



Market Opportunities for Anaerobic Digestion of Livestock and Agro- Industrial Waste in India

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Table of Contents

Acknowledgements	iii
Disclaimer	iii
1. Uses of Biogas and Digestate	1-1
1.1 Biogas Use	1-1
1.2 End Uses of Digestate.....	1-2
2. Current Biogas Policies and Incentives in India	2-1
2.1 Waste to Energy Program	2-1
2.2 Sustainable Alternative Toward Affordable Transportation (SATAT) Initiative.....	2-2
2.3 National Policy on Biofuels	2-2
2.4 Galvanizing Organic Bio-Agro Resources (GOBAR)-DHAN	2-2
2.5 National Biogas and Manure Management Program (NBMMMP).....	2-3
2.6 Electricity Act.....	2-3
2.7 Companies Act of 2013	2-3
2.8 References.....	2-4
3. Biogas Potential from Agricultural Feedstocks.....	3-1
3.1 Overview of Reviewed Agriculture Sectors	3-1
3.2 Dairy Manure	3-4
3.3 Poultry Manure.....	3-6
3.4 Sugarcane Processing	3-8
3.5 Distilleries	3-10
3.6 Milk Processing.....	3-11
3.7 Fruit and Vegetable Processing	3-13
3.8 Cornstarch Production.....	3-15
3.9 Tapioca Production	3-17
3.10 Crop Residues	3-18
3.11 References.....	3-20
4. Technology Options	4-1
4.1 Small-Scale AD Technologies	4-2
4.2 Medium/Large-Scale AD Technologies.....	4-5
4.3 References.....	4-11
5. Business Models and Case Studies	5-1
5.1 Aspects of Successful AD Systems	5-1
5.2 Owner and Operator Models.....	5-2
5.3 Diversification of Project Revenue Sources.....	5-2
5.4 Case Studies	5-4
5.5 References.....	5-15
Appendix A: Biogas Production Potential Calculations	A-1
Appendix B: Indirect Emissions Reduction Calculations	B-1

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Preface

The Global Methane Initiative (GMI) promotes cost-effective, near-term methane abatement and recovery, and use of methane as a clean energy source. In the agriculture sector, GMI encourages anaerobic digestion (AD) of manure and agro-industrial waste as a method to reduce methane emissions and generate renewable energy.

The **Global Methane Initiative** works in partnership with developed and developing countries, with participation from the private sector, development banks, and nongovernmental organizations. GMI focuses on biogas (produced in the agriculture, municipal solid waste, and wastewater sectors), as well as methane emissions from coal mines and oil and gas systems. Focusing collective efforts on methane sources is a cost-effective approach to reduce greenhouse gas emissions and increase energy security, enhance economic growth, and improve air quality.

Report Overview

Under the auspices of the GMI, the U.S. Environmental Protection Agency developed this market opportunities assessment for biogas from livestock and agro-industrial wastes in India.¹ Recent developments in India that have spurred this effort include but are not limited to:

- Increasing energy demands and growing interest in using renewable energy sources to meet that demand
- Environmental concerns associated with manure and agro-industrial waste management
- New and/or modified national policies supporting AD and renewable energy development
- Opportunities for potential “green” job growth as a result of an expanding AD market.

This market opportunities assessment is geared toward informing project developers, policymakers, and other interested stakeholders about the potential for biogas capture and use in India. It includes the following sections:

- **Uses of Biogas and Digestate**, which describes the uses of biogas as an energy source for multiple purposes, including cooking, transportation, heating, and cooling; and the digestate (leftover material from AD after the feedstock has gone through the digestion phase) as soil amendment, fertilizer, or compost product.
- **Current Biogas Policies and Incentives in India**, which discusses a number of policies and initiatives in effect in India that create an enabling environment for biogas project development. The objectives of the policies vary, including improved manure management, reduced dependence on oil and gas imports, and improved sanitation at the village level. Each of these policies help promote the development of biodigesters to use agricultural waste to produce biogas.
- **Biogas Potential from Agricultural Feedstock**, which provides an overview of the various agricultural feedstocks in India that can be used as input into AD systems, and estimates the potential for methane emissions reduction and methane production for use as an energy source. The sectors discussed include dairy farms, sugarcane processing, distilleries, fruit and vegetable processing, cornstarch production, tapioca production, and milk processing. The goal of this overview is to help industry developers, financiers, and policymakers determine where to focus efforts on biogas development in India.
- **Technology Options**, which identifies the current anaerobic digester technologies used in India. It summarizes the key attributes of anaerobic digesters and identifies small-scale digester technologies used at a household or farm level, followed by medium- and large-scale digester technologies used on a commercial scale. It helps inform project developers and policymakers about the process, types of feedstock, and the scale at which each of these technologies is currently being implemented. It also helps technology providers and project developers understand the technology landscape in India so

¹ This effort is to update a resource assessment that was developed in 2011 (GMI, 2011).

they can consider deployment of alternative technologies used in other countries that may be appropriate for India.

- **Business Models and Case Studies**, which discusses business models, including the key aspects of successful AD systems, potential owner and operator models, and diversification of revenue generation; and provides case studies to highlight successful business models primarily from India.

Reference

GMI. 2011. Resource Assessment for Livestock and Agro-Industrial Wastes – India. Prepared for the Global Methane Initiative by Eastern Research Group, Inc.; TetraTech Consulting Group; and Federation of Indian Chambers of Commerce and Industry. January. Available: https://www.globalmethane.org/documents/ag_india_res_assessment.pdf. Accessed 5/28/2019.