

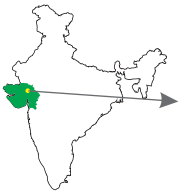
“Promoting Energy Efficiency and Renewable Energy in selected MSME clusters in India”

With an aim to develop and promote a market environment for introducing energy efficiency and enhanced use of renewable energy technologies in process applications in the selected energy-intensive MSME clusters, United Nations Industrial Development Organization (UNIDO), in collaboration with Bureau of Energy Efficiency (BEE), is implementing a project titled “Promoting Energy Efficiency and Renewable Energy in selected MSME clusters in India” funded by Global Environment Facility (GEF) and co-financed by Ministry of Micro, Small and Medium Enterprises (MoMSME) and Ministry of New and Renewable Energy (MNRE). The project supports MSME units in implementing various energy conservation measures and thus result in reduced energy consumption and Green House Gas (GHG).

A GEF-UNIDO-BEE Project

Methane Capture from Dairy Effluents and Used as a Fuel

Company Profile



Mother Dairy (AmulFed Dairy - A unit of Gujarat Cooperative Milk Marketing Federation Limited) having its plant at Bhat, **Gandhinagar, Gujarat** offers wide spectrum of dairy products to the entire nation including cultured products, ice creams, paneer and ghee under the 'Mother Dairy' brand. The Company also has a diversified portfolio with products in edible oils, fruits & vegetables, frozen vegetables, pulses, processed food like fruit juices, jams, etc. to meet the daily requirements of every household.

Objective



To capture methane from effluents, & utilize it as a fuel.

Intervention



Biogas generation using anaerobic digester and utilize the same as fuel for boilers, canteen and staff quarters of the plant.

Outcomes



- Biogas generated: 4000 m³/day
- Calorific value of biogas: 6000 kcal/m³
- Savings from biogas generation: ₹ 72000/day



Principle

- ❖ Conventional methods of aerobic effluent treatment consume high levels of energy (owing to the nature of the mechanical equipment) and simultaneously release large quantities of methane into the atmosphere.
- ❖ Dairy effluents contain high Chemical Oxygen Demand (COD) & Biochemical Oxygen Demand (BOD), and are therefore suitable for anaerobic methane capture.
- ❖ Capturing methane from effluents provides an alternative source of energy and simultaneously protects the environment by reducing the emission of greenhouse gas. The biogas so generated is utilized as a fuel for boilers, canteen and staff quarters of the plant.



Implementation

- ❖ The plant collects around 1700 kL liquid effluents per day from the different processes into a common anaerobic digester. This organic matter is decomposed in an anaerobic environment to produce a mixture of methane and carbon dioxide gas, referred to as biogas.



**Activity implemented by unit,
disseminated by project**



Cost-Economics

COD load per day	13600 kg/day
COD reduction percentage consideration	80%
Actual reduced COD load	10880 kg/day
Biogas generated (of reduced COD load)	0.4 m ³ /kg
Actual biogas generated (Avg. of monthly production)	4000 m ³ /day
Calorific value of biogas	6000 kcal/m ³
Total heat that can be generated from biogas	24000000 kcal/day
Calorific value of natural gas	8350 kcal/m ³
Natural gas equivalent biogas generation	2874 m ³ /day
Cost of natural gas (variable)	₹ 28/m ³
Savings from biogas generation	₹ 80000/day
Nos. of working of days per annum*	360 days
Total expected savings per annum	₹ 28800000
Expected energy savings per annum	864 TOE
Investment of this project includes mechanical and electrical equipment and civil work	₹ 2,50,00,000

* Assumption

Biogas Generation Through Methane Capture



Digester



Gas Holder



Boiler with Separate Biogas Line



RESULTS

Proper disposal of dairy effluent leads to arresting release of methane into atmosphere

With the help of anaerobic methane capture system, about 864 TOE savings is possible per annum and reduction of **459 tonnes of CO₂** emission per annum

Around **4000 m³/day** bio-gas is generated from the system, equivalent to 2874 m³/day natural gas



Replication Potential

- This type of measure can be implemented in all the dairy units where sufficient effluent is available to generate methane gas
- Anaerobic methane capture technology is very well proven and there is no risk involved in implementation of this measure



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