COMPRESSED BIO GAS

FUEL OF THE FUTURE

WASTE TO WEALTH

February 2025

Indian Natural Gas Overview

Extracting clean energy from waste can potentially solve the dual challenge of disposing of India's ever-growing mounds of garbage and reducing dependence on fossil fuels

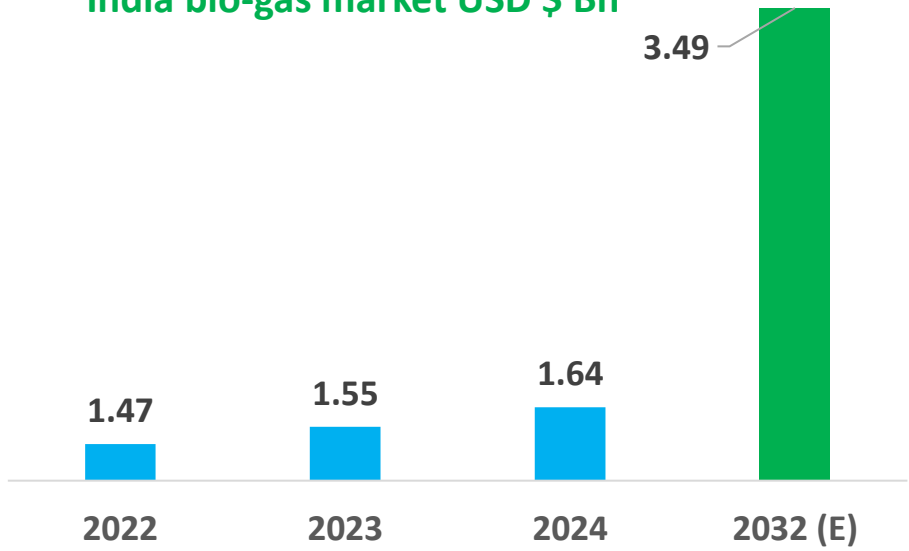
India is the third largest energy consumer globally with over 50% of its natural gas requirements met by imports and in FY 22, India imported USD $ 11 9 billion on the import of over 32 BnCM of LNG

According to the IBA (Indian Biogas Association), India generates an average of 500 MnT of agricultural residue annually, with ~150 MnT as surplus after discounting its usage as fodder and fuel for domestic and industrial applications

The various categories of waste as raw material are municipal solid wastes, slaughterhouse waste, vegetable, agricultural residues, and other market wastes, and industrial/STP wastes & effluents

Indian biogas market size was valued at USD 1 64 billion in 2024 The market is projected to be worth USD 1 77 billion in 2025 and reach USD 3 49 billion by 2032

India bio-gas market USD $ Bn



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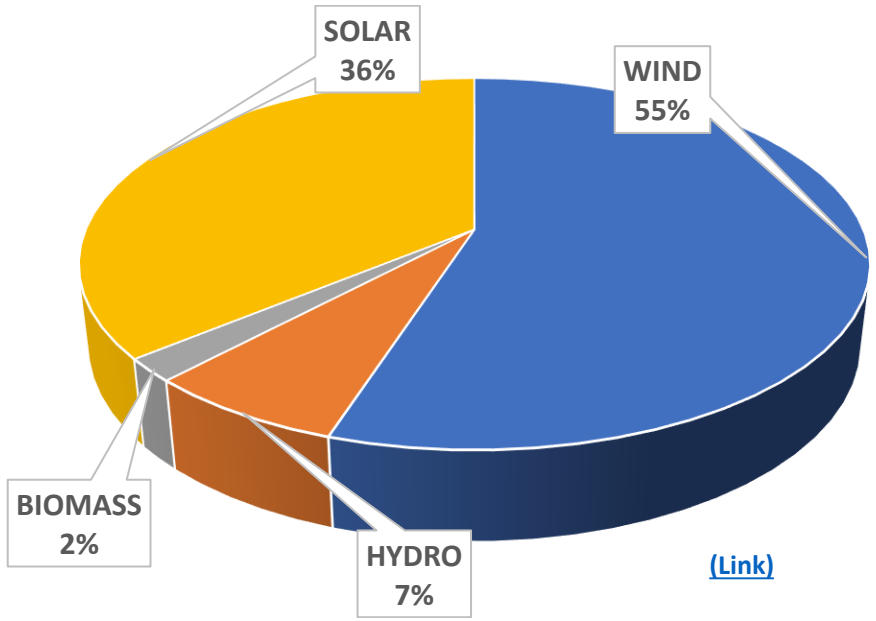
Source wise Potential
(21 Lakh MW) of RE Power in India in FY 23



