

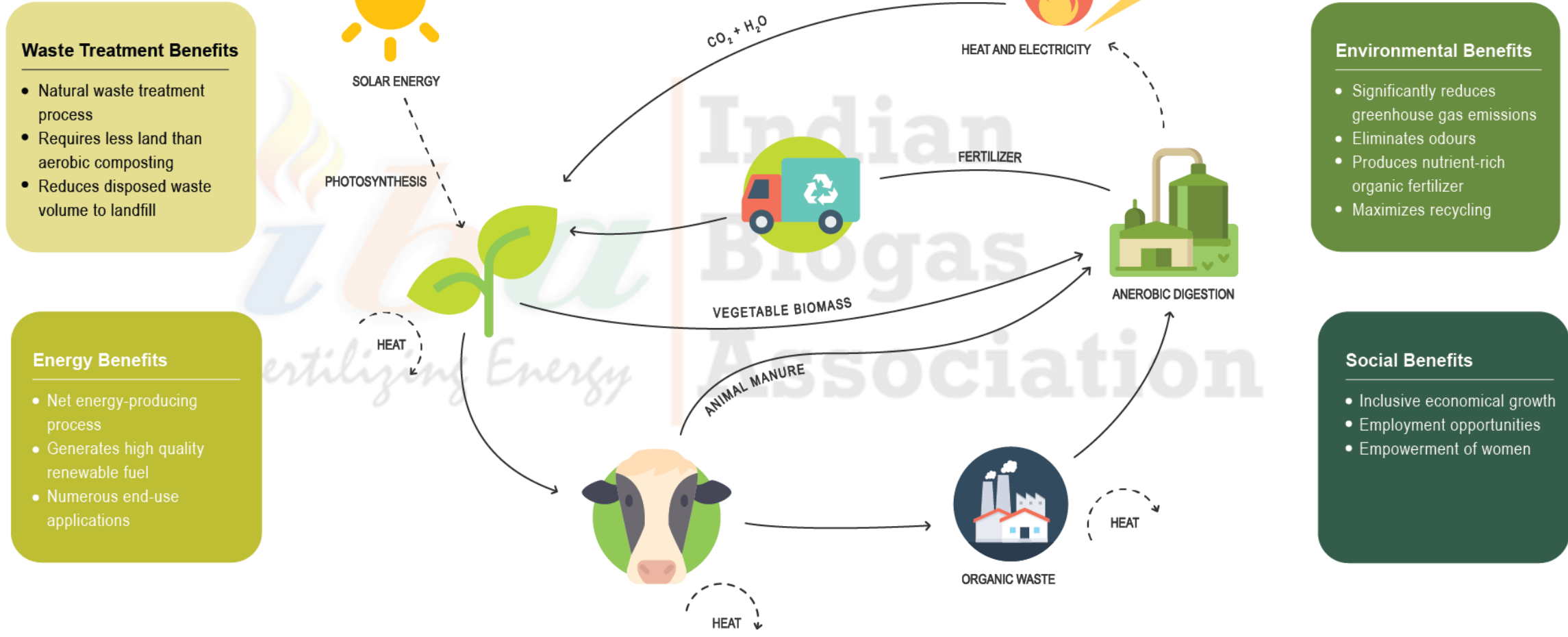


Decarbonisation in gas sector through RNG



www.biogas-india.com

Biogas as an all-rounder



Biogas Plants- Types

House-hold based
(1-25 m³)



Commonly used technology :

- Fixed Dome- Janta Model, Deenabandhu Model
- Floating Dome-KVIC, FRP based,

Community based Biogas
Plant (25-1000 m³)



Commonly used technology :

- KVIC, Nisarguna (BARC), decentralized containerized solution

Large Scale Biogas
Plant (>2500m³)



Commonly used technology :

- UASB, CSTR, Plug- Flow Type, Garage Type(Dry Fermentation)

