

INDIA /The Energy and Resources Institute (TERI)

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GMI Biogas Subcommittee Meeting 28 October 2019

Overview of Biogas Market in India

■ Feedstock supply side

- Industrial waste water streams
- Agriculture Waste (livestock waste, agro-residues)
 - 683 MT from eleven major crops and about 178 MT is surplus quantity
 - Livestock population is about 192.5 million with potential to produce 224.8 million tons biogas generation (assuming 50% cattle waste is collected and used in biogas plants)
- Municipal Waste (organic waste materials, fruit and vegetable waste, sewage sludge etc..)
 - India generates daily 188,500 tonnes of MSW (Municipal Solid Waste) - 68.8 million tonnes per year

■ Drivers

- Policies and incentive system
- To reduce dependence on energy import
- Huge unmet energy needs in different sectors
- Opportunity to achieve goal of low C clean energy pathways



Agriculture waste material



Industrial waste water

Biogas technology offer big opportunity to convert these waste materials into useful form

Key Policies to promote Biogas development in India

Waste to Energy Programme, MNRE

- Focuses on energy recovery in from Industrial, Agricultural & Urban waste/effluent (biogas plants >2500m³/day)

New National Biogas and Organic Manure Programme , MNRE

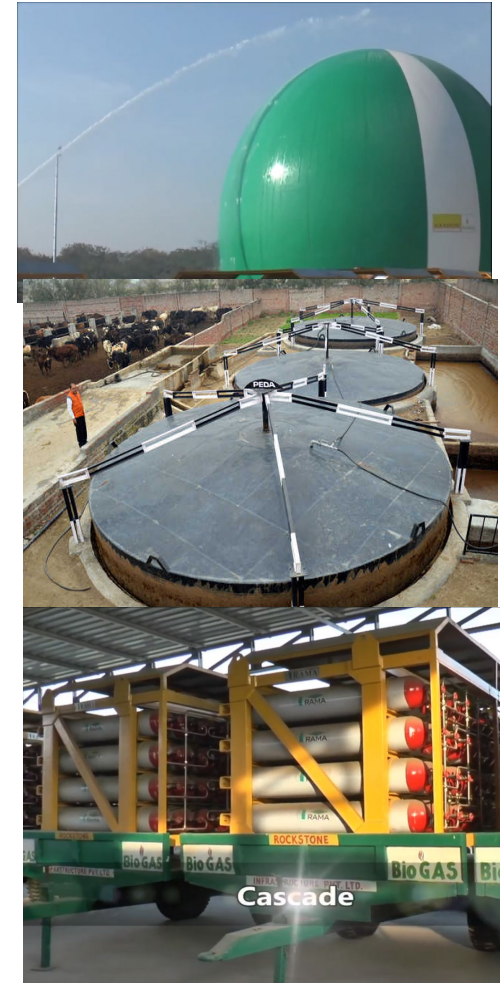
- Biogas from Cattle manure and other organic waste in rural areas to establish small-scale biogas plants (<2500m³/day)

Sustainable Alternative Towards Affordable Transportation (SATAT)

- To promote Compressed Biogas(CBG), target to develop 5000 CBG plants with expected production capacity of 15 million tonnes of CBG per annum by 2023

Galvanising Organic Bio-Agro Resources Dhan (GOBAR-Dhan)

- to improve sanitation in Indian villages by processing livestock manure and solid agricultural waste to produce bio gas.



Biogas Potential from Agro-industrial wastes (in MW)

Name	Energy Generation Potential – MW (Estimation)
Sugar mills (liquid waste)	49
Sugar press mud (solid waste)	200
Pulp and paper (liquid waste)	254
Starch (liquid)	36
Starch (solid)	15
Distillery (liquid waste)	781
Milk processing	24
slaughterhouse	311
Poultry	462
Total	2132

Overall estimated potential is > 5000 MW

Assist GMI partners in India

- Provide technical, analytic, and capacity-building support to promote methane mitigation from the agriculture sector, particularly in the following tasks:
 - AD-Project Screening Tool (Abt Associates)
 - To refine these tools and applicable to projects in India to estimate of annual biogas and digestate production
 - Risk Analysis and Technical Review Guidance & Checklist for Biogas Projects (Abt Associates)
 - To ensure sufficient information to evaluate project feasibility based on technical and financial considerations
 - Preparation of AD Project Database for Punjab, Haryana and Uttar Pradesh (Tetra Tech)
 - Organizing Stakeholder meetings and workshop

Helps:

MNRE, IREDA, State Energy Development Agencies, Banks in AD projects appraisal process to estimate the technical and financial feasibility of biogas projects.

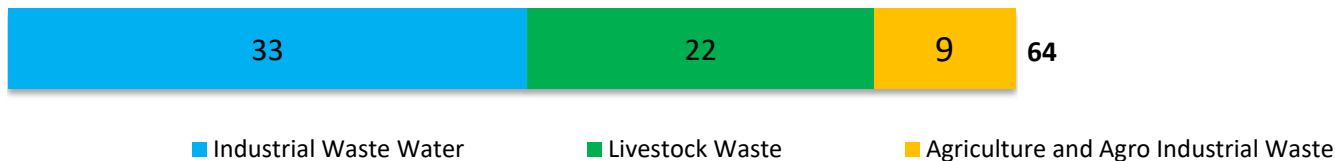
AD Project Database

1. Developed framework for collecting data (database format)

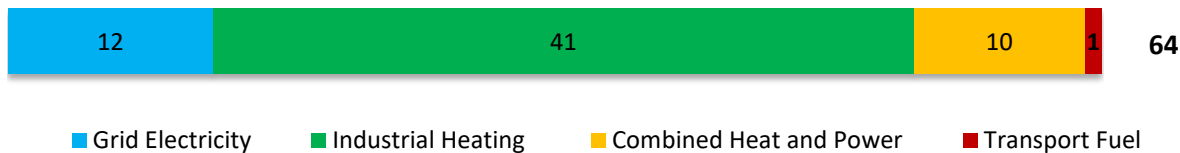
2. Complied data primary outreach to MNRE, SNAs and AD project developers

	Haryana	Punjab	Uttar Pradesh	Total
Number of Plants	12	21	31	64

AD projects by feedstock types



End Use Application



A database of 64 medium- and large-scale AD projects in the agricultural sector in State of Punjab, Haryana and UP prepared

Helps:

- ✓ To built national inventory of AD projects and to **track success of projects** and emissions reductions
- ✓ Expand market and scale up of AD projects and **increase viability of future projects**

Key challenges to scale up

Technological

- Co-digestion of mixed waste based bio-digester design
- Dry fermentation technology for agri-waste materials
- Low temperature Anaerobic Digestion for colder regions
- Infrastructure challenges for transport of biogas/bio-CNG

Financial

- High initial capital cost of biogas plants
- Access to low cost financing instruments
- High working capital requirements for agri-waste based AD projects

Policy constraints

- Additional policies needed to
 - Feedstock supply chain management
 - to allow sale of digested manure from biogas plant under FCO