From cow dung to biogas in Karnataka, India

Project summary

With the carbon offset project "Kolar Biogas Project", myclimate and its local partner SKG Sangha are contributing to the reduction of greenhouse gas emissions and to less degradation of the forest. In addition, people profit directly from money and time savings on fuelwood and its collection and suffer less indoor pollution.

The project is installing domestic biogas plants in around 10,000 rural households in Karnataka State, India. The biogas installations are fed with animal dung and kitchen wastewater. The generated gas is then mainly used for cooking. In addition, the slurry of the remaining manure serves as high quality fertiliser replacing chemical products.

The Gold Standard®
Premium quality carbon credits
Applicant 670

Project benefits

The project is helping to reduce CO_2 while improving the quality of life of the participants:

- **Reduction of the consumption of fuel wood, protecting scarce forest resources**
- **Improvement of soil quality and its water retention capacity thanks to the replacement of chemical fertilisers with high-quality compost**
- **Reduction of expenditure on health as biogas cooking is clean and does not create indoor air pollution as much as the traditional firewood cooking stoves**
- **Reduction in time and work for fuel-wood collection, giving more time for schoolwork and other tasks**
- **Cost savings thanks to the avoidance of fire-wood and kerosene purchases**
- **Creation of sanitation as the cattle dung is properly treated in the biodigester**

Facts and figures on the carbon offset project

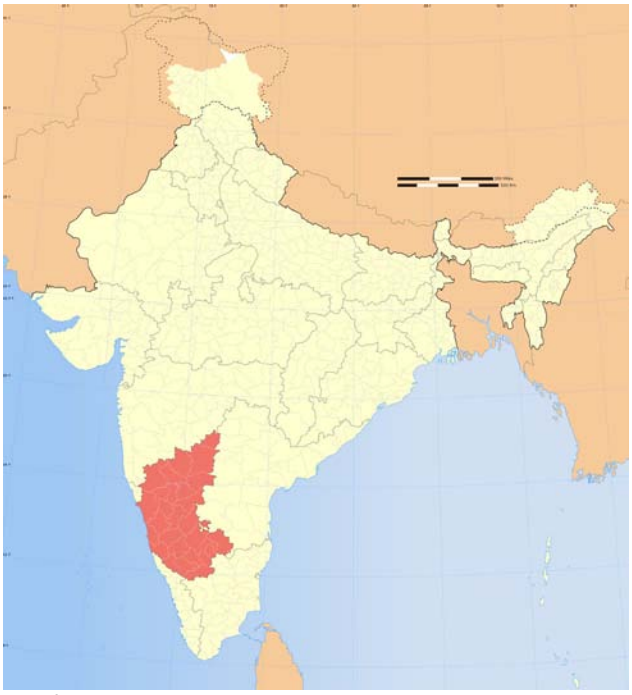
Project name	Kolar Biogas Project
Project location	India, Karnataka State
Project standard	Gold Standard CDM
Project type	Biogas, Methane reductions
Emission reductions	546,000 t CO_2e (over 10 years)
Situation without project	Using firewood and kerosene for cooking
Project status	Implementation
Project validation	SGS United Kingdom Limited
Project start	January 2012

The project country

With a population of more than 1.2 billion, India is the world's largest democracy. Over the past decade, the country's integration into the global economy has been accompanied by impressive economic growth. India´s diverse economy encompasses traditional village farming, modern agriculture, handicrafts, a wide range of modern industries and a multitude of services. Still, slightly more than half of the work-force is employed in agriculture.

While agriculture's share in the country's economy is gradually declining, India remains a global agricultural powerhouse. It has the world's largest area devoted to wheat, rice and cotton, and is the world's largest producer of milk, pulses and spices. The country is also home to the world's largest number of cattle, mainly consisting of buffaloes.

In parallel with India's remarkable economic growth, it is important to keep in mind that India is still a developing country with less than 75 per cent literacy and with entire regions living in a most precarious situation.



Map of India: Karnataka, where the project is being implemented highlighted in red.

