



# COMPRESSED BIOGAS LANDSCAPE IN UTTAR PRADESH

The Leading State in  
Potential, Policies and Projects







# **COMPRESSED BIOGAS LANDSCAPE IN UTTAR PRADESH**

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Potential, Policies and Projects**

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# Abbreviations

AD	Anaerobic Digestion
AIF	Agriculture Infrastructure Fund
BDTCs	Biogas Development and Training Centres
BIS	Bureau of Indian Standards
CAPEX	Capital Expenditure
CBG	Compressed Biogas
CBO	CBG Blending Obligation
CNG	Compressed Natural Gas
CFA	Central Financial Assistance
CGD	City Gas Distribution
CH <sub>4</sub>	Methane
CO <sub>2</sub>	Carbon Dioxide
CPCB	Centre Pollution Control Board
CSTR	Continuously Stirred Tank Reactor
COE	Consent to Establish
COP	Conference of the Parties
DPR	Detailed Project Proposal
FCO	Fertilizer Control Order
FOM	Fermented Organic Manure
FPO	Farmer Producer Organization
GAIL	Gas Authority of India Limited
GHGs	Greenhouse Gases
GDP	Gross Domestic Product
GOBAR	Galvanizing Organic Bio-Agro Resources
GOI	Government of India
GST	Goods and Service Tax
HPCL	Hindustan Petroleum Corporation Limited
IEA	International Energy Agency
IOAGPL	Indian Oil-Adani Gas Pvt Ltd
KLD	Kilo Litres Per Day
KVK	Krishi Vigyan Kendra
LFOM	Liquid Fermented Organic Manure
LOI	Letter of Intent
MMT	Million Metric Tonnes
MMTPA	Million Metric Tonnes Per Annum
MMSCM	Million Standard Cubic Meters of Gas



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MT	Metric Tonnes
MNRE	Ministry of New and Renewable Energy
MoA	Ministry of Agriculture
MoPNG	Ministry of Petroleum and Natural Gas
MSW	Municipal Solid Waste
NOC	No Objection Certificate
NZE	Net Zero Emissions
NPK	Nitrogen, Phosphorous, Potassium
OGMCs	Oil and Gas Marketing Companies
OPEX	Operation Expense
PPP	Public-Private Partnership
PSL	Priority Sector Lending
RBI	Reserve Bank of India
SATAT	Sustainable Alternative Towards Affordable Transportation
SBM	Swachh Bharat Mission
SDGs	Sustainable Development Goals
SFOM	Solid Fermented Organic Manure
SOP	Standard Operating Procedure
TPD	Tonnes Per Day
UPNEDA	Uttar Pradesh New and Renewable Energy Development Agency
TS	Total Solids
VS	Volatile Solids

# EXECUTIVE SUMMARY

The purified version of biogas—termed compressed biogas (CBG) or bio-CNG (biomethane in Europe and renewable natural gas in the United States)—contains over 90 per cent methane and is produced through anaerobic digestion from organic waste or biomass. Various feedstocks—such as municipal solid waste, agricultural waste, pressmud and animal waste—contribute to the generation of CBG.

Implementing CBG projects in India offers numerous benefits, including improved waste management, fostering in-house clean energy production, and reducing dependence on compressed natural gas (CNG) imports, which currently fulfil 47 per cent of India's gas consumption. CBG seamlessly integrates with existing natural gas structures, eliminating the need for new infrastructure.

Among Indian states, Uttar Pradesh has taken the lead in this sector with its ambitious bioenergy policy, allocating Rs 750 crore (2022–27) for CBG, while providing subsidies, land for lease and other incentives.

The initiative provides a subsidy of Rs 75 lakh per tonne of CBG to investors, in addition to financial assistance from the Ministry of New and Renewable Energy (MNRE) under the Waste-to-Energy (WtE) scheme. This translates to Rs 3.75 crore as subsidy for a five tonne per day CBG production plant, supporting the developers with about 15-20 per cent of the initial capital expenditure (CAPEX) requirement.

Under the initiative, government-owned land can be leased at a nominal rate of Rs 1 per acre per year for the establishment of CBG plants and the storage of feedstocks. The state government has also committed to offering a 30 per cent subsidy (maximum Rs 20 lakh) for the procurement of equipment such as balers, rakers and trolleys used in the collection, compression and transportation of agricultural waste from farms. The policy also includes the provision of an online bioenergy portal for streamlined single-window clearance.

This report aims to provide a comprehensive overview of the CBG scenario in Uttar Pradesh, highlighting both positive and negative aspects. By doing so, policymakers can identify challenges and devise solutions, while successful practices may inspire other states to adopt similar policies. Detailed information

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on feedstock advantages, challenges and pricing can assist investors in making informed decisions.

