WORLD BIOGAS ASSOCIATION

Policy and Market Briefing 2024

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In association with

INVEST INDIA

Introduction

India has been building momentum towards a sustainable energy transition, with a goal of achieving Net Zero by 2070. This vision reflects the country's determination to address its growing energy demand, utilise the significant waste generated and tackle pressing environmental challenges such as air pollution.

To accelerate the energy transition and create jobs across the country, **India has been fostering the production and expansion of biogas and compressed biogas (CBG)**, also known as biomethane. The International Energy Agency (IEA) highlighted in the Renewables 2024 report that India is addressing the growing demand for biogas and is building infrastructure and feedstock supply chains for future acceleration[1].

Strategic government policies now include a blending obligation for CBG with Compressed Natural Gas (CNG) for use as transportation fuel and piped natural gas (PNG) for use in the domestic segment. This and financial incentives for small, medium, and industrial biogas and CBG projects aim to secure consistent offtake to build a robust CBG sector nationwide.

In the Financial Year (FY) 2023-24, India consumed 66.7 billion cubic meters (bcm) of natural gas, with 46.4% (~31.79 bcm) of this demand met through the import of Liquified Natural Gas (LNG) worth USD 13.3 Bn[2]. Further, in the current fiscal year 2024-25, up to September (April-September), India has imported 18.97 bcm of LNG, valued at USD 7.7 Bn. This represents an increase from the 15.4 bcm, worth USD 6.5 Bn, LNG imported during the same period in the previous year[3]. India's natural gas demand is expected to increase threefold to reach 182 bcm by 2030[4].

India's energy mix targets include establishing 50% cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030. As the demand for natural gas is projected to grow, the emphasis on cleaner energy solutions becomes critical.

CBG offers a renewable and carbon-neutral alternative to fossil-based natural gas, aiding in the reduction of methane emissions from agricultural waste and landfills. The integration of CBG into the natural gas grid supports the country's dual objectives of reducing dependence on LNG imports and advancing its decarbonisation goals.

Key policies from the Government of India, include the **Sustainable Alternative Towards Affordable Transportation (SATAT)** scheme and the **CBG-CGD Synchronisation Scheme** under the **GOBARdhan** initiative. These initiatives are making steady progress in facilitating the offtake of CBG from producers and promoting its seamless integration into India's energy ecosystem.

In addition to providing financial assistance for setting up CBG plants, the Government of India has announced separate financial incentives for two key areas: procurement of biomass aggregation machinery to support efficient feedstock collection, and the development of pipeline infrastructure to inject CBG into the CGD network. These measures aim to strengthen the entire CBG value chain, from feedstock collection to compressed biogas distribution.

In 2023, during its G20 Presidency, India launched the **Global Biofuels Alliance (GBA)**, a multi-stakeholder initiative that brings together governments, international organisations, and industries. The alliance unites the world's largest biofuel producers and consumers