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Introduction to Compressed Bio Gas (CBG)

Compressed Bio Gas (CBG) is produced from Waste / Bio-mass sources like agricultural residue, cattle dung, sugarcane press mud, municipal solid waste and sewage treatment plant waste etc. using anaerobic decomposition process

The biogas is purified to remove hydrogen sulfide (H2S), carbon dioxide (CO2), water vapor and then compressed as Compressed Bio Gas (CBG) having more than 90% methane content

CBG has calorific value and other properties equal to CNG and hence replace CNG to be used in automotive, industrial and commercial areas or household

5 million bio-gas plants are operational in the country with current bio CNG output of 3.2 BnCM/yr as India has readily available feedstock volumes, capable of producing over 86 BnCM/yr

As on date, 2026 active LOIs of CBG Plants with 82 commissioned and 23,578 Tons of CBG Sold in FY2024-25

SATAT Scheme, Govt of India
(Ministry of Petroleum & Natural Gas)

- SATAT' (Sustainable Alternative Towards Affordable Transportation) scheme on Compressed Bio Gas (CBG) was launched by Govt of India in October 2018
- The scheme envisages to target production of 15 MMT (million tons) of CBG by 2023, from 5,000 Plants
- Under SATAT scheme, entrepreneurs shall set up CBG plants, produce & supply CBG to OMCs for sale as automotive & industrial fuels
- Oil and Gas Marketing Companies IOCL, BPCL, HPCL, GAIL and IGL have invited Expression of interest (EoI) to procure CBG for further marketing at an assured price
- The CBG Plant Owner shall be responsible for planning, preparation, engineering and execution of the project, including storage of raw material, operation and maintenance of the plant etc as per as per existing central / state norms
- RBI has notified inclusion of CBG projects under Priority Sector Lending in September 2020
- Various Central and State government incentives are available under SATAT scheme

CBG: Multi Benefit effect on Indian economy

Potential to reduce import bills

CBG can substitute natural gas and crude oil and decrease reliance on imported fossil fuels as India imports ~50% of its natural gas requirements, with expenses of USD 11 9 billion on LNG imports in 2021-22

Government support

The Indian government is promoting CBG through favorable policies and infrastructure development The Galvanizing Organic Bio-Agro Resources Dhan (GOBARdhan) scheme has a budget of Rs 10,000 crores to install 500 new bio-CNG plants

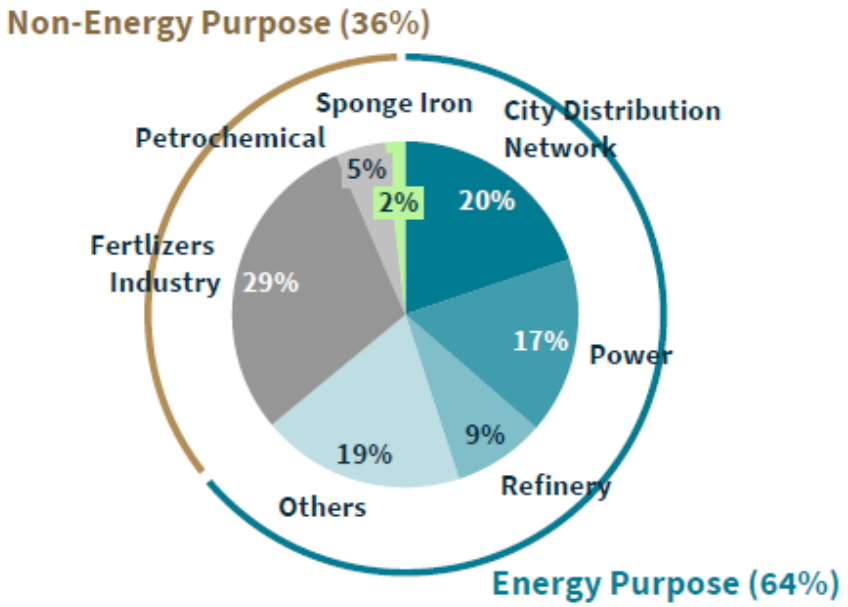
Strong policy support and infrastructure:

India has specific policies that support biogas production and sales, supported by existing and planned natural gas pipelines The natural gas pipeline network spans 20,000 km with an additional 13,000 km under construction

Feedstock availability:

CBG production can utilize various feedstocks like agri waste, livestock waste, municipal solid waste (MSW) and press-mud India has a significant potential for CBG production, estimated at around ~ 60 MMTPA

Sector wise Natural Gas Consumption, FY'22



Advantage of CBG Usage

- ❖Reduced dependence on imported fossil fuel
- ❖Solving stubble burning of paddy etc and reducing emissions/Pollution
- ❖Producing organic manure to make India pesticide free
- ❖Achieving Zero Carbon Economy

CBG: Multi Benefit effect on Indian economy

Address soil depletion:

CBG production generates Fermented Organic Manure (FOM) which can help replenish depleted soil The Soil Organic Carbon (SOC) content in India has decreased from 1% to 0 3% between 1950 and 2020 FOM has a high organic carbon content (35%-50%) which can improve SOC levels

Carbon credit opportunities:

CBG projects can generate carbon credits, providing an additional revenue stream International agreements and carbon neutrality commitments drive the carbon credits market India is the world's second largest developer and supplier of carbon credits

SATAT Scheme:

The Sustainable Alternatives Towards Affordable Transportation (SATAT) scheme aims to replace 35% of fossil gaseous fuels with CBG The scheme promotes the sale of CBG through Oil & Gas Marketing Companies (OMCs) retail outlets

High Growth Potential:

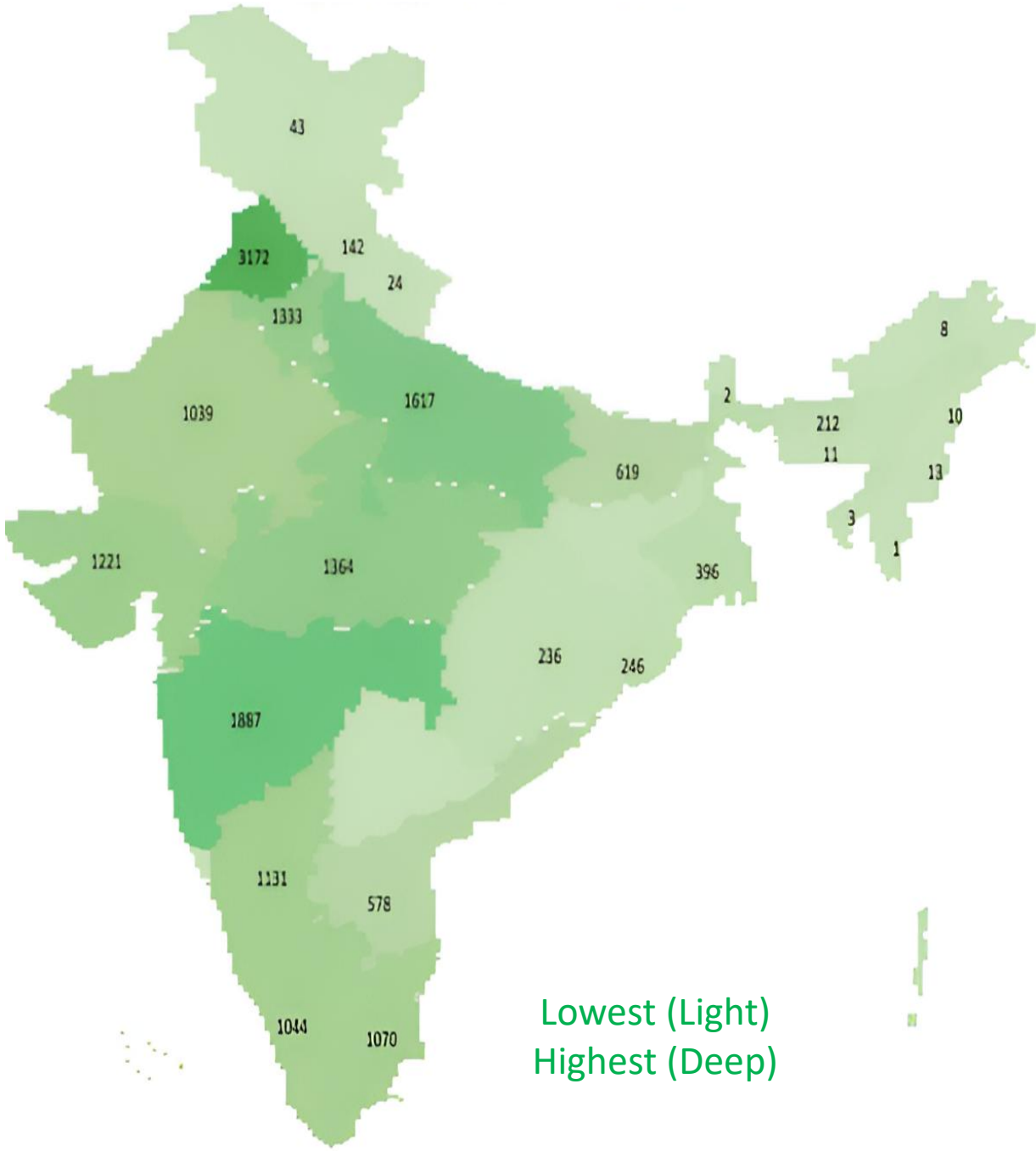
India's CBG potential is estimated around ~ 60 MMTPA, with current installed capacity being less than 1%