Our analysis indicates that Uttar Pradesh has the potential to produce 15.5 million metric tonnes of CBG annually. This amount aligns with the potential for CBG targeted by the Union government's Sustainable Alternative Towards Affordable Transportation (SATAT) scheme nationwide, aiming to establish 5,000 CBG plants. It's noteworthy that Uttar Pradesh contributes approximately 24 per cent of the total CBG generation potential in the country, which is estimated at around 62 million metric tonnes per annum.

This report attempts to explicitly identify ten hotspot districts with significant CBG potential, highlighting Lakhimpur-Kheri, Bijnor and Bulandshahr for having most abundant organic feedstocks. The state could support 1,000 CBG projects out of 5,000 plants envisioned under the SATAT scheme nationwide, if only 20 per cent of its surplus feedstock is tapped.

As of February 2024, 12 CBG plants are operational in Uttar Pradesh. Eight of these rely on pressmud (a sugar industry waste) as their main raw material, and ten are located in the western part of the state. All these facilities are presently functioning below their full capacity due to diverse issues, including incomplete gas utilization, difficulties in disposing of fermented organic manure, inefficiencies in the feedstock supply chain and operational challenges.

Based on the economic analysis, it was found that gross margins of CBG projects significantly improve if the byproduct fermented organic manure is being marketed and carbon credits are availed. However, when solely focusing on gas as the revenue product, pressmud—a byproduct arising from the sugar manufacturing process—emerges as a highly practical option with a net margin of 43 per cent.

Despite leading the way in the bioenergy sector in India, Uttar Pradesh encounters challenges in policy implementation. These challenges include a lack of information at the grassroots level, limited CNG consumption in rural and semi-urban areas, insufficient training for personnel involved, low financial support from banks, poor coordination among state departments, the presence of multiple and complex online portals, and issues related to the marketability of fermented organic manure (FOM). FOM is the biodigestate produced from anaerobic reactors in the form of slurry and can be used as a soil conditioner due to its high carbon content.

This report gives a number of recommendations. The initiation of a government-backed guarantee programme to alleviate collateral requirements, thereby encouraging financial institutions to more readily extend loans. Establishing a biogas training and development centre in Uttar Pradesh which can facilitate capacity building for all stakeholders. Creating a more effective communication channel between district-level committees for the seamless implementation of the existing policy. Currently, 80 per cent of CBG plants primarily rely on pressmud, with limited focus on agricultural and municipal solid waste (MSW), therefore efforts should be directed towards utilizing MSW along with liquid effluents like spent wash from distilleries, industrial discharges from paper and pulp manufacturing, and other liquid industrial waste for CBG generation. Farmer-producer organizations can be incentivized to serve as feedstock aggregators, replacing third-party private entities. To boost demand in rural areas, incentives should be given for converting tractors and two-wheelers to run on CNG or for the adoption of CNG-powered agricultural machinery. To improve the offtake and marketability of FOM in CBG projects, commitments from chemical fertilizer companies to procure FOM at fixed prices are crucial, therefore introducing a scheme similar to SATAT, specifically designed for FOM offtake at predetermined rates, should be considered.

The Uttar Pradesh New and Renewable Energy Development Agency (UPNEDA) has undertaken commendable initiatives to support the CBG ecosystem in the state. One notable effort involves establishing a unified pool for all CBG plants, streamlining the process of applying for carbon credits through a single channel, with the application fees covered by UPNEDA. Additionally, the strategic plan to install one bioenergy plant in each tehsil has effectively prevented feedstock competition among plants by designating tehsils as exclusive catchment areas. Lastly, the creation of district-level committees, acting as intermediaries between farmers, feedstock aggregators and bioenergy plant owners, ensures a consistent supply of feedstock to bioenergy plants, thereby safeguarding the long-term economic viability of these plants.



# **1. INTRODUCTION TO COMPRESSED BIOGAS (CBG) AND ITS POTENTIAL IN UTTAR PRADESH**

- **Uttar Pradesh contributes a significant 24 per cent of the total CBG generation potential in the country**
- **Uttar Pradesh has the capacity to produce about 15 million metric tonnes per annum of CBG if its full potential is harnessed with maximum contribution (62 per cent) from agricultural waste**
- **There has been a fivefold increase in the number of CNG stations in Uttar Pradesh from 2020–21 to 2022–23. However, Uttar Pradesh lags with only 12 CNG vehicles per lakh people compared to Delhi, Gujarat and Haryana, where 57, 54, and 49 vehicles are registered, respectively.**

## 1.1 THE NATIONAL CONTEXT

### Net-zero and bioenergy

Achieving India's net-zero emissions target by 2070 necessitates fast and deep reductions in both carbon dioxide (CO<sub>2</sub>) and other greenhouse gases (GHG), with a particular focus on methane (CH<sub>4</sub>). Postponing these reductions would pose challenges to attaining the net-zero emissions objective.