Comparison between CBG and CNG

S No.	Characteristic	CBG IS 16087 : 2016	CNG IS 15958 : 2012
1	Methane, minimum	90%	90%
2	Ethane, maximum	-	6%
3	C3 and higher HC, maximum	-	3%
4	C6 and higher HC, maximum	-	0.5%
5	Total unsaturated HC, maximum	-	0.5%
6	Carbon Dioxide, maximum	4%	3.5% (CO ₂ and N ₂)
7	Total sulfur, maximum	20 mg/m ³	20 mg/m ³
8	Moisture, maximum	5 mg/m ³	5 mg/m ³
9	O ₂ , maximum	0.5%	0.5%

CBG is a Premium CNG and can be used as automotive fuel for CNG vehicles

Feedstocks

Source

Approx. CBG Potential

Cattle Dung & Chicken Litter

18 MMT

Forest Residue

8 MMT

Agriculture Residue

12 MMT

Press Mud, Spent Wash & Baggasse

8 MMT

Municipal Solid Waste

2 MMT

Prospective energy crops in Barren, Waste & Single Crop Land

12 MMT

Total approx. CBG Potential: 60 MMT

Developments in CBG industry



Revision of CBG procurement price from 01.06.2022

- CBG price indexed to CBG Under SATAT initiative - Rs. 54/kg plus GST (minimum)
- Under CBG-CGD Synchronisation Scheme ~Rs. 1470/MMBtu



Market Linkage for FOM

- Department of Fertilizers (DoF) notification to fertilizer companies for mandatory offtake of FOM with chemical fertilizers as a “Basket approach”.
- DOF's has moved an EFC Note to provide Market Development Assistance to Bio & Organic Fertilizers including FOM



MNRE's Umbrella Scheme “National Bioenergy Programme”

- CFA scheme revived for WTE and Biogas Projects



Expediting setting of CBG projects

- OGMCs reviewing the LOI issuance process and providing handholding to entrepreneurs
- No separate PESO approval needed if approval is sought for dispensing CNG



