



GOLD STANDARD
BIOGAS PROJECTS
IN
RURAL INDIA

GOLD STANDARD BIOGAS PROJECT

The rigorous Gold Standard certification process ensures genuine quality, and like all high end products, Gold Standard carbon offsets carry a price premium. We are proud that our credits command this premium over other standards since it reflects the credibility, honesty, integrity and robustness of the standard and our brand. Moreover, it clearly demonstrates that The Gold Standard approach delivers not only better quality projects but also more commercially viable investments. Only by meeting these two criteria can carbon markets be financially sustainable in the long term.

For the end buyer, reduced reputational risk due to offsetting with Gold Standard credits brings peace of mind – an offset programme is only as strong as its weakest tonne. With sustainable development and environmental co-benefits being maximized, and ensured via The Gold Standard's Monitoring, Reporting and Verification, companies that invest in quality Gold Standard carbon credits invest in their own brand, demonstrating to clients, staff and suppliers sincerity towards environmental and corporate social responsibility

WHY DEVELOP GOLD STANDARD PROJECTS?

- ✓ The Gold Standard is the benchmark global carbon standard
- ✓ Gold Standard certified carbon credits sell at a price premium due to their high quality, robustness and sustainable development benefits
- ✓ The Gold Standard has nearly a decade of expertise and great market recognition
- ✓ There is high end-buyer demand
- ✓ Projects are more likely to be eligible for future compliance schemes

WHY BUY GOLD STANDARD?

- ✓ Reduced reputational risk
- ✓ Confidence and peace of mind in credit robustness
- ✓ The only standard to monitor, report and verify sustainable development criteria in all projects throughout the crediting lifetime of the project
- ✓ Widely viewed as the quality carbon credit in the marketplace
- ✓ Chosen to demonstrate broader CSR commitment
- ✓ Measurable co-benefits can enable a strong organizational fit
- ✓ Endorsed and supported by more than 85 NGOs worldwide
- ✓ Credits more likely to be eligible in future compliance regimes

RURAL SCENARIO

Located in climate zones of the tropical and sub-tropical regions, India is a favoured with a predominant agro-friendly climate. The Indian economy depends heavily on agriculture, ranking second worldwide in farm output, accounting for approximately 17% of the GDP in 2012 and 51% of the total workforce employed. Indian states including Uttar Pradesh, Punjab, Haryana, Madhya Pradesh, Andhra Pradesh, Bihar, West Bengal, Gujarat and Maharashtra are key agriculture contributing states. India also has the largest herds of cattle in the world.



The estimated agricultural residues and cattle waste from the vast resources account to a huge potential in capping biogas in the country. Biogas is the product of the anaerobic digestion of organic waste such as manure, sewage, municipal waste, green waste, plant material and crops. With an estimated 2 million households in India already accessing the facility of biogas, it has the potential to effect the energy transition from conventional to renewable energy. The estimated potential of Biogas is about 17,000 MW, and can fulfil the energy needs of energy-deprived rural India.

Biogas, commonly referred as "Gobar Gas", is a fuel that would substitute the traditional use of firewood, agricultural residues for household cooking and energy needs. Biogas systems also provide a residue organic waste, after anaerobic digestion that has rich nutrient qualities over the usual organic fertilizer, cattle dung, as it is in the form of ammonia.

Rural India, yet considers agriculture as the chief source of livelihood. The average per capita income of the region of the project is 300 to 400 USD. This income is usually gained from the local agriculture produce. To sustain their energy needs, a rural Indian depends a lot on the use of low cost fuel like firewood and kerosene.