In the Global Net Zero Emissions (NZE) Scenario, the traditional use of biomass is phased out, while the utilization of modern bioenergy more than doubles by 2050. This increase is attributed to its capacity to serve as a direct substitute for fossil fuels. Modernized feedstock supply chain will experience significant growth, driven by investments and the commercialization of advanced conversion technologies. According to the International Energy Agency's Net Zero Roadmap Report 2023, modern bioenergy emerges as a key component of the clean energy transition, expanding from 6 per cent of total energy supply today to 13 per cent in 2030 and reaching 18 per cent in 2050 on a global scale in the NZE Scenario.<sup>1</sup>

Most of the expansion in the utilization of modern bioenergy in the NZE Scenario is observed in emerging markets and developing economies. By 2030, it is set to nearly double, growing at a rate approximately one-third faster than in advanced economies. The abundant biomass resources in these emerging economies contribute significantly to the upsurge in modern bioenergy applications across industrial, transportation and electricity sectors.

While bioenergy finds application in various sectors, its pivotal role is notably pronounced in the transportation sector. In this context, the share of bioenergy in the demand for liquid fuel transport is anticipated to rise from just under 4 per cent presently to over 10 per cent by 2030. This surge is predominantly fuelled by increasing demand in passenger cars, heavy-duty trucking, long-haul aviation and international shipping.

During the latest G20 summit, India highlighted the Global Biofuel Alliance as a key focus of its G20 presidency. The alliance, initially proposed by India, was officially inaugurated on 9 September 2023, with the participation of leaders from the United States of America, Brazil, Singapore, Argentina, Bangladesh, Italy, Mauritius and the United Arab Emirates. A total of 19 nations and 12 international organizations have committed to being part of this alliance. Its primary objectives include fostering robust biofuel markets, facilitating global biofuel trade and promoting the exchange of policy insights. The alliance aims to serve as an expert hub and a catalytic platform for achieving these goals.

## CBG and circularity

The upgraded form of biogas, known as compressed biogas (CBG) or bio-CNG (biomethane in Europe and renewable natural gas in the United States), contains over 90 per cent methane and is generated through anaerobic digestion from organic waste streams. These waste materials arise from diverse industrial, economic, agricultural and household activities. The CBG cycle serves as an ideal representation of circularity, as it is derived from various wastes generated by human activities and is subsequently utilized as a resource in the form of clean energy and biofertilizer (see *Figure 1: Schematic showing the waste-to-energy circularity model using CBG*).