Relaxed recognition of CPCB

- CBG plants producing FOM (solid and liq.) kept under White (relaxed) category

Fertilizing Energy | Biogas Association

Status of SATAT Initiative

CBG Plants Commissioned: 46

CBG supply initiated through Retail Outlets: >61

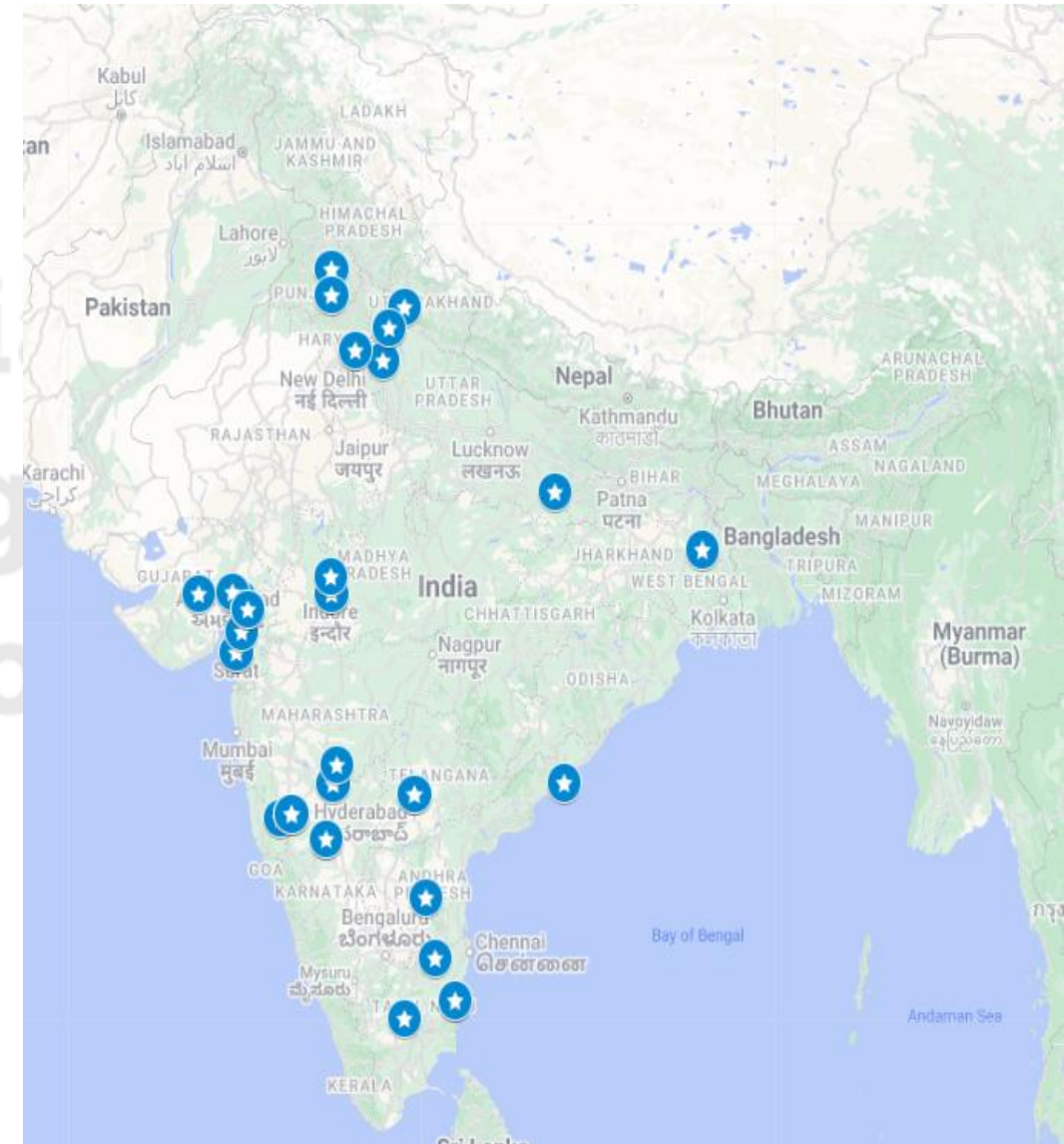
GA's supplying CBG under synchronization scheme: >12

CBG Sale : ~16,000 tons

LOI's issued: ~4100



CBG Plants under SATAT



LOI awarded



LOIs issued - 4090

Exp. CBG production >7.6 MMTPA

New pricing mechanism

New procurement price of CBG delivered at OMC Retail Outlet situated at any distance (up to 75 km one way):-

S No	Lower Retail Selling Price of CNG in Slab	Higher Retail Selling Price of CNG in Slab	Procurement price of CBG	Procurement price of CBG
	including tax	including tax	Without GST	With GST
	Rs./kg	Rs./kg	Rs./kg	Rs./kg
1	Retail Selling Price of CBG up to 70		54.00	56.70
2	70.01	75.00	55.25	58.01
3	75.01	80.00	59.06	62.01
4	80.01	85.00	62.86	66.01
5	85.01	90.00	66.67	70.01
6	90.01	95.00	70.48	74.01
7	95.01	100.00	74.29	78.01

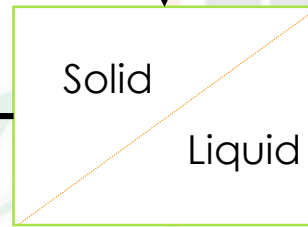
- The minimum procurement price of CBG will not be lower than Rs. 46/kg + applicable taxes for the period up to 31.3.2029.
- The Retail Selling Price of CBG in a market shall be at par with RSP of CNG (as provided by the authorized CGD entity).
- Additional transportation cost for transportation of CBG beyond 75 km (one-way distance) from CBG Plant shall be paid separately, at mutually discussed & agreed rates.
- For further increase in slabs beyond Rs. 100/kg, procurement price will be extrapolated as per the above.