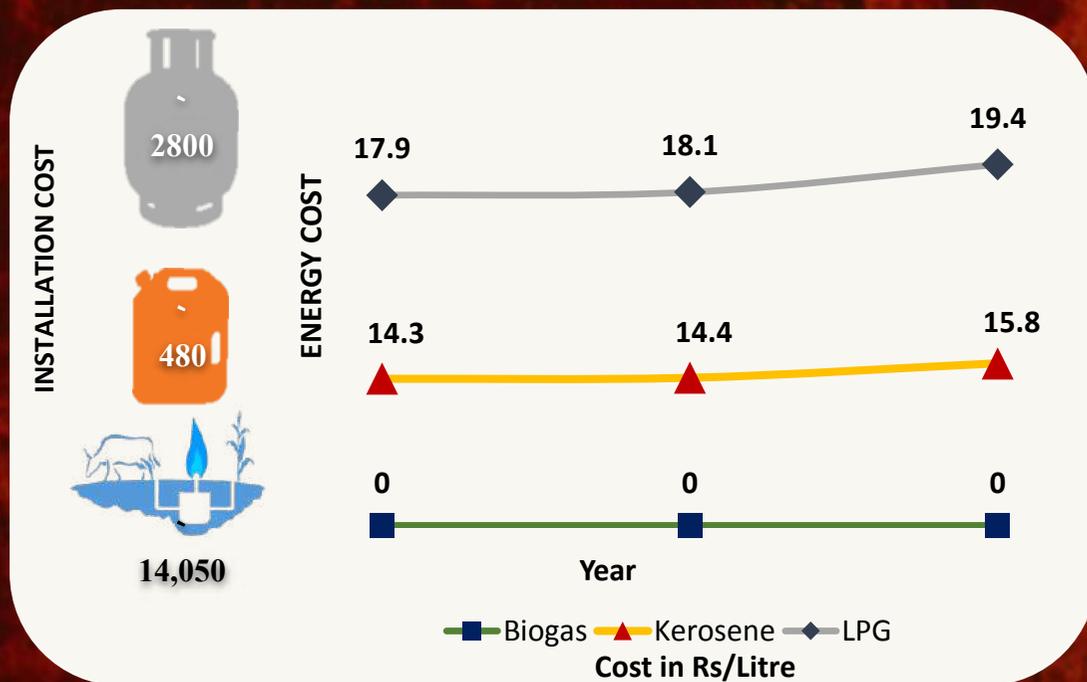
The present fuel dependency in project areas is largely on the use of firewood. There are no significant investments to the continued use of traditional cook stoves and non-renewable firewood for cooking. This wood is sourced from the farm, the forest fringe or purchased from the local dealers, who source it from the forest. But traditional use of firewood has tremendous health implications to the operator, which in most cases would be the women and children of the households.

LPG and kerosene are also used in these regions, but are not financially viable to replace the use of firewood. This project plans to explore the more viable option of using biogas. Biogas is financially a better option as the expenses are negligible, barring the installation cost and basic maintenance charges.