**Figure 1: Schematic showing the waste-to-energy circularity model using CBG**

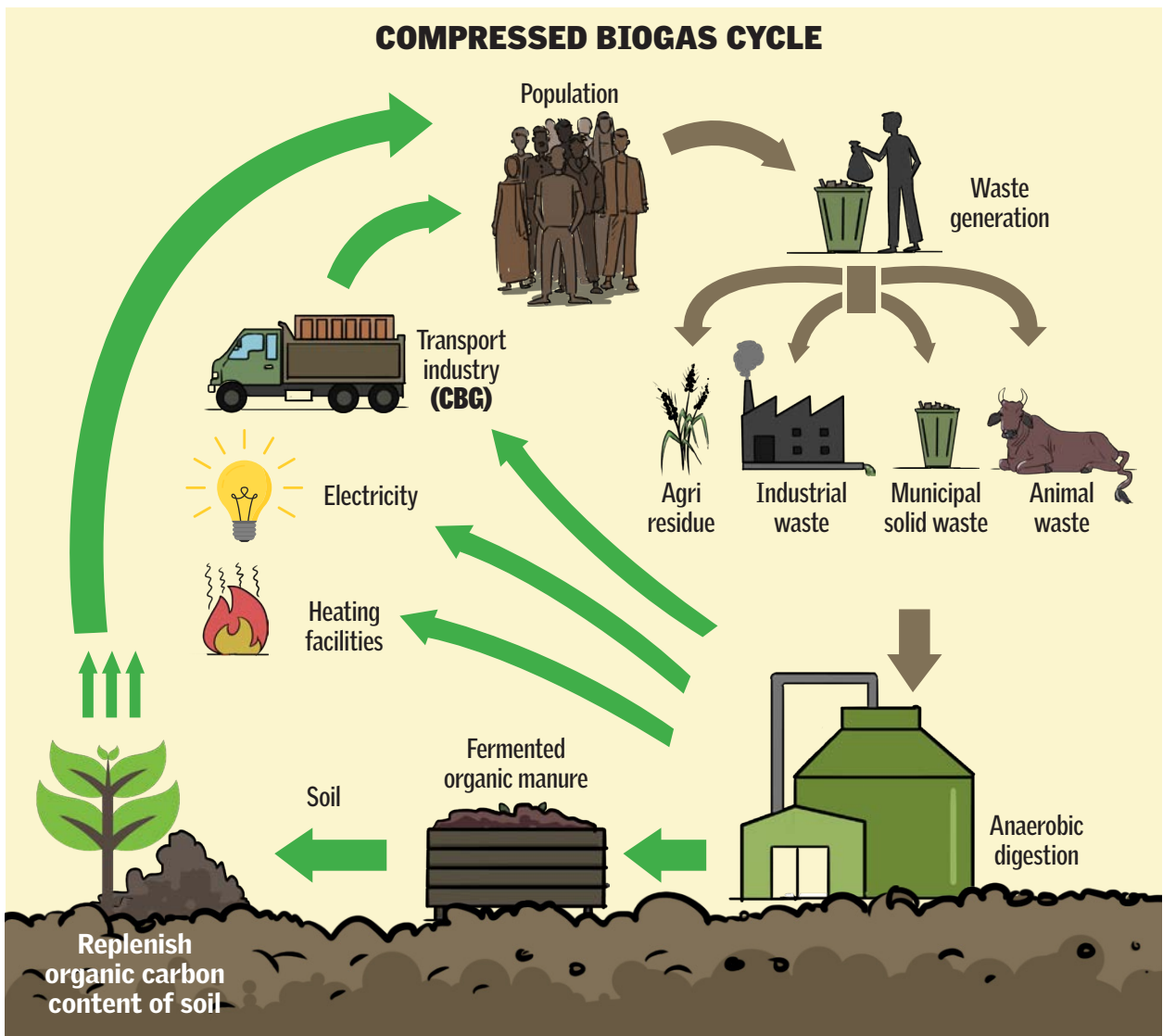
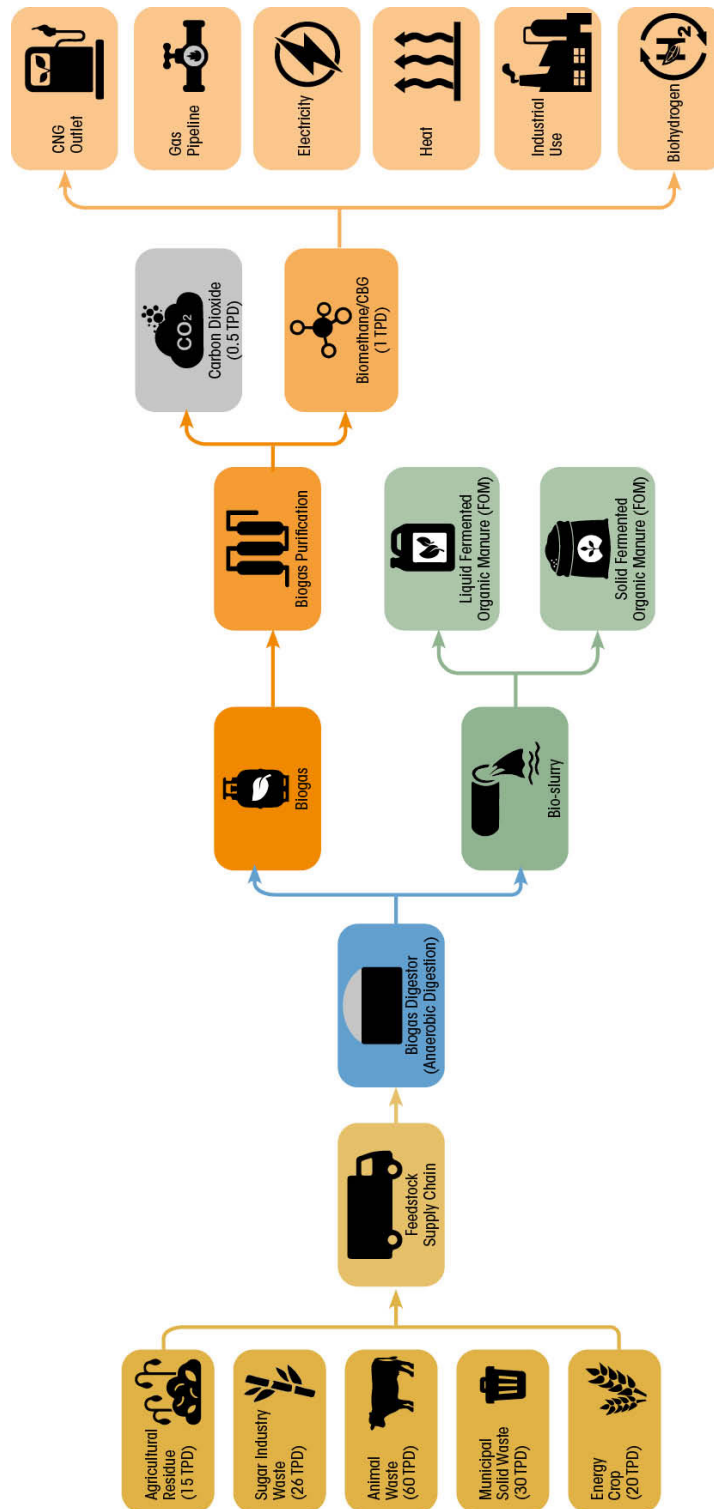