State wise CBG Capacities

Details of BioCNG projects supported under Waste to Energy Programme

State	Commissioned (TPD)	Under Installation (TPD)	Total (TPD)
Punjab	82,087	30,000	1,12,087
Uttar Pradesh	75,380	59,733	1,35,113
Maharashtra	57,033	35,600	92,633
Gujarat	49,966	17,400	67,366
Tamilnadu	33,800	5,600	39,400
Haryana	27,050	39,400	66,450
Madhya Pradesh	16,500	2,000	18,500
Karnataka	15,230	5,500	20,730
Telangana	10,800	3,360	14,160
Rajasthan	8,688	2,000	10,688
Uttrakhand	5,880	20,000	25,880
Andhra Pradesh	4,780		4,780
Jharkhand		5,000	5,000
Delhi		11,200	11,200
Total	3,87,194	2,36,793	6,23,987

State Wise Biomass Power Potential (MW) FY21



Case Study :

VER BIO

(INR Cr)	FY 2023	FY2022
Revenue	22	13
EBITDA	-26	-20
EBITDA (%)	- 121	- 161
PAT (%)	-274	- 521
Debt: Eq ratio	4.47	-27

INDORE CLEAN ENERGY PRIVATE LIMITED

(INR Cr)	FY 2023	FY2022
Revenue from Ops	4	9
PAT	- 1.86	- 0.03

JAKRAYA SUGAR LIMITED

(INR Cr)	FY 2023	FY2022
Revenue from Ops	3	2.8
PAT	9.2	9.8

FARM GAS PRIVATE LIMITED

(INR Cr)	FY 2023	FY2022
Revenue from Ops	10	6
PBT	1.7	4

CBG Developers

Top 20 Company	Commissioned (TPD)	Under Installation (TPD)	Total (TPD)
Reliance Industries Ltd	20,000	72,400	92,400
Verbio India Pvt Ltd	33,000		33,000
Indian Oil Corporation Limited		22,333	22,333
Jakraya Sugar Ltd	20,000		20,000
Shivom Dayal Energies Haridwar Pvt Ltd		20,000	20,000
Indore Clean Energy Private Limited	15,300		15,300
Sangrur RNG Private Limited	14,840		14,840