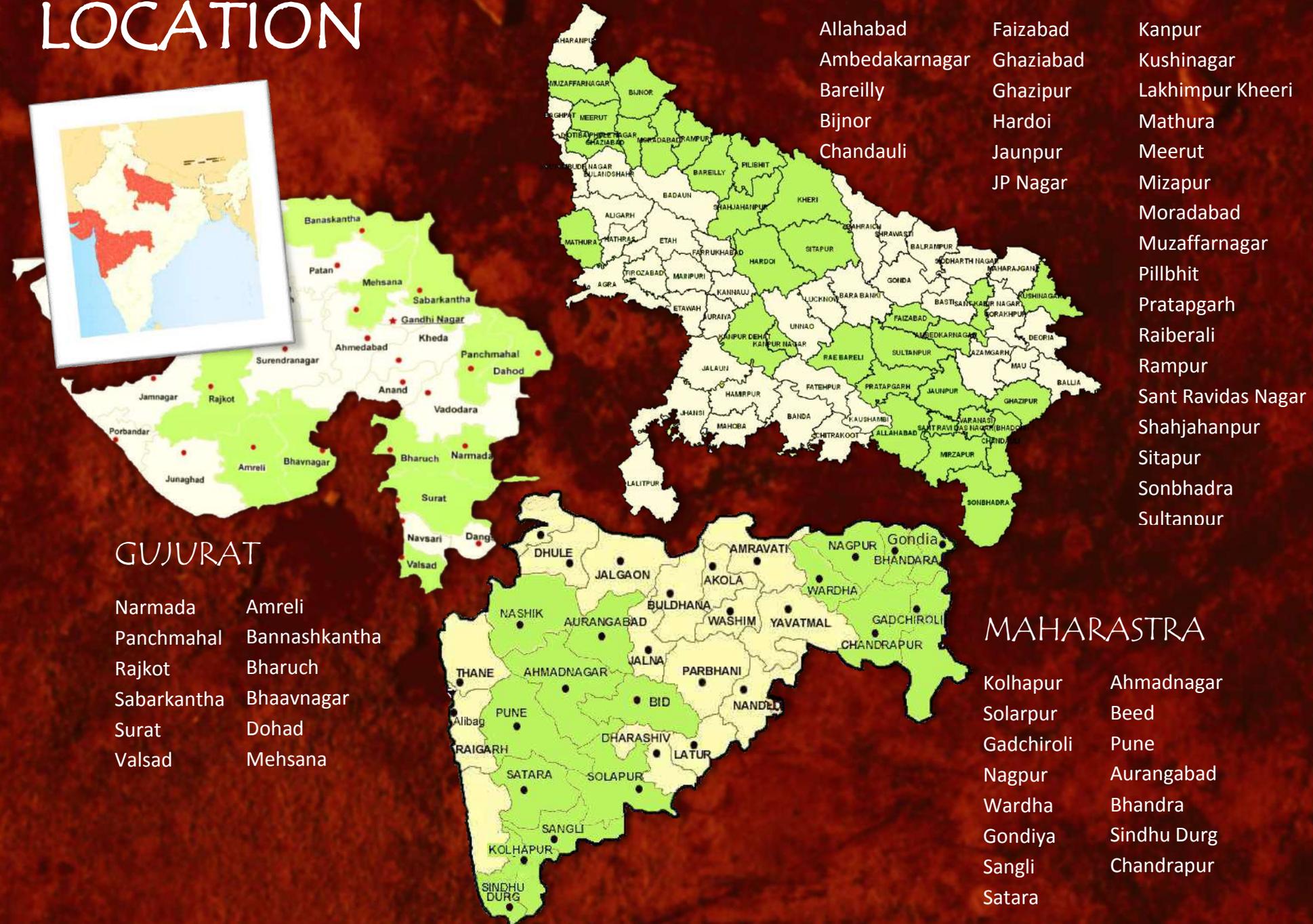


“ We had been using chula’s (traditional firewood cooking) for a long time. We had a lot of health issues back then. But ever since we have installed the biogas at our home, life has become much easier. It has helped in our sanitation condition and with our fields for natural manure. Cooking for our family has become much easier and faster. ”

- Geeta,
Dhekoliwadi village,
Maharashtra



LOCATION



UTTAR PRADESH

- | | | |
|----------------|-----------|--------------------|
| Allahabad | Faizabad | Kanpur |
| Ambedakarnagar | Ghaziabad | Kushinagar |
| Bareilly | Ghazipur | Lakhimpur Kheeri |
| Bijnor | Hardoi | Mathura |
| Chandauli | Jaunpur | Meerut |
| | JP Nagar | Mizapur |
| | | Moradabad |
| | | Muzaffarnagar |
| | | Pillbhit |
| | | Pratapgarh |
| | | Raiberali |
| | | Rampur |
| | | Sant Ravidas Nagar |
| | | Shahjahanpur |
| | | Sitapur |
| | | Sonbhadra |
| | | Sultanour |

GUJRAT

- | | |
|-------------|---------------|
| Narmada | Amreli |
| Panchmahal | Bannashkantha |
| Rajkot | Bharuch |
| Sabarkantha | Bhaavnagar |
| Surat | Dohad |
| Valsad | Mehsana |

MAHARASTRA

- | | |
|------------|-------------|
| Kolhapur | Ahmadnagar |
| Solarpur | Beed |
| Gadchiroli | Pune |
| Nagpur | Aurangabad |
| Wardha | Bhandra |
| Gondiya | Sindhu Durg |
| Sangli | Chandrapur |
| Satara | |

TECHNOLOGY



FACT :

Climate & Size:

- Fixed-dome plants must be covered with earth up to the top of the gas-filled space to counteract the internal pressure (up to 0,15 bar).
- The earth cover insulation and the option for internal heating makes them suitable for colder climates.
- Due to economic parameters, the recommended minimum size of a fixed-dome plant is 5 m³.
- Digester volumes up to 200 m³ are possible.

The project promotes energy needs of cooking in rural households by replace the scarce wood as primary fuel for cooking. The project encompasses 25,000 individual biogas plants. The biogas digester system includes the pipe leading to the stove and the stove itself.

In India the First Biogas Plant was commissioned in the year 1962 .This was known as KVIC Floating Dome Model (Popularly known as Indian Model). In 1979, the First Fixed Dome Model (Janata) was commissioned. The Deenbandhu Biogas plant model was the successor of the Janata plant in India, with improved design. It was more crack-proof, and consumed less building material than its predecessor.