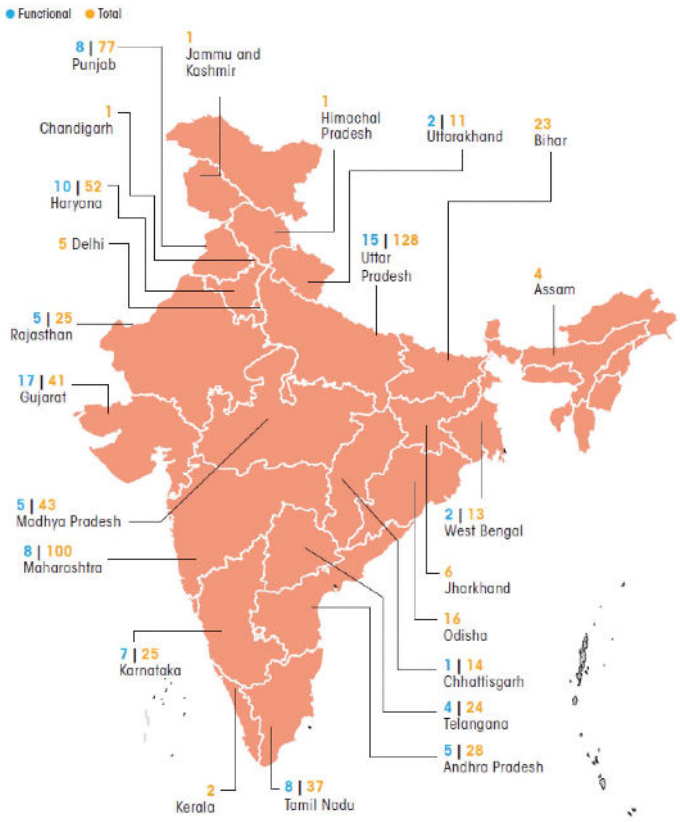

Figure 1: Functional, planned and under construction CBG plants in India as of August 2024 (CSE Report)

to accelerate the development and deployment of biofuels globally. The GBA aims to position biofuels as a critical driver in the energy transition, contributing to economic growth and job creation. **Biogas** plays an essential role in this strategy, supporting clean energy transition, waste management, biofertiliser production, and the circular economy. The **World Biogas Association (WBA)** is a founding member of the GBA, aligning its efforts to promote biogas as a central solution to these global challenges.

Market Status

According to the Government of India's GOBARdhan portal, there are currently **872 operational biogas plants** with a minimum capacity of five cubic meters per day, with an additional 350 plants under progress. Further, over **100 large scale CBG plants** are operational, and approximately 600 plants are under development[5]. The states of Gujarat (17), Uttar Pradesh (15) and Haryana (10) have the highest number of operational CBG plants[6].

Market Potential

1. Feedstock potential

India produces a total of 160,000 metric tons of solid waste every day in Urban areas, 95.4% of which collected[7]. Of the collected waste, only 50% undergoes treatment, and the rest goes to landfill.

By 2031, municipal solid waste (MSW) generation is forecast to rise to 165 million tonnes, and by 2050, it could reach 436 million tonnes, representing a near fourfold increase in waste production over the next two or three decades[8,9].

Organic waste	Annual feedstock potential (MMT)	CBG potential (MMT)
Agro residue	150	20
Press mud	20	2
Municipal waste	62	5
Sewage	50	10
Animal waste	190	25
TOTAL	**472**	**62**

Table 1: CBG potential across different feedstocks

2. Biogas and Biomethane potential

India is likely to account for 25% of global energy demand growth between 2020-2040. At present, India is the fourth largest importer of LNG. Coal is expected to deliver a more than 50% share in power generation in the coming years.

Currently, biogas contributes only a small fraction of India's overall energy demand, although the potential is much higher. The WBA report in 2023 showed the country **could produce 62 MMT of CBG**.

The CBG blending obligation aims to stimulate investment of around INR 37,500 crore (~USD 4.46 Bn) and facilitate the establishment of 750 CBG projects by 2028-29[10].

In 2023, ~12,693 small biogas plants and 1.107 MW(e) (medium-sized) were installed. An annual target of 46,000 small biogas plant installations was allocated during the FY 2023-24 to different Programme Implementing Agencies of various states[11].

Enabling Policy Environment

National Policies

1. The SATAT scheme is making steady progress in establishing an ecosystem to produce CBG from diverse biomass and waste sources. By ensuring a guaranteed offtake price and encouraging commercial partnerships with Oil & Gas marketing companies, the scheme aims to promote the use of CBG alongside natural gas. Prices for CBG offtake continue to be driven by the market, according to Compressed Natural Gas (CNG) prices. There are strong trends to scale up CBG plants in India[12]:

As it stands today, the SATAT scheme target of 5,000 CBG plants producing 15 MMT CBG by 2023-24 has not been realised due to multiple challenges. India continues to amplify its efforts in this regard but would need to scale up its efforts 10 times in order to meet the CBG targets even by 2030.

CBG sales under SATAT

Active letters of intent: **2,212** (SATAT **https://satat.co.in/satat/#**)
Commissioned: **75 Plants**
CBG Retail Outlets: **236**
Sale of CBG in 2023-24: **19,724 Tons**
Sale of CBG in 2024-25 (up to August): **14,877 Tons**

2. CBG-CGD Synchronisation Scheme allows co-mingling of CBG / Biogas (meeting the technical standards) with domestic gas supplied to the CGD networks for use in CNG (Transportation) & PNG (Domestic) segments. In October 2023, the scheme was further extended by 10 years.