Figure 2: Flow chart of CBG production and utilization



Source: CSE analysis



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Implementing CBG projects in India offers multiple advantages. It reduces the need for CNG imports, promotes in-house clean energy production, enhances waste management, strengthens the rural economy, and expands the non-chemical fertilizer sector. This aligns with the Indian government's goal of transitioning to a gas-based economy, aiming to increase its gas share from the current 6.5 per cent to 15 per cent by 2030. Currently, India produces 34,000 million standard cubic meters (MMSCM) of gas but consumes 64,000 MMSCM, resulting in a significant 30,000 MMSCM shortfall, constituting 47 per cent of total consumption, which is met through imports.<sup>2</sup> CBG sourced from agricultural residues, municipal solid waste, animal waste and industrial organic waste, can address this gap without requiring new infrastructure, as it seamlessly integrates with existing natural gas structures. Figure 2 illustrates the CBG production process using diverse raw materials (along with associated amounts needed to generate 1 tonne of CBG) and its application in various uses such as automotive fuel, electricity, heat, industrial applications and biohydrogen generation.

### **CBG policies and announcements in 2022-23**

The year 2018 marked a significant turning point for India's bioenergy sector with the introduction of two ambitious initiatives: The National Biofuel Policy and the Sustainable Alternative Towards Affordable Transportation (SATAT) scheme. The SATAT scheme, launched by the Ministry of Petroleum and Natural Gas (MoPNG), aimed to stimulate the production of 15 million tonnes (MT) of CBG from 5,000 plants by 2023-24. Under the scheme, oil and gas marketing companies (OGMCs) would procure this CBG for use as automotive and industrial fuels at a pre-determined price.

To address the slow progress of the SATAT scheme, the government issued guidelines in November 2021 allowing the co-mingling of CBG in the total domestic gas supplied to the CNG and piped natural gas (PNG) segment of the city gas distribution (CGD) sector. Additionally, to promote blended CNG, the government exempted excise duty on the goods and services tax (GST) paid on CBG in the blended CNG. In response to the rise in CNG prices in India, in May 2022 the price of CBG was indexed to the retail selling price of CNG, with the lower limit fixed at Rs 46/kg plus applicable taxes and procurement price kept between Rs 54 and Rs 70 per kg. Seeking to strengthen the CBG ecosystem further, the Ministry of New and Renewable Energy (MNRE) unveiled the National Bioenergy Programme on 2 November 2022. This programme includes incentives to cover the capital costs of CBG plants under the Waste-to-Energy Programme.

## IMPORTANT CBG ANNOUNCEMENTS POST INTERIM BUDGET 2024

### Support for biomass aggregation machinery

- Support biomass collection for the initial 100 biomass-based CBG plants by providing financial assistance to CBG producers for procurement of biomass aggregation machinery.
- Maximum financial assistance of 50% of the procurement cost of biomass aggregation machinery or Rs 90 lakh per set (whichever is less) will be admissible as grant to a CBG producer.
- All the existing and upcoming CBG projects which are using at least 50% biomass (agri residue) as feedstock and have an installed CBG production capacity of at least 2 tonnes per day (TPD) are eligible to avail the assistance.

### Mandatory blending of CBG and green certificates

- CGD entities are mandated to blend CBG as a prescribed percentage of natural gas consumed in the CNG (transport) or PNG (domestic) segment of the CGD sector across the country.
- CBO will be kept as 1%, 3% and 4% of total CNG (T)/PNG (D) consumption for FY 2025-26, 2026-27, and 2027-28 respectively. From FY 2028-29 onwards, CBO will be 5%.
- CBG will be promoted as green fuel by guaranteeing its renewable origin. It could be suitably monetized through tradability of the green certificate system.

## 1.2 STATE CONTEXT: CBG IN UTTAR PRADESH

### Uttar Pradesh: A leading state in CBG

Currently, Uttar Pradesh seems to be fostering CBG in a big way. Notably, the state is set to host 105 CBG plants out of a total of 542 upcoming CBG projects in different stages of construction, commissioning and operation countrywide. Maharashtra, Punjab and Haryana respectively have 76, 70 and 50 CBG projects lined up.