The Deenbandhu biogas plants have a fixed underground digester chamber, constructed with a layer of bricks and an additional layer of cement mortar forming the roof above. Connected to the underground chamber is an inlet tank (labelled on diagram as “Mixing Tank”), through which manure is fed into the plant. The manure then ferments separating the slurry from the methane gas which rises and collects at the top of the digester tank, and is released through the gas outlet pipe. The slurry passes into the outlet tank where it is ejected from the plant and can be used as fertilizer on the field.

The KVIC model, consists of a deep well, and a floating drum, usually made of mild steel. The system collects the gas, which is kept at a relatively constant pressure. As more gas is produced, the drum gas holder consequently rises. As the gas is consumed, the drum then falls. The biomass slurry moves

ORGANIC WASTE COLLECTED



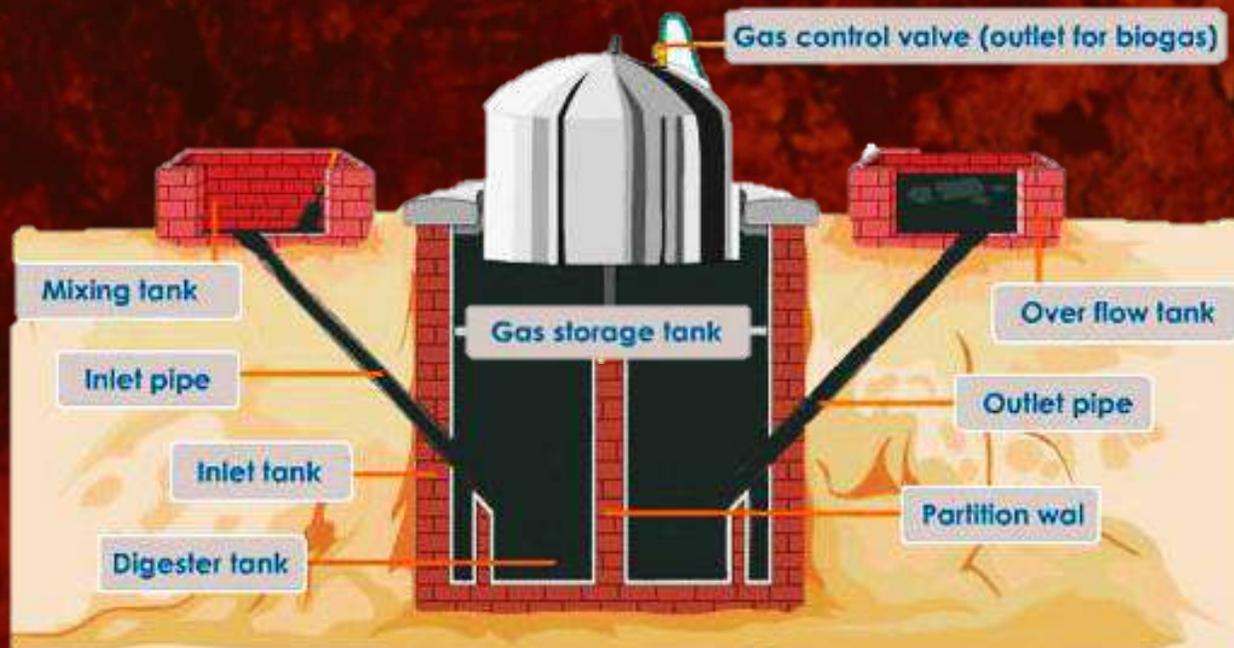
WASTE PUT IN MIXING TANK



BIOGAS CONNECTED TO STOVE



BIOGAS OUTLET



The major feed is cow dung and other organic waste material which are mixed with water and fed into the plant through the inlet chamber of the plant. This waste is converted into biogas with the help of a special type of anaerobic bacteria. The digested material, which comes out of the plant, is enriched manure.