Under the scheme, one of India's government-owned energy corporations, GAIL, has been mandated to operationalise the Synchro Scheme and supply Biogas/CBG co-mingled with domestic gas at a Uniform Base Price (UBP) to CGD companies[13].

India has set a target to increase the share of natural gas in the energy mix from the current 6.7% to 15% by 2030. The entire country (except the Islands) has been authorised exclusively for the development of the city gas distribution network[14].

3. The CBG Blending Obligation (CBO) announced by the Ministry of Petroleum and Natural Gas (MoPNG) mandates the mandatory blending of CBG into CNG for the transport sector and PNG for domestic use within the City Gas Distribution (CGD) sector. This obligation will be phased in according to the timelines below[15]:

- FY 2024-25: Voluntary
- FY 2025-26: 1%
- FY 2026-27: 3%
- FY 2027-28: 4%
- From FY 2028-29 onwards: 5%

4. Financial assistance to CBG producers for procurement of Biomass Aggregation Machinery (BAM)[16] allows CBG producers to avail financial assistance for the procurement of biomass aggregation machinery, aimed at streamlining the feedstock collection process. The scheme has an outlay of INR 564.75 crore (~USD 67 million) from FY 2023-24 to FY 2026-27. The funding pattern under the scheme is as follows:

a) Grant funding of up to 50% of the procurement cost of BAM or INR 90 lakh (~USD 107,000) per set, whichever is lower.
b) Financial assistance of INR 1.8 crore (~USD 214,000) for 4 TPD CBG capacity projects, capped at INR 9 crore (~USD 1 Mn) per project on a pro-rata basis.

5. Scheme for Development of Pipeline Infrastructure (DPI) for injection of CBG in CGD network[17]:

Under this scheme, financial assistance can be accessed by CGD/ CBG companies for laying pipeline infrastructure to connect the CBG plant with CGD network. The scheme has a total outlay of INR 994.50 Crore (~USD 118 Mn) from FY 2024-25 to FY 2025-26. The funding is available as per Table 2 below:

Distance	Steel / MDPE	Only MDPE
Up to 50 km*	INR 50 lakh/km (~USD 59,500 per km)	INR 7.5 lakh/km (~USD 8,900 per km)
50-75 km#	INR 15 lakh/km (~USD 17,800 per km)	INR 7.5 lakh/km (~USD 8,900 per km)

*50% of the project cost or prescribed CFA, whichever is lower

#50% of the additional project cost or prescribed CFA, whichever is lower

Table 2: Funding structure of the DPI schemes

The maximum support available under the scheme is of INR. 28.75 crore (~USD 3.4 Mn) per project but the beneficiaries can opt to lay pipeline beyond the funded 75 km at their own expense.

6. Market Development Assistance for the promotion of Organic Fertilisers (such as Digestate)[18]:
The market development assistance is prescribed at INR 1,500/MT (~USD 18/MT) of sale of Fermented Organic Manure (FOM) / Liquid Fermented Organic Manure (LFOM)/ enriched phosphate-rich organic Manure produced at Biogas / CBG plants. The scheme has a total outlay of INR 1,451.82 Crore (~USD 173 Mn) from FY 2023-24 to FY 2025-26.

7. In August 2024, the Government announced the continuation of Issuance of concessional custom duty certificates to the project Developer wanting to take up the concession on Custom Duty for the goods that are required to build a CBG generation project using non-conventional materials; namely, agricultural, forestry, agro-industrial, industrial, municipal, and urban waste[19].

State Level Policies
Multiple States have biofuels, bioenergy or renewable energy policies promoting the CBG/biogas sector, such as:

Andhra Pradesh Andhra Pradesh Integrated Clean Energy Policy 2024:

- Capital subsidy of 20% on Fixed Capital Investment (FCI) of the CBG plant, subject to a maximum of INR 1 Cr (~USD 0.12 Mn) per tons per day (TPD) capacity of the CBG plant. Subsidy shall be eligible only for plants with a minimum capacity of 10 TPD of CBG. The subsidy is applicable only for first 1,000 plants or up to 10,000 TPD capacity, whichever is achieved first.
- 100% State Goods and Services Tax (GST) and electricity duty reimbursement for 5 years.
- Support in land lease deemed Non-Agriculture (land conversion) status for the land for the project.