Patiala RNG Private Limited	14,800		14,800
Circle CBG India Private Ltd	14,600		14,600
Baramati Agro ltd		25,600	25,600
Farm Gas Pvt Ltd	12,000		12,000
Enlighten Biofuels & Biofertilizer Pvt Ltd		11,200	11,200
Spark Bio Gas Pvt Ltd	5,600	5,600	11,200
Energim Sustainable Solutions, Cuddalore	10,600		10,600
Indian Potash Limited	10,200		10,200
M/s Leafiniti Bioenergy Private Limited	10,200		10,200
DEMETER AGRO ENERGIES PRIVATE LIMITED		10,000	10,000
Enernxt Private Limited		10,000	10,000
GULMIRE SANITARY WARE		10,000	10,000
M/s IOT Biogas Pvt Ltd (Formely IOT Mabagas Pvt Ltd)	10,000		10,000
M/s Spectrum Renewable Energy Pvt Ltd	8,000		8,000
M/s Green Elephant India Pvt Ltd	15,920		15,920
Total	2,15,060	1,87,133	4,02,193

Feed Stock & Finished Goods analysis

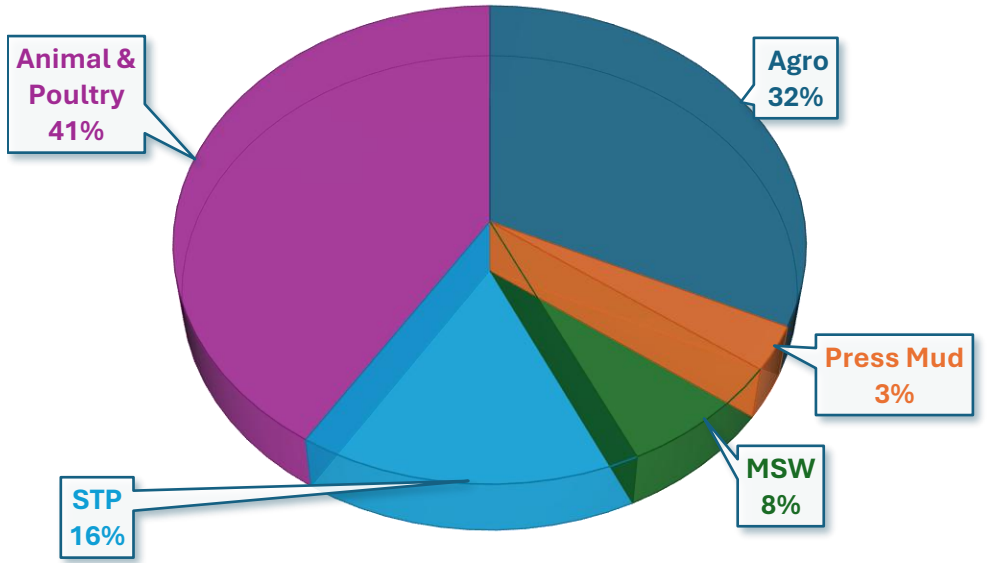
Waste Categories	Annual Feedstock Potential (MMT)	Estimated Potential of Bio CNG (MMT)
Surplus Agro Residues	150	20
Spent wash/Press Mud	20	2
Municipal Solid Waste (MSW) Organic Fraction	62	5
Sewage Treatment Plants (STP)	50	10
Animal and Poultry Waste	190	25

Agri related Waste have the highest yield of 8-20%, followed by MSW & Pressmud (4-5%), while Animal & Poultry has only 1-2% Yield and the average cost of Feedstock lies between 3-5 Kg

As per SATAT scheme, the minimum procurement price of CBG compressed at 250 bar pressure) is Rs. 46 / Kg + Tax till end of FY 2028 while the Retail Selling Price of CBG varies between Rs 70 – 95/ Kg

