people for the entire project	
Way of monitoring	How	9,380 beneficiaries and 500 masons, supervisors and relevant people for the entire project time. This will be monitored using the SKG Sangha data records.
	When	Yearly
	By who	SKG Sangha

No	9	
Indicator	Quantitative employment and income generation	
Mitigation measure	No mitigation measure is required	
Chosen parameter	No of people employed due to the project activity and	

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		additional income generated by utilising the saving time which would have spent on collection of fuel wood?
Current situation of parameter		No project activity and continuation of the present cooking practices
Estimation of baseline situation of parameter		Use of traditional fire wood cook stoves and women are spending time on collection of fuel wood.
Future target for parameter		a. No of people employed b. Income generation activities taken up by women due the saved time.
Way of monitoring	How	SKG Sangha data base
	When	continuous
	By who	SKG Sangha

No		10
Indicator		Balance of payments and investment
Mitigation measure		No mitigation measure is required
Chosen parameter		Monetary savings due to decrease in Kerosene and chemical fertiliser use
Current situation of parameter		Use of kerosene for cooking and fertilisers for agricultural lands
Estimation of baseline situation of parameter		22. 71liters per year
Future target for parameter		Will be monitored during the monitoring period.
Way of monitoring	How	Random survey of 469 households (or 5% of the total units installed)
	When	Yearly
	By who	SKG Sangha

No		11
Indicator		Technology transfer and technological self-reliance
Mitigation measure		no mitigation measure is required
Chosen parameter		How many beneficiaries are trained
Current situation of parameter		Plants not yet installed
Estimation of baseline situation of parameter		
Future target for parameter		9,380 plants
Way of monitoring	How	Random survey of 469 households (or 5% of the total units installed)
	When	Yearly
	By who	SKG Sangha

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No	12	
Indicator	Quantitative employment and income generation	
Mitigation measure	no mitigation measure is required	
Chosen parameter	Existing local wages and wages paid by the project	
Current situation of parameter	Local wage rate	
Estimation of baseline situation of parameter	Above the local wages	
Future target for parameter	9,380 plants	
Way of monitoring	How	Random survey of 4 households (or 5% of the total units installed)
	When	Yearly
	By who	SKG Sangha

Additional remarks monitoring

The monitoring survey will be carried out by selecting the households on a random basis. All the sustainable parameters will be monitored with a relevant question in the monitoring survey sheet. Information about the number of training programmes and number of participants will be made available to the verifiers by the SKG Sangha central office. Quantitative measurement of IAP, leeching of compost pits and etc., involves costly equipment and time. Hence the biogas plant functioning and hours of usage of biogas stove to assure the complete replacement of traditional cook stove; quantity of cow dung fed into the biogas plant to assure comparative less leeching of compost pits will be monitored

1. Desired Precision/Expected Variance and Sample Size.

Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project categories (I.E/ Version 3) states that a sample size shall be chosen for a 90/10 level of precision (a 90% confidence interval and 10% margin of error). But the according to the EB 65 decision the precision level will be 95/10. So the data will be collected at this level of confidence.

The proposed sampling approach has been found to meet this requirement. This is demonstrated as follows:

$$n = (Z_{\alpha/2} * \sigma/E)^2$$

Where:

n = the sample size

$Z_{\alpha/2}$ = 1.96 for a confidence interval of 95%

σ = the standard deviation

E = the maximum error of estimate – in this case 10% of the average value of the specific parameter

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As neither σ nor E is known for the parameters to be sampled, these values were calculated from an analysis of the results obtained from the baseline survey of another project, the results of which have been inspected by the validator.

By applying the formulae to the values calculated from the survey findings, the minimum sample size (n) for each parameter was calculated and is summarized in the table below.

Calculation of minimum sample size required to deliver a 95% confidence interval and a 10% margin of error for each parameter to be sampled.

Parameter	Units	$Z_{\alpha/2}$	σ	Average value from survey	E	n
B_{biomass}	Kg	1.96	3.66	10	1	51
$B_{\text{biomass, non-project}}$	Kg	1.96	3.66	10	1	51
N_t	No. of cattle	1.96	1.04	3.76	0.38	29
$B_{\text{manure_generated}}$	Kg	1.96	25.5	73.32	7.33	46
$B_{\text{manure_fed}}$ **	Kg	1.96	22.33	62.92	6.29	48
$F_{\text{collected}}$	Animals in confinement	1.96	3.21	20.61	2.06	9

The table shows that the sample size required to achieve a confidence interval of 95% of the different factors ranges from 9 to 51

A minimum sample of 51 households is needed to achieve a confidence interval of 95%.