The fourth-largest state in India by land area, covering 2.4 lakh square kilometres, UP holds a pivotal position in the country's landscape. With 75 districts, 689 city towns, 18 divisions and 820 blocks, UP shares inland borders with seven states and an international border with Nepal, making it a geographically diverse and significant region.<sup>3</sup>

**Figure 3: CBG announcements 2022-23**

**MAY 2022**

CBG procurement price indexed to prevalent Retail Selling Price (RSP) of CNG in the market



**OCTOBER 2022**

Uttar Pradesh launched its Bioenergy Policy



**NOVEMBER 2022**

Launch of the National Bioenergy Programme by MNRE



**JANUARY 2023**

Operational Guidelines of Financing Facility under Agriculture Infrastructure Fund (AIF)



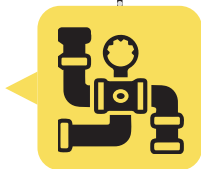
**FEBRUARY 2023**

Budget 2022-23: 500 new CBG plants announced under GOBARdhan Scheme with an investment of ₹10,000 crore



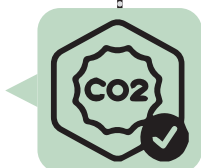
**FEBRUARY 2023**

Excise duty exemption for CNG blended with CBG



**FEBRUARY 2023**

Inclusion of CBG plant in list of eligible activities for carbon credits under Article 6.2 of the Paris Agreement



**MARCH 2023**

"Design, Construction, Installation, and Operation of Biogas (Biomethane) Plant-Code of Practice" published by the Bureau of Indian Standards



**MAY 2023**

Fertilizer Control Order Amendment - Authorization exemption and moisture up to 70%



**JULY 2023**

Crop Residue Management guidelines to strengthen biomass aggregation in the states of Punjab, Haryana, Uttar Pradesh, Madhya Pradesh and NCT of Delhi



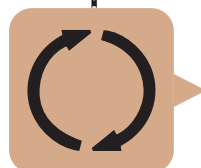
**JULY 2023**

Bihar Bio-Fuels Production Promotion Policy, 2023



**SEPTEMBER 2023**

Market Development Assistance @ ₹1,500/MT on Fermented Organic Manure produced from CBG projects



**OCTOBER 2023**

CBG-CGD Synchronization Scheme extended for 10 years



**NOVEMBER 2023**

5% CBG Blending Obligation (CBO) announced



**DECEMBER 2023**

Special Fund for partial guarantee funded under Swachh Bharat Mission to be housed in HUDCO



**DECEMBER 2023**

Special subsidiary based on waste processing to be set up under Engineers India Limited (EIL)

The state is not only the most populous in India, with a population of 24 crore constituting 17 per cent of the nation's total population, but it also stands out as one of the fastest-growing economies. Impressively, 56 per cent of UP's total population falls within the working-age group, contributing to its dynamic and youthful demographic profile. As India's third-largest economy, UP plays a crucial role in the nation's economic landscape, contributing 8 per cent to the national GDP.

CSE's previous report, *Greening India's Energy Mix with CBG*, revealed that UP possesses the highest CBG generation potential among all Indian states.<sup>4</sup> This potential stems from the state's abundance of four distinct biomass sources: agricultural residue, animal waste, sugar industry waste and municipal solid waste. The state presents an excellent opportunity to dive deep into the progressive CBG landscape.

Uttar Pradesh has emerged as one of the first few states with an ambitious bioenergy policy in place, supporting initiatives to harness the potential of CBG and other renewable energy sources. The CBG status report for UP aims to delve into the ground-level reality of CBG initiatives in the state. By understanding the challenges faced by investors and developers, the report seeks to highlight key initiatives and provide valuable insights for decision makers. This knowledge can contribute to informed policymaking, benefitting Uttar Pradesh, and serve as a model for other states seeking to replicate successful green energy initiatives.

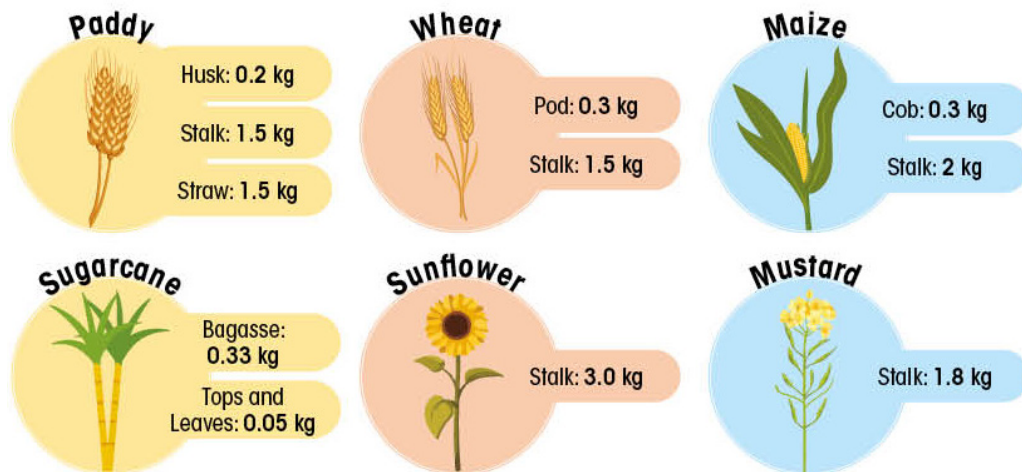
## **CBG potential from different waste streams generated in Uttar Pradesh**