MONITORING



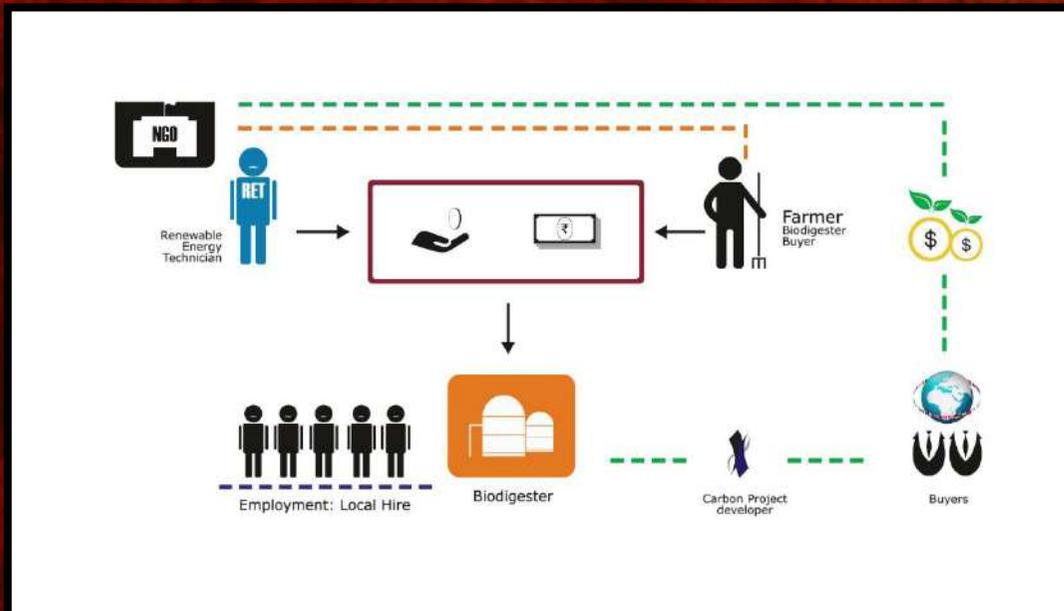
PROBABLE RISKS

As per the Evaluation study of the National Project on Biogas Development, the main reasons for plants becoming non-functional or for other structural and operational problems is the easy availability of other convenient fuels. This leads to the chocking of inlet/outlet, corrosion, leakage in pipeline, scum formation in digester slurry and water accumulation in gas pipe when the biogas plant is not in continuous use. Some of the problems can be rectified by the beneficiaries themselves, provided they are trained properly about preventive maintenance.

MONITORING SYSTEM

Bearing in mind of the risks elucidated, the project has accounted for regular training of Renewable Energy Technicians (RETs). Periodic training every fortnight is scheduled to keep technicians abreast with mechanics and problem solving techniques. Furthermore, any grievances in the operations of a biogas plant are addressed to the local RET. Each owner has a designated local RET whose contact details are provided. If the issue maybe beyond the scope of the local RET, a senior expert members of the AKKPS team help in rectifying the issue. Since the initiation of the project, there have been no complaints reported.

CREDIT CYCLE

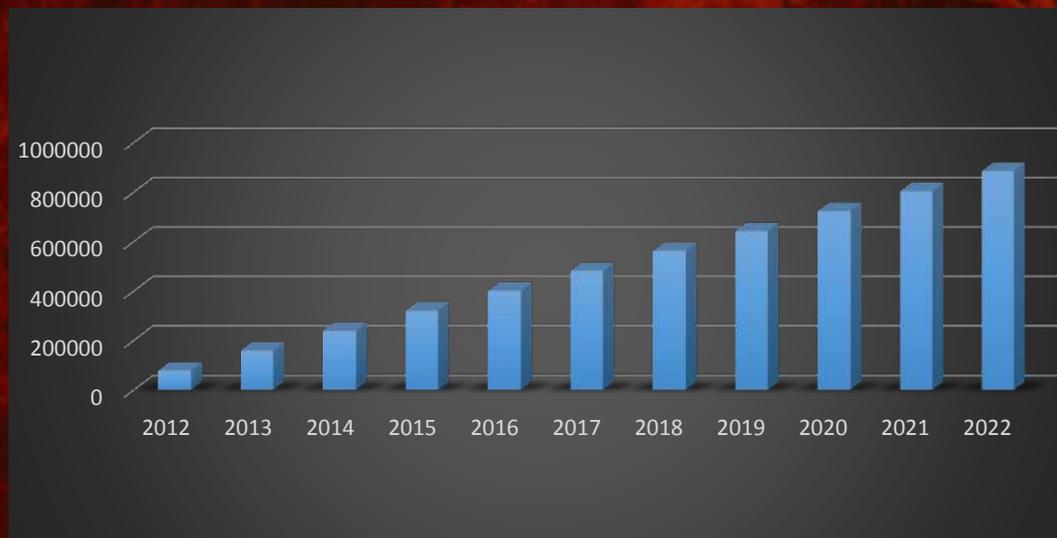


An RET or Renewable Energy Technician is appointed by AKKPS to liaise with farmers. The farmer is walked through the economic assessment – investment costs, subsidies, time to break even in addition to details on the socio-environmental benefits noted from existing users.