Bio Manure Processing Technologies



CBG Plant

Digestate/
Slurry Out



Separation Techniques (Screw Press, Screen Press, Centrifuge, Sieves, Band filter)

Process

Products

Composting

Drying

Pelletising

Vacuum Evaporation

Membrane Filtration

Precipitation

Water Treatment

Compost

Nutrient Solution, Granulates, PROM, Ammonium Sulphate

Digestate pellets

Nutrient Solution, Water, Ammonium Sulphate

Nutrient Solution, Water

Magnesium Ammonium Phosphate, Calcium Phosphate, P-reduced digestate

Degree of prevalence in Indian Scenario



“Organic” economy

Total fertilizer import value 2022-23 (projected) – Rs. 2.15 lakh crore

Manure generated from 5000 CBG Plants: 50 MMTPA

Direct Replacement

- Urea (N) : 1.74 MMTPA
- SSP (P): 0.2 MMTPA
- MOP (K): 3.2 MMTPA

Value generated: Rs. 7000 crore through direct replacement of Chemical fertilizers

Compressed Bio Gas – CBG future?

Organic Waste
Biomass

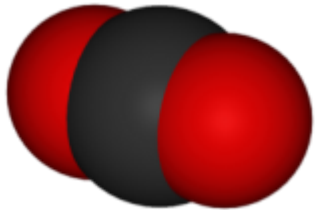
Contains Compounds of Carbon, Hydrogen,
Oxygen, Nitrogen, Sulphur, other elements

Anaerobic Digestion

CH_4

CO_2

H_2S



Purification &
Compression

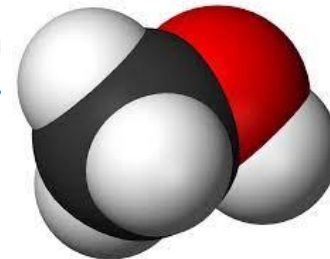
CH_4



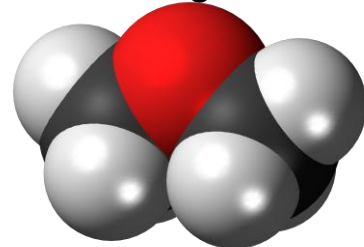
Compressed Bio Gas
Methane >96%

Catalyst

CH_3OH



CH_3OCH_3



CBG Plant Economics

S. No.	Plant Capacity	CBG Output	Solid Manure	Project cost	IRR%	Payback Period
Feedstock: Paddy Straw						
1	100 TPD	10 TPD	30 TPD	40-50 Cr	13%	4-6 years
Feedstock: Press Mud						
1	100 TPD	4 TPD	20 TPD	25-30 Cr	14%	4-6 years
Feedstock: Cow Dung / Chicken Litter						
1	100 TPD	2 TPD	20 TPD	25-30 Cr	10%	8-10 years

Land requirement: 5-10 acres (as per requirement for feedstock storage)

*shall vary with plant design, technology, feedstock etc



**Indian
Biogas
Association**

Introduction

Professional bioenergy association

Underwent ~7 years of partnership with German Biogas Association (BIG-P)

Indian Biogas Association

Estd. 2011

Headquarters: Gurgaon, Haryana

Supports, and Represents the stakeholders:

- Operators,
- Manufacturers,
- Planners,
- Representatives from public bodies,
- Science and research, and
- All other environmental enthusiasts.



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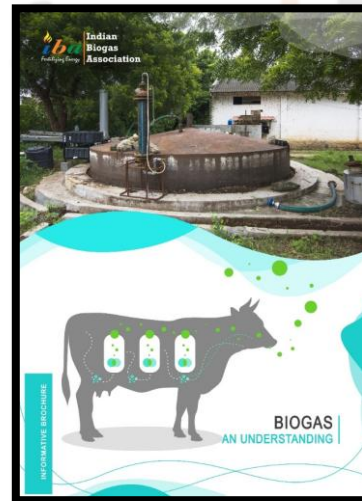
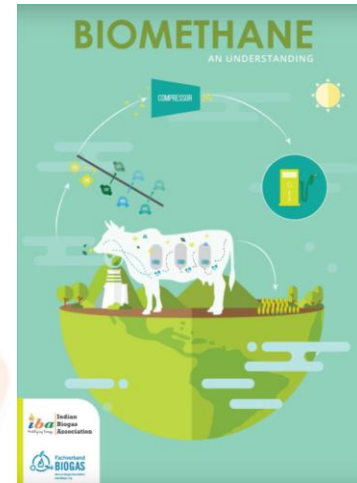
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Services – a glimpse