Source

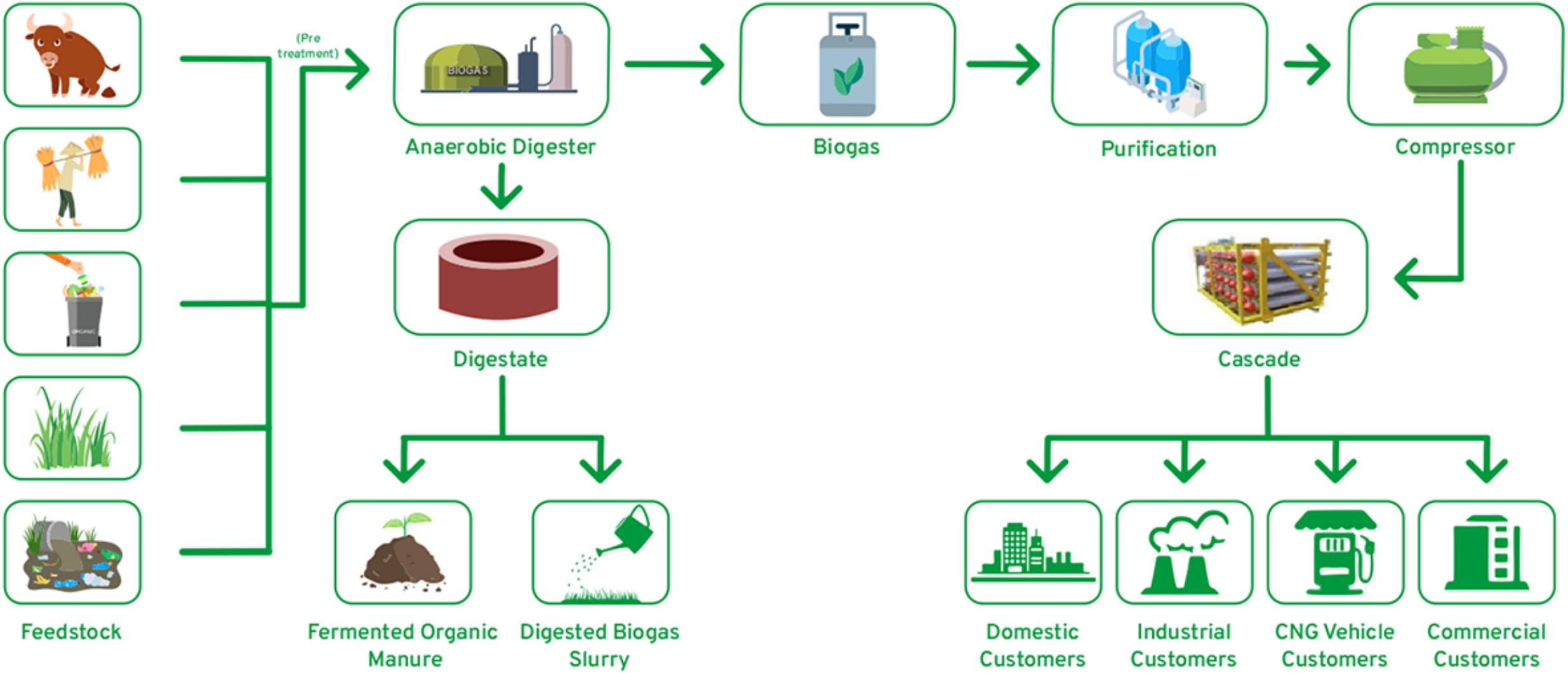
Source wise Share of Bio-CNG Potential



Agri Residue

MSW

CBG Business Model



CBG as good as CNG

CBG has calorific value and other properties Thus, CNG and hence can be utilized as green renewable automotive fuel

Thus, it can replace CNG in automotive, industrial and commercial areas Ministry of Road Transport and Highways, Government of India had permitted usage of bio-compressed natural gas (bio- CNG) for motor vehicles as an alternate composition of the compressed natural gas (CNG)

Compressed Biogas (CBG) produced from the CBG plant will be retailed through the CBG dispensing unit set-up by the Oil Marketing Companies within the radius of 25 kms

CBG supplied under SATAT scheme shall meet IS 16087:2016 specifications of BIS

IS 16087 : 2016 Standard		
Sr No	Characteristics	Requirement
1	Methane (CH4), minimum %	90 0%
2	Only Carbon Dioxide (CO2), maximum %	4%
3	Carbon Dioxide (CO2) + Nitrogen (N2) + Oxygen (O2), maximum %	10%
4	Oxygen (O2), maximum %	0 5%
5	Total sulphur (including H2S) mg/m3, maximum %	20 mg/m3
6	Moisture mg/m3, maximum %	5 mg/m3