The farmer intending to install a biogas plant puts in an agreed percentage of installation cost, while the remainder is loaned from the designated RET. Relevant subsidies are availed by the RET to install the biogas unit. Local labourers are hired to construct the unit. This facilitates a local economic presence.

When the farmer commences biogas supply, VNV develops a carbon project, which generates carbon credits. These credits are purchased by buyers across the world. The money generated from carbon credits goes to AKKPS for capacity building, from which a percentage goes to the farmer.

The project is estimated to reduce around 890,000 tonnes of GHG emissions over the project period of 10 years. By the induction of biogas plants in the regions, an approximate overall average reduction of firewood usage of around 1280 kg/month per district has been noticed. Reduced stress emissions levels on forest areas are also occurring.



IMPACTS

ECONOMIC

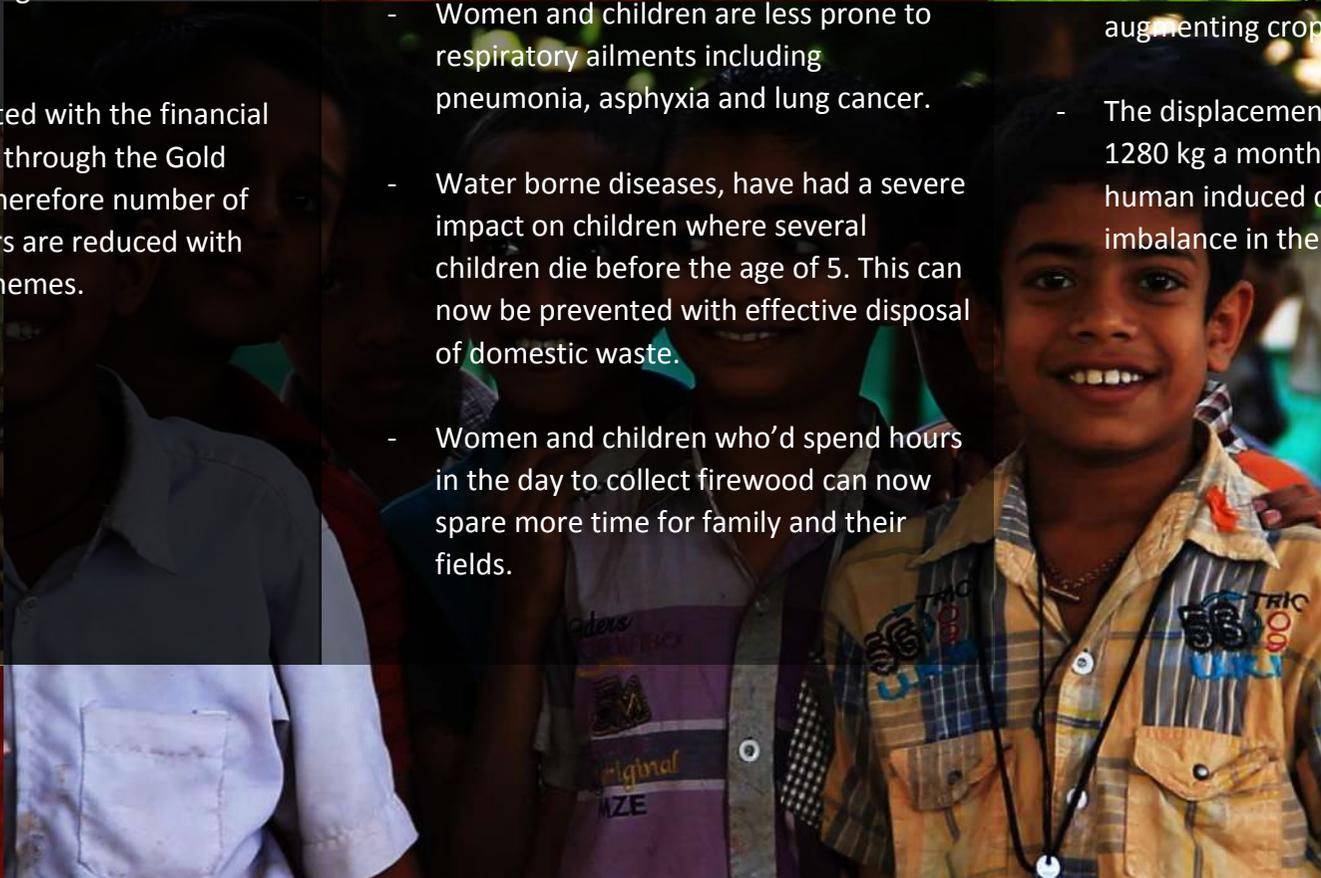
- With the advent of this project there have been an average of 7-8 people employed in the construction of a bio-digester.
- Local hiring of village mechanics and technicians, reduce the need to migrate to neighbouring villages or cities to find decent labour.
- Farmers are benefitted with the financial assistance credited through the Gold Standard Project, therefore number of bank loan defaulters are reduced with flexible payback schemes.