Magazines



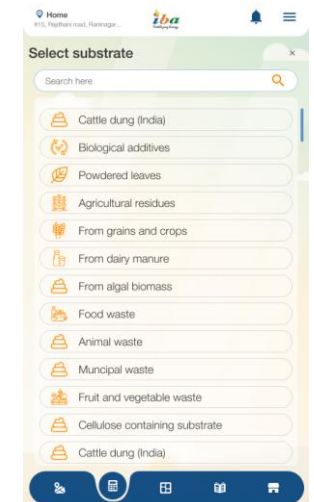
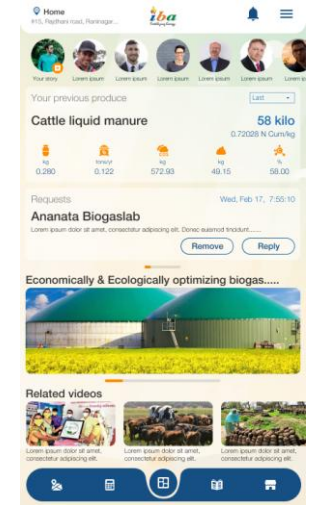
Biogas/Biomethane Brochure



Biolab Portal



Biogas App



Services

Basic Modes

- Newsletter, Flyers
- Magazines, Informative Brochures
- Social Networking
- What'sApp group
- Helpline
- Pavilion, Seminars, Awards and workshops
- Regional working groups
- Members' Feedback management
- General Assembly
- Online Training Courses
- Biogas Lab, Feasibility Studies

Advanced

- Consultancy in waste management
- On-Demand Training
- Plant installation and O&M Training Program (Biomitra)
- Plant Certification
- Buyer Seller Platform (Biogas App)
- Due diligence of biogas projects

Services – a glimpse (cont'd)

Key Features:

- Located at IIT-BHU, Varanasi
- Comprehensive testing facility
- State of the Art laboratory
- Cross Disciplinary
- Regional Labs to be set-up

Working Domains:

- Laboratory Analytics
- Yield Optimization
- Study of Substrates
- Feedstock Analysis



Tests:

- Dry Matter (DM)
- Organic Dry Matter(oDM)
- Biomethane Potential
- Total Alkanity (TAC)
- Total Volatile Fatty Acids
- FOS/TAC
- $\text{NH}_4\text{-N}_{\text{tot}}$
- $\text{H}_2\text{S}_{\text{tot}}$
- BOD
- COD
- Acid Spectrum (C2-C6)
- Phosphorus (P_2O_5)
- Potassium(K_2O)
- Total Organic Carbon (TOC)

Biogas Lab

Services – a glimpse (cont'd)

✓ Site Assessment:

- Analysis of different available feedstock in project vicinity
- Land identification and its suitability
- Utility mapping of frozen site
- Overall demand mapping and assessing off-take feasibility
- Socio-economical analysis
- Identification and earmarking the relevant stakeholders

✓ Financial Feasibility

- Capex , Opex Estimates
- Free Cash Flow Analysis
- Financial Appraisal-Profitability, Liquidity, Leverage, Project Returns
- Sensitivity Analysis



✓ Technical Recommendations

- Comparison with contemporary technologies
- Specific Technology recommendation across the process steps
- Mapping with probable equipment suppliers

✓ Risk Analysis and Overall Recommendations:

- Setting up the overall project schedule (micro/macro level planning)
- Listing project specific permissions and clearance requirement
- Recommendation for optimal business model
- Scenario Analysis, overall risk assessment and mitigation plan–feedstock, offtake, social, technical, regulatory

Feasibility Assessment



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