Uttar Pradesh Bioenergy Policy 2022)[20]:

- A subsidy of INR 75 lakh (~USD 89,285) per tonne of CBG production capacity, capped at INR 20 crore (~USD 2.38 Mn) per project.
- Government-owned land can be leased at a nominal rate of INR 1 (~USD 0.01) per acre per year to set up CBG plants and store feedstock.
- Waiver of Development fees, stamp duty, and electricity duty.
- Subsidy on Biomass aggregation machinery.

Bihar Bihar Biofuels Production Promotion Policy, 2023[21] and Bihar Industrial Investment Promotion Policy 2016[22]:

- A capital subsidy of 15% of the cost of plant and machinery, capped at INR 5 crores (USD 0.59 Mn).
- A 100 % exemption on stamp duty, registration fees & land conversion fees.
- Interest subvention incentive.
- Tax-related incentives including a 100% State Goods and Service Tax (SGST) reimbursement and a 100% electricity duty reimbursement for five years.
- Skill development subsidy.
- Note: if investors receive any subsidy under Central Government schemes, the amount of subsidy will be deducted from the subsidy admissible under the above policy.

Digestate Developments

The co-product of biogas, the biofertiliser also called digestate, produced during anaerobic digestion, has been underutilised globally, including India. Given its large agriculture sector, India can benefit economically and environmentally from the use of digestate. The Ministry of Agriculture and Farmers Welfare classifies digestate as **Fermented Organic Manure (FOM)**, with specific standards to ensure its quality, including nutrient levels, moisture content, organic carbon content, and heavy metal limits.

Furthermore, the Indian Council of Agricultural Research (ICAR) has also developed the interim "Package of practices" for important crops (rice, wheat, maise, pea, sugarcane, mustard, etc) regarding the use of FOM and Liquid fermented organic manure (LFOM) . The insights from the aforementioned package of practices for the major crops rice and wheat crops are as follows:

A. Rice

- In transplanted puddled rice crop, application of FOM (bio-slurry enriched and stabilised to 2.1% Nitrogen (N)) @ 2.5 t/ha (tons/ hectare) during nursery preparation and @1.25 t/ha after transplanting is recommended along with the recommended dose of fertiliser (120 kg N/ha, 60 kg P_2O_5/ha, 60 kg K_2O/ha).
- In direct seeded rice, the liquid FOM is recommended @ 1.25 t/ha along with the RDF.
- LFOM should be used @ 500 Litre per ha for 2 to 3 times.

B. Wheat

- In wheat, soil application of FOM (dried bio-slurry) @ 6-8 t/ha, 10 days before sowing is recommended along with recommended dose of fertiliser (120 kg N/ha, 60 kg P_2O_5/ha, 60 kg K_2O/ha) for sustainable productivity.
- FOM should be applied before last plough and ploughed into the soil

Gujarat Biotechnology Policy 2022-2027[23], supports the setting up of 500 biotechnology units and create over 120,000 lakh jobs in the biotechnology sector, including biofuels segment. The policy offers the following:

- Capital assistance of 25% of Capital Investment, with a ceiling of INR 40 crore (USD 4.76 Mn).
- Operational assistance is provided at 15 % of expenses, on the account of Power Tariff, Patent Assistance and Market Development, Lease Rental, Bandwidth Leasing, and Quality Certifications, capped at INR 5 crores (~USD 0.59 Mn) per annum.
- Electricity duty reimbursement.
- Interest subvention incentive.
- Employment linked subsidy.

Gujarat Waste-to-Energy Policy 2022[24]:

- Waste-to-energy projects are incentivised to effectively collect and utilise municipal solid waste to generate electricity, and support skills and investment in the sector.

Haryana Bio-energy policy 2018:

- The policy outlines incentives and ease of doing business including facilitating lease of Panchayat (local government-owned) land at reasonable rates, allowing use of agricultural land for biomass-based project, exemptions from certain taxations/ charges, support in Biomass collection machineries.