SOCIAL

- Better health and sanitation with the biodigester displacing firewood cooking.
- Mothers-to-be are spared from toxic fumes emitted from *chulhas* and long journeys to collect firewood. Therefore considerably reducing pre-natal complications.
- Women and children are less prone to respiratory ailments including pneumonia, asphyxia and lung cancer.
- Water borne diseases, have had a severe impact on children where several children die before the age of 5. This can now be prevented with effective disposal of domestic waste.
- Women and children who'd spend hours in the day to collect firewood can now spare more time for family and their fields.

ENVIRONMENT

- The biodigester produces an organic soil enriching digestate which can be used in the farmers field.
- This has been an effective fertilizer, which stabilises soil quality and enriches fertility in the land, thereby augmenting crop yield
- The displacement of firewood of nearly 1280 kg a month has helped in reducing human induced deforestation and imbalance in the ecological systems.



SDGS ADDRESSED BY THE PROJECT

3 GOOD HEALTH AND WELL-BEING



5 GENDER EQUALITY



7 AFFORDABLE AND CLEAN ENERGY



8 DECENT WORK AND ECONOMIC GROWTH



12 RESPONSIBLE CONSUMPTION AND PRODUCTION



13 CLIMATE ACTION



15 LIFE ON LAND



PARTNERS

Adivasi Khadi & Krishi Prasikshan Sansthan (AKKPS):

AKKPS is a grass root NGO that fund, training & maintain biogas plants. They further impart the training to the local people employed in each of the districts to take care of the maintenance of the bio digesters. The procedures cover management responsibilities, data monitoring procedures, training and maintenance procedures and annual surveys.

AKKPS role also include the following:

- Empowers rural folk to take up biogas and other technologies for energy access
- Maintains the biogas ecosystems via providing services for maintenance and understanding of biogas systems
- The ground partner for the carbon project
- Data collection
- Responsible for implementation of the projects like construction and maintenance
- Responsible for distribution the funds to individual stakeholders



VNV Advisory has actively facilitated businesses, government bodies and public organizations transit to a low carbon economy, through our carbon transaction expertise and our sustainability business strategies. Our solutions have evolved incorporating climate change and sustainability to help serve our clients better.

Our role in the Gold standard project is:

- VNV is the facilitator for this carbon project ensuring that the technology deployed is capable of generating carbon revenue.
- Preparation of Project documentation like PDD & Gold Standard passport and other Gold Standard documents
- Prepares marketing material for the project under discussion
- Co-ordinates the role of AKKPS and other bodies internal and external to the project, thus supporting the whole ecosystem for sustainable management
- Coordinating agency for sale of carbon credits and fund disbursement.
- It is also the focal point to address an issues related to the project



PROJECT CONTRIBUTION TO SDG (SUSTAINABLE DEVELOPMENT GOALS)

3 GOOD HEALTH
AND WELL-BEING



The project contributes directly in achieving the SDG#3 &7 in addition to SDG#13 as required by Principle-1 of GS4GG. The project will have following benefits:

- Environmental Benefits: Reduction in firewood consumption and emission of greenhouse gases, forest and biodiversity conservation (SDG#13).
- Health Benefits: Sufficiently enhance indoor air quality thereby improving health of family members and reducing incidences of smoke and fire related injuries (SDG#3).
- Social Benefits: The project will provide affordable and clean fuel compared to baseline scenario (SDG #7)

7 AFFORDABLE AND
CLEAN ENERGY



13 CLIMATE
ACTION



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