But it is decided to take sample size as 500 households to get more accurate data for all the parameters.

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

[See Toolkit 2.3] Additionality has been demonstrated in the CDM PDD and the PDD has been validated. Moreover all the parameters suggested by the GS, 1. Identification of alternatives, 2. Barrier analysis, 3. Common practice analysis and 4. investment analysis were the components of the additionality demonstration in the PDD. Hence there is no need to demonstrate additionality again. See below guidelines of the GS in: – GS REQUIREMENTS – VERSION 2.2 page 32.

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VI.b. Gold Standard CDM and JI project activities. Gold Standard CDM and JI project activities are not required to carry out additional assessment for demonstration of additionality over and above what has been done for registration / determination with the CDM EB / JISC.

H.2. Conservativeness

[See Toolkit 2.2]

- The Gold Standard applies the principle of conservativeness in selection of your baseline scenario. As an example of conservativeness the two following cases are presented: If similar project activities in the region of your project have been registered with a certain baseline, you should not use a less conservative baseline unless there is a convincing case for an alternative choice of baseline methodology.

There are two registered CDM projects in the same area and they have used the AMS IC methodology and AMS IE to calculate the emission savings. The present project is also used the same methodologies to calculate the emission savings.

If you have a project registered at the UNFCCC and in the meantime the EB came up with a new and more conservative interpretation, or a new version of the methodology with a more conservative baseline has been approved prior to submission to The Gold Standard, then you must revise your baseline for Gold Standard registration. This can lead to different volumes of credits under The Gold Standard and the UNFCCC, which is not a problem, as CERs or ERUs are identified via the serial numbers.

In the PDD AMS IE version 3 is used to calculate the baseline emissions. After the project registration a new version AMS IE V.4 came into force. In this new version EB came up with a default emission factor, 81,600 for the projected fossil fuel. In the PDD the NRB component has been multiplied with the default value of 71,500, meant for projected fossil fuel, kerosene. See calculation in the PDD below:

(ii) Avoided non-renewable biomass

Annual baseline emissions for 1 operating unit:

$$BE_{NRB} = B_{biomass} * f_{NRB} * NCV_{NRB} * EF_{kerosene} * 10^{-3}$$

The following parameters are used:

Parameter	Value	Unit	Source
$B_{biomass}$	4.74	T	Baseline survey
f_{NRB}	0.78	-	Study by Ramachandra and Rao 2005, see Annex 5
NCV_{NRB}	0.015	TJ/t	IPCC 2006 T.1.2
$EF_{kerosene}$	71,500	kg CO ₂ /TJ	AMS IE

Therefore:

$$BE_{NRB} = 4.74 \text{ t} * 0.78 * 0.015 \text{ TJ/t} * 71,500 \text{ kg CO}_2/\text{TJ} * 10^{-3} = 3.966 \text{ t CO}_2$$

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If we replace the value 71500 with 81600 the emission savings from avoided NRB will be: 4.201 t CO₂ /unit/year.

An increased emission savings of 0.2347 t CO₂ /unit/year

In the PDD AMS III R version 1 is used and the emission savings were calculated according to that version. Later CDM EB came with a newer version AMS III R v.4. In this an uncertainty factor 0.94 has been introduced in the formula to calculate the emission savings.

See the PDD calculations provided below:

(iii) Avoided methane from cattle manure

Annual baseline emissions for 1 operating unit:

$$BE_{\text{manure}} = \sum_{(T)} (EF_T * N_T) * N * GWP_{\text{CH}_4} / 1000$$

$$EF_{(T)} = VS_{(T)} * 365 * B_{o(T)} * 0.67 \text{ kg/m}^3 * (MCF_{\text{liquid}}/100 * MS_{\text{liquid}} + * MCF_{\text{liquid with crust}}/100 * MS_{\text{liquid with crust}} + MCF_{\text{solid}}/100 * MS_{\text{solid}})$$

The following parameters are used:

Parameter	Value	Unit	Source
GWP_CH ₄	21	kg CO ₂ / kg CH ₄	IPCC
MCF _{liquid}	80	%	IPCC 2006 T. 10A-4 to 10A-6
MCF _{liquid with crust}	50	%	IPCC 2006 T. 10A-4 to 10A-6
MCF _{solid}	5	%	IPCC 2006 T. 10A-4 to 10A-6
MS _{liquid}	0.32	-	Baseline survey
MS _{liquid with crust}	0.20	-	Baseline survey
MS _{solid}	0.16	-	Baseline survey
<i>Dairy cow</i>			
N _T	2.56	-	Baseline survey
VS _(T)	3.8	kg dry matter/(head*day)	Biogas Technology by B.T. Nijaguna
B _{o(T)}	0.15	m ³ CH ₄ /kg VS	Biogas Technology by B.T. Nijaguna
<i>Buffalo</i>			
N _T	1.17	-	Baseline survey
VS _(T)	3.1	kg dry matter/(head*day)	IPCC 2006 T. 10A-4 to 10A-6
B _{o(T)}	0.1	m ³ CH ₄ /kg VS	IPCC 2006 T. 10A-4 to 10A-6
<i>Other Cattle</i>			
N _T	0.55	-	Baseline survey
VS _(T)	1.4	kg dry matter/(head*day)	IPCC 2006 T. 10A-4 to 10A-6
B _{o(T)}	0.1	m ³ CH ₄ /kg VS	IPCC 2006 T. 10A-4 to 10A-6

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Therefore:

$$EF_{\text{dairy cow}} = 3.8 \text{ kg VS}/(\text{head} \cdot \text{day}) * 365 * 0.15 \text{ m}^3 \text{ CH}_4/\text{kgVS} * 0.67 \text{ kg}/\text{m}^3 * \\ * (80/100 * 0.24 + 50/100 * 0.20 + 5/100 * 0.16) = 50.59 \text{ kgCH}_4/\text{year}$$

$$EF_{\text{buffalo}} = 3.1 \text{ kg VS}/(\text{head} \cdot \text{day}) * 365 * 0.1 \text{ m}^3 \text{ CH}_4/\text{kgVS} * 0.67 \text{ kg}/\text{m}^3 * \\ * (80/100 * 0.24 + 50/100 * 0.20 + 5/100 * 0.16) = 27.52 \text{ kgCH}_4/\text{year}$$

$$EF_{\text{other cattle}} = 1.4 \text{ kg VS}/(\text{head} \cdot \text{day}) * 365 * 0.1 \text{ m}^3 \text{ CH}_4/\text{kgVS} * 0.67 \text{ kg}/\text{m}^3 * \\ * (80/100 * 0.24 + 50/100 * 0.20 + 5/100 * 0.16) = 12.43 \text{ kgCH}_4/\text{year}$$

$$BE_{\text{manure}} \text{ for a } 3\text{m}^3 \text{ unit} = (50.59 \text{ kgCH}_4/\text{year} * 2.56 + 27.52 \text{ kgCH}_4/\text{year} * 1.17 + 12.43 \\ \text{ kgCH}_4/\text{year} * 0.55) * 21 \text{ kgCO}_2/\text{kgCH}_4 / 1000 = 3.54 \text{ tCO}_2\text{e}$$

$$BE_{\text{manure}} \text{ for a } 2\text{m}^3 \text{ unit} = 3.54 \text{ tCO}_2\text{e} * 2/3 = 2.36 \text{ tCO}_2\text{e}$$

As it is planned that 30% of the units are 3m³ units and 70% are 2m³ units, then BE_{manure} for 1 average unit is:

$$BE_{\text{manure}} = 3.54 \text{ tCO}_2\text{e} * 0.3 + 2.36 \text{ tCO}_2\text{e} * 0.7 = 2.714 \text{ t CO}_2\text{e}$$

If we apply the Version 4 uncertainty factor to the above emission savings the value becomes: 2.551 a net change of (-) 0.163 t CO₂/unit/ year

The emission savings according to the PDD: 3.966 (NRB) + 2.714 (Manure) = 6.68 t CO₂/unit/year

With the current methodologies the emission savings will be: 4.201 (NRB) + 2.551 (Manure) = 6.752 t CO₂/unit/year

The emission savings in the PDD are more conservative than the emission savings calculated with the latest versions of the methodologies.

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ANNEX 1 ODA declaration

[See Toolkit Annex D]

No ODA funds are involved as the project is funded with CER revenues. If at all the CER revenue is not sufficient to fund the unit cost then the project developer may avail eligible Govt. of India funds meant for CDM projects to lessen the beneficiary contribution burden. The ODA declaration is attached here under.

ODA DECLARATION

Name of the project: Kolar Biogas Project GS670.

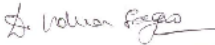
I, Vidya Sagar Devabhaktuni, President of SKG Sangha, project developer and implementer of the above referred project acting on behalf of all project participants, now make the following declaration:

I am familiar with the provisions of official development Assistance (ODA).

I understand that the above-referred project is not eligible for registration if the project receives or benefits from ODA.

I now expressly declare that no financing provided in connection with the above project has come from or will come from ODA sources.

Date: 1st February 2012.


Signature
(Vidya Sagar Devabhaktuni)