There are four primary feedstocks to generate CBG in the state whose potential has been described below:

### ***Agricultural waste***

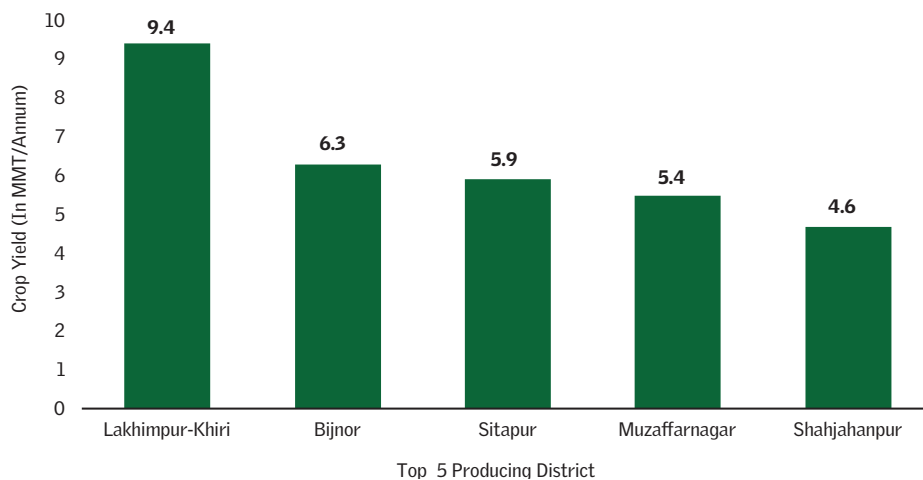
The agricultural sector, serving as the primary means of sustenance for most of the population in Uttar Pradesh, utilizes a significant portion of agricultural land and produces substantial amounts of residues. Agricultural residue primarily consists of organic materials generated as by-products during the processing and harvesting of crops. These residues can be categorized as either primary (field-based residues obtained during crop harvest) or secondary (processing-based residues accumulated during processing).<sup>5</sup> Examples of primary residues include rice straw and sugarcane tops, while secondary residues encompass rice husk and bagasse. Figure 4 shows the different quantities of waste generated from the prominent agricultural crops per kg of crop production.

**Figure 4: Crop residue generated in different agricultural crops per kg of crop production**



The disposal of primary agricultural residues typically involves open burning or field dumping, leading to GHG emissions. However, these residues represent a valuable indigenous resource with significant bioenergy potential. Based on our analysis, if effectively utilized, these residues could potentially yield approximately 9.6 million metric tonnes of CBG annually. Graph 1 highlights the top five districts in Uttar Pradesh with the highest amounts of agricultural residues generated.

**Graph 1: Top five districts in agro-residue production in Uttar Pradesh**



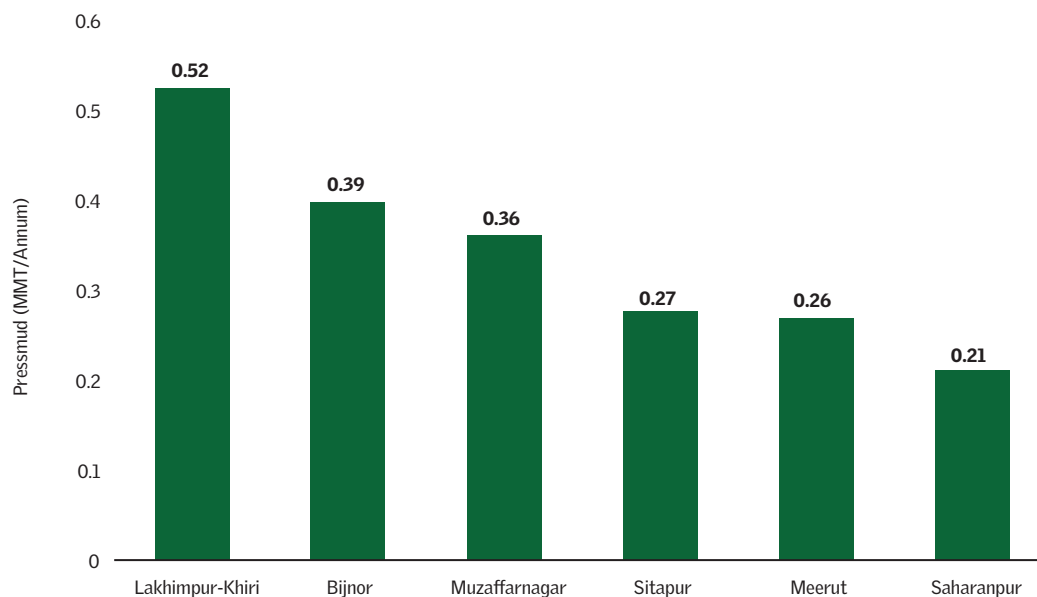
Source: Author analysis based on the U.P. State Bioenergy Development Board's data<sup>6</sup>

