

AGRICULTURE SUCCESS STORY

One-Megawatt, High-Rate Biomethanation Plant

Ludhiana, Punjab, India

Haebowal Dairy Complex

OVERVIEW OF AGRICULTURE PROJECT:

Household biogas plants that yield 1-6 cubic meters of biogas per day using cattle manure have been promoted in India for more than three decades. During that time, more than 4.5 million plants have been installed. A few small and medium size biogas plants of capacities up to 100 kW have also been installed.

This project at Haebowal was set up as the first project to demonstrate large-scale power generation from cattle manure. The project has proven the technical feasibility of developing such projects for energy recovery as well as producing large quantities of enriched organic fertilizer and reducing GHG emissions.

ACTUAL ANNUAL EMISSION REDUCTIONS: 4,800 MTCO₂E

PROJECT DETAILS

- **Site Name:** 1-MW high-rate biomethanation plant based on cattle manure
- **Geographic Location:** Haebowal Dairy Complex, Ludhiana, Punjab, India
- **Site Type:** Dairy complex
- **Site Size:** 80,000 cattle
- **Baseline Waste Management System:** Collected manually, used for making cow dung cakes for use as fuel or disposed of into city sewerage system
- **Digester Type:** Intermittently stirred tank reactors based on biogas-induced mixing arrangement
- **Digester Volume:** 2 x 5,000 CUM
- **Type/Volume of Gas Storage:** 1,000 CUM (bell- and shell-type storage made of neoprene-coated nylon fabric)
- **Year Built/Operational:** Constructed and commissioned in Sept 2004
- **Feedstock(s):** Cattle manure, 200 tons/day
- **System Designer:** Ministry of New and Renewable Energy and Punjab Energy Development Agency developed and executed the project with technology obtained from ENTEC (Austria)

BIOGAS AND ENERGY HIGHLIGHTS

- **Generating Capacity & Biogas Generation:** 10,000 CUM/day of biogas generation for use in 1000 kW GE gas genset
- **Total Annual Generation Capacity:** 6 million kWh
- **Biogas Use:** Used for generating electricity for feeding into the national grid. The waste heat recovered from the engine provides heat to the digesters for maintaining them at a constant temperature of 37 C (+/- 2 C)
- **Energy Generation Cost:** Operating cost is about Rs 3.14/kWh (Capital cost was provided as a grant by the Government of India and the State Government of Punjab)
- **Price of Energy Sold to the Grid:** Rs 3.49/kWh
- **Final Digestate Use:** Separated solids with less than 70% moisture are sold as farm manure at Rs 1000 per metric ton

INCENTIVES/BENEFITS

- **Reason for Installing Digester:** It was set up as a demonstration project to recover energy and reduce GHG emissions, as well as improve the environment by scientific management of cattle manure
- **Incentives Used to Install Digester:** Grants provided by the Ministry of New and Renewable Energy, Government of India, and the Government of Punjab
- **Benefits Gained from Digester System:** GHG reduction, power generation, and proper management of manure through reduced risk of run-off and leaching of nutrients; conversion of nutrients from organic to inorganic form, allowing use as a natural fertilizer; potential revenue from sale of excess energy and digested manure

Additional system information is available online: www.peda.gov.in

**DIGESTER AND
GAS HOLDER**



**GAS ENGINE AND WASTE HEAT
RECOVERY UNIT**



FOR MORE INFORMATION

Anil Dhussa
Adviser
Ministry of New and Renewable Energy
Block 14, CGO Complex
New Delhi 110003
Phone: 91 11 24364188, 91 8826247248
E-mail: akdhussa@nic.in
www.mnre.gov.in

DISCLAIMER: The information and predictions contained within this poster are based on the data provided by the site owners and operators. The Global Methane Initiative cannot take responsibility for the accuracy of this data.