Reliance Industries in CBG

Reliance Industries Ltd (RIL) has set up Reliance Bioenergy in 2023 to focus and develop CBG to achieving net carbon zero by 2035

Reliance Bioenergy set up two demo Compressed Biogas (CBG) units in Jamnagar and is successfully operating those

Reliance executed a record-breaking 10-month construction of first commercial-scale CBG plant in Barabanki UP

In November 2024, Reliance Bioenergy signed a Memorandum of Understanding (MoU) with Andhra Pradesh Government for establishment of 500 CBG plants with a total investment of around Rs 65,000 crore (Rs 130 crore per plant)

CBG Plant, Jamnagar, GJ

Source & Couertsey :Link 1, Video Link, Link 2

Reliance Bioenergy will construct the plants viable for production through municipal solid waste

This will result in a reduction of 0 7 million metric tonnes per annum (MMTPA) of imported liquefied natural gas

Central & State Incentives of Odisha

✓ **Central Financial Assistance:**

10 Crore One-time MNRE subsidy

✓ **Central Agri Infrastructure Fund (AIF):**

3 % PA Interest subvention (Max **2 Crore**) for **7 Years**

✓ **State Land Incentives:**

100% exemption from payment of premium on land registration

✓ **State Capital Investment Subsidy:**

30% subsidy on actual investment in Plant & Machinery over **5 years**

✓ **State Electricity Duty Exemption:**

100% exempt from electricity duty for **10 years**

✓ **State Power Tariff Reimbursement:**

A reimbursement of **Rs 2/unit for 10 years**

✓ **State Employment Subsidy:**

100% reimbursement of the employer's contribution towards ESI and EPF

Farm Gas Company's Biogas Plant, GJ

Ever Enviro's Bio-CNG Plant, Indore

State Source
Central Source

Regulatory Approvals

Sl No	List of Items	Approving Agency
1	No objection certificate (NOC) for setting up the project	Local municipality cooperation/gram panchayat
2	Electricity and water connections	Utilities/distribution company and jal board
3	Taxes	Revenue Department
4	Change of Land Use (CLU), if required	State Town Planning Board
5	Consent to establish and consent to operate	State Pollution Control Board
6	Explosive substance license	Petroleum and Explosives Safety Organization (PESO)
7	Certificate of incorporation of Project SPV, if required	Ministry of Corporate Affairs
8	Factory license	Indian Factories Act, 1948 from Chief Inspector of Factories
9	Labour license	Department of Labour
10	NOC from Fire Department	State Fire and Emergency Services
11	NOC for forest clearances, if required	State Forest Department
12	Certificate of Manufacture of Mixture of Fertilisers/ Micronutrient mixtures/ Bio-fertilisers/ Organic Manures	Department of Agriculture

COST BENEFIT ANALYSIS

ASSUMPTIONS

Total project cost (Cr)	₹125
Plant capacity / day (Tons)	20
Annual plant running days	330

Snapshot financials for 1st year

Revenue

Annual Revenue

- **BIO-CNG Gas : ₹ 42 Crore**
- **Manure : ₹ 5 Crore**
- **Carbon Credit : ₹ 5 Crore**
- **TOTAL Annual Revenue: ₹ 52 Crore**

Subsidies and Grants

- **State Subsidy: ₹ 23 Crore**
- **Central Financial Assistance: ₹ 10 Crore**
- **Total Subsidies & Grants: ₹ 33 Crore**

Expenditure

Annual Operational Expense

- **Raw Material (Paddy Straw): ₹ 7 Crore**
- **Manpower: ₹ 5 Crore**
- **Utilities (Water, Electricity): ₹ 4 Crore**
- **Miscellaneous Op Costs: ₹ 8 Crore**
- **Total OpEx: ₹ 24 Crore**

Debt Expense

- **Interest Payable: ₹ 6 Crore**
- **Working Capital : ₹ 21 Crore**
- **Total OpEx: ₹ 24 Crore**

RFQ

Finalcial Model

Thank You

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