### *Sugar industry waste*

Pressmud, a residual by-product commonly referred to as filter cake or press cake in the sugar industry, has been recognized as a valuable resource for the production of green energy. Pressmud is the leftover substance resulting from the clarification of sugarcane juice. When sugarcane juice is heated with additives, it causes pressmud to precipitate. This pressmud, considered waste, typically makes up 3–4 per cent of the processed sugarcane’s weight in a unit. This lightweight material, characterized by its nearly amorphous nature, looks like a dark brown to black compressed waste material. Moreover, it possesses a relatively favourable carbon-to-nitrogen (C/N) ratio, ranging approximately between 10 and 20, making it an appealing candidate for anaerobic fermentation-based biogas production.<sup>7</sup>

Uttar Pradesh and Maharashtra, the foremost states in sugarcane cultivation, are collectively accountable for around 65 per cent of the total sugarcane cultivation area in the country.<sup>8</sup> In the 2022–23 period, Uttar Pradesh processed 115.13 million tonnes of sugarcane, resulting in the production of 10.79 million tonnes of sugar and 3.78 million tonnes of pressmud. Graph 2 illustrates the top five districts in Uttar Pradesh producing pressmud.

**Graph 2: Districts in Uttar Pradesh with the highest pressmud production**



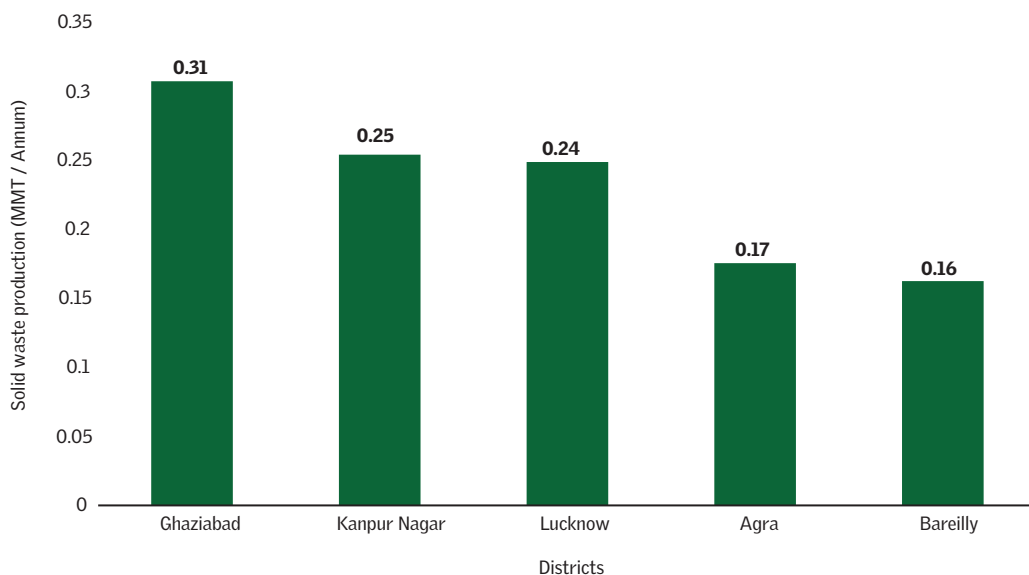
Source: CSE analysis

### ***Municipal solid waste (MSW)***

MSW generation in Uttar Pradesh, like in many other populous states in India, is a significant environmental concern. Due to rapid urbanization and population growth, the state's urban areas generate substantial amounts of solid waste. The traditional approaches to waste disposal—including disorderly landfilling, unregulated waste dumping and extensive burning—have been practised in the state for many years. These methods have given rise to numerous environmental and health challenges. The open dumping of untreated MSW leads to air pollution through the emission of gaseous and particulate matter, as well as chemical and biological degradation of soil and water resources. The organic content in MSW attracts viruses, bacteria and various pathogens, potentially causing severe and prolonged illnesses in living organisms. The adverse effects of MSW are not limited to the vicinity of disposal sites; they extend to a broad surrounding area. Consequently, there is an urgent need to transition from conventional waste disposal methods to advanced technologies.

The characteristics and composition of Indian MSW differ significantly from that of developed countries, with the most significant fraction (51 per cent) consisting of food/biodegradable waste, as opposed to paper or inorganic waste.<sup>9</sup> Graph 3 displays the five districts in Uttar Pradesh that generate the highest amount of MSW.

**Graph 3: Districts in Uttar Pradesh with the highest municipal solid waste (organic fraction) production**