Karnataka Karnataka Renewable Energy Policy 2022:

- Incentives available for co-generation and waste-to-energy plants that aim to convert biogas into electricity.

Madhya Pradesh Madhya Pradesh Renewable Energy Policy 2022:

- Incentives for community-based biogas manufacturing, exemption in Electricity Duty and Energy Development Cess (i.e. tax incentives), 50% reimbursement on stamp duty, provision of allocating Government land on concessional rate to developers.

Maharashtra Maharashtra Renewable Energy Policy 2020:

- State-level support for biogas to electricity, INR 40,000 per kW (~USD 476 per kW) is available for biogas-based power in the range of 3-250 kW capacity.

Punjab Punjab New and Renewable Sources of Energy Policy 2012: Stamp duty and registration charges on land exempted, Panchayat (local government-owned) land available for projects on a long-term lease basis, electricity duty exempted during the construction and testing period.

Decentralised Biogas

Biogas has played a crucial role in bringing economic and health benefits to rural communities. India has the second highest number of small-scale biogas plants globally after China. **Over 5 million small scale biogas plants** across the country are providing an alternative to burning fuels and conventional biomass such as wood. Increased biogas uptake can address the challenges prevalent in clean cooking[28].

There is abundant feedstock availability from agricultural residues and livestock manure, along with supportive government policies aimed at promoting renewable energy sources and improving waste management practices.

India has been addressing two key economic challenges: **high installation costs and competition from other readily available fuels**, by implementing financial support mechanisms to help overcome these barriers. For instance, the Ministry of New & Renewable Energy (MNRE) has a Biogas Programme that funds plant construction and commissioning on reimbursement basis after successful commissioning of the biogas plant. A further challenge is a lack of education and awareness about the benefits and operation of biogas systems in many developing countries. Addressing these challenges requires concerted efforts in policy support, financial incentives, and educational programs to promote biogas technology.

Path Forward

India's involvement in various global partnerships and domestic policy initiatives reflect its commitment and shows positive progress towards meeting sustainable development. Looking towards the future, India's stakeholders aim to scale up biogas production significantly. Indian companies and research institutions have been instrumental in developing technologies to enhance biogas production and utilisation.

Carbon Markets

Domestic Carbon Market

India is among the emerging carbon markets globally with both a voluntary and a new and evolving mandatory carbon trading mechanism.

India's Carbon Credit Trading Scheme (CCTS) establishes two mechanisms:

i. Compliance mechanism:

- A mandatory program for energy intensive industries (such as metal and fuel refineries) where the government will set Greenhouse Gas (GHG) emission intensity targets (GHG emission per unit of output) for these entities, and they will have to comply with these targets.

ii. Voluntary Mechanism:

- A voluntary project-based baseline and credit mechanism for the non-obligated entities where the non-obligated entities can register their projects for GHG emission reduction, removal, or avoidance against the baseline for the issuance of Carbon Credit Certificates (CCC)

It is envisaged that Carbon Credit Certificates will be issued on the Indian Carbon Market Registry and traded over an electronic trading platform[26].

International Carbon Markets

As part of its commitment to the Paris Agreement, India has notified the decision-making body for the Agreement regarding the type of projects that may take part in international carbon market under Article 6 mechanisms.

CBG is one of 13 activities that have been finalised for consideration for the trading of carbon credits under bilateral / cooperative approaches under Article 6.2 of the Paris Agreement Rule Book[27].

The biogas sector has also seen increased investment, with private companies partnering with local governments to build larger biogas plants capable of producing CBG.

Role of WBA

WBA's **#MakingBiogasHappen** programme, as it moves into Phase 2 of creating country-specific biogas roadmaps, will support India in accelerating uptake and overcoming barriers to the scale-up of the Indian Biogas and CBG markets.

This programme includes the Global Biogas Regulatory Framework and the International Anaerobic Digestion Certification Scheme (ADCS), which aims to harmonise regulations and certification practices internationally. By fostering knowledge sharing and driving growth, these initiatives can support the biogas sector in India. In collaboration with government departments, industry leaders, and research institutions, WBA will work towards designing an **India Biogas Roadmap** tailored to the country's needs for sustainable growth.

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