Indicator	India	Switzerland
Total area (in km²)	3,287,590	41,285
Population (2011)	1,210,193,422	7,870,134
GDP in USD per capita (2011)	1,489 USD	80,391 USD
Share of population living below the national poverty lines (2010)	29.8 %	6.9 %
Energy use per capita (kg of oil, 2009)	585 kg	3,362 kg
CO_2-emissions per capita (in 2008)	1.5 t	5.3 t
	Mumbai	Zurich
Min. working time to buy 1 kg of rice in min.	37	9
Min. working time to buy 1 kg of bread in min.	17	12

India vs. Switzerland. (Source: CIA – The World Factbook, www.cia.gov/library/publications/the-world-factbook; World Development Indicators, web.worldbank.org; Bundesamt für Statistik)

The situation in the project region

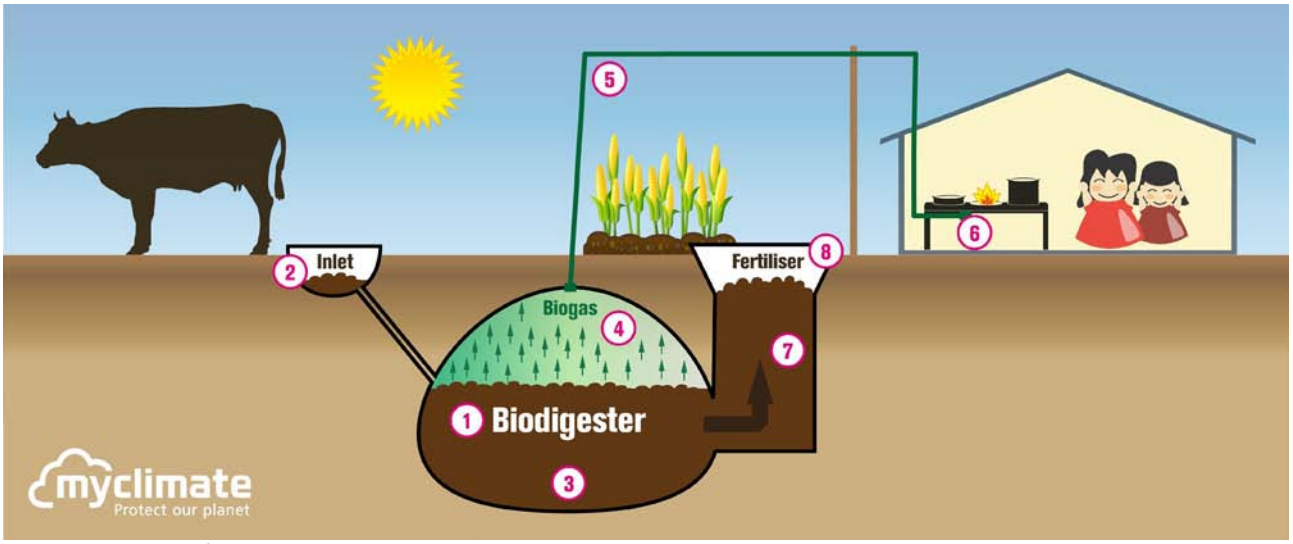
Even though the state of Karnataka is a leader in the information technology industry and biotechnologies, with its capital city being the famous Bangalore, more than half of its inhabitants live off agriculture. The rural areas are disconnected from the cities and the people live in extremely simple conditions. In the rural areas, like in the Kolar district where the project is mainly being implemented, literacy doesn't always reach 50 per cent of the population. In such areas, the energy needs of the local population for cooking are mainly met through the use of firewood. The traditional firewood cooking stoves create indoor air pollution in the houses. The cow dung is not processed and the farmers use chemical fertilisers in their fields.

Traditional inefficient cooking stove, such as was used before cooking with biogas began (cooking situation without project).

The biogas plant

In each household, a family-size biodigester is installed together with a biogas-based cooking stove unit. The biogas units are constructed of bricks, sand, cement, pipes, pipe fittings, metal clips, wire and gas burners, with all materials being produced locally. The capacity of the biodigesters is either two or three cubic metres of biogas per day. The biogas unit size is chosen based on the number and type of cattle owned by the household and the number of people living in it. The plants are built by the participants with the help of the SKG bricklayers. Cattle dung and wastewater are fed into the biodigester [1] each day by being added to a mixing tank above the ground, which has an inlet pipe [2] to a digester chamber which is below the ground. The generated slurry [3] remains in the chamber for approximately 40 days and breaks down anaerobically, producing biogas [4]. This biogas builds up above the slurry and remains in the biodigester until it is released through the gas outlet pipe [5] at the top of the chamber when the gas burner [6] in the household is turned on. This means that the pipe at the top of the biodigester leads to the cooking stove in the household. The biodigester also produces slurry, which is pushed into the displacement chamber [7] as the biogas builds up in the digester and finally exits through the outlet tank [8]. It is this slurry that can be used as fertiliser to improve crop yields.

Participants constructing the digester with help of bricklayers from SKG.



From cow dung to biogas for cooking.

How the project is implemented

myclimate works with SKG Sangha, an Indian non-governmental organisation, to implement the project. SKG Sangha has already successfully implemented over 100,000 biogas units in India over the last 18 years and plans to complete the installation of these 10,000 units in three to four years. The implementation of the project started in 2012, and there are currently around 1,500 biodigesters installed already.

One of the critical aspects of the implementation of this project is that every participant of the project should have access to support and be able to maintain their biodigester in a sustainable way. It is one of the reasons why myclimate has decided to work with SKG Sangha. The structure of the NGO is set up in such a way that groups of employees only oversee installations and make sure they are available and present for questions, remarks and to help if necessary. Furthermore, one member of each community is trained and becomes an integral part of the project´s success. They are responsible for maintaining the plants as well as directly supporting the participants if they have technical questions. On top of that, visits are made regularly to keep communication active and constantly support the participants.

Projects under the Gold Standard scheme, as compared to other schemes, have to fulfil strict criteria regarding the involvement of stakeholders in the project development process and on the documentation of environmental and socio-economic impact. All potential issues were discussed in detail in the stakeholder consultation in December 2008. No negative or critical environmental impacts were identified.

How the project is financed

Each participant is responsible for financing 15 per cent of the material necessary to build the biogas plant. The rest is covered by the carbon credits organised and supervised by myclimate. In order to ensure such a financing plan, myclimate managed the application and the documentation of the project and took care of the follow-up work during the whole process necessary for a project to be rewarded with carbon credits.

Environmental aspects

On the positive impacts side and in addition to the reduction of CO2 and CH4 emissions, the project reduces the consumption of fuelwood by the participants by up to 80 per cent. This economy is the best way to protect the neighbouring forests, as the farmers, lacking other choices, used to get their fuel wood directly from the forests.


A family participating in the project.


myclimate project manager Tanja Schmid looking out of a digester being built.


The biogas plants are fed with animal dung and kitchen wastewater.


Participant cooking on the new cooker using the gas from the biogas plant.


The biogas plant is underground and the gas is transported to the house by a small gas pipeline.

The generation of high-quality fertiliser has an important environmental impact as well. Soil quality and its water retention capacity improve by the indiscriminate use of chemical fertilisers with the application of this high-quality natural one. On top of that, the risk of water pollution is reduced due to proper management of the wastewater and a reduced use of chemical fertilisers and pesticides.

Socio economic aspects

The biogas plant removes the need for firewood consumption, thus reducing the burden of firewood collection for women and children. At the same time, the cleaning of the kitchen and pots used for cooking is easier, as biogas is a clean burning fuel and does not produce the levels of soot and other particulate matter that are produced by burning fuel-wood and kerosene. Using this new technology also makes it much faster to cook in general, as there is no need to set a fire anymore. These many aspects lead to enhanced gender equality amongst rural communities, as the position of women and young girls in the families and communities is strengthened. By reducing the time needed for fetching firewood and cooking, more time is devoted for example, for studying or generating income. Additionally, the biogas plant also relieves the household's budget in relation to fuel purchases.

Furthermore, emissions are reduced and indoor air quality is considerably improved through the cleaner and more efficient combustion of gas. Respiratory infections and eye complications amongst women and young adults, especially girls, are expected to decrease. The improved health conditions also reduce household expenditure on medication and treatments.

Finally, the slurry produced by the biogas units is a valuable organic fertiliser. The household doesn't need to buy chemical fertiliser any more, once again saving important money here.

Monitoring

A precondition for a carbon offset project certified under the Gold Standard and CDM is the existence of a stringent monitoring of the parameters used for emission reduction calculations and of sustainability indicators. This guarantees measurable and real savings of CO2 and a concrete contribution to local sustainable development.

Through its work with biogas plants over the last 18 years, myclimate's partner SKG has developed a system of installing and maintaining the biogas units. The operational and monitoring plan builds on this experience.

Monitoring is done in a hierarchical manner. In each village cluster where the project is implemented, a local person is selected and hired to be the motivator. He is responsible for accurate and transparent record keeping, quality control and monitoring the functionality of the biogas units. They are also in charge of reporting to the regional supervisor, who in turn reports to the project coordinator and his team at the main office.

Parameters monitored include firewood and kerosene consumption, fertiliser production, the quantity of biogas used, improvements in indoor air quality as well as time or financial savings due to reduced fuel consumption.

Inscription of the unique tracking identity code on the inlet for transparency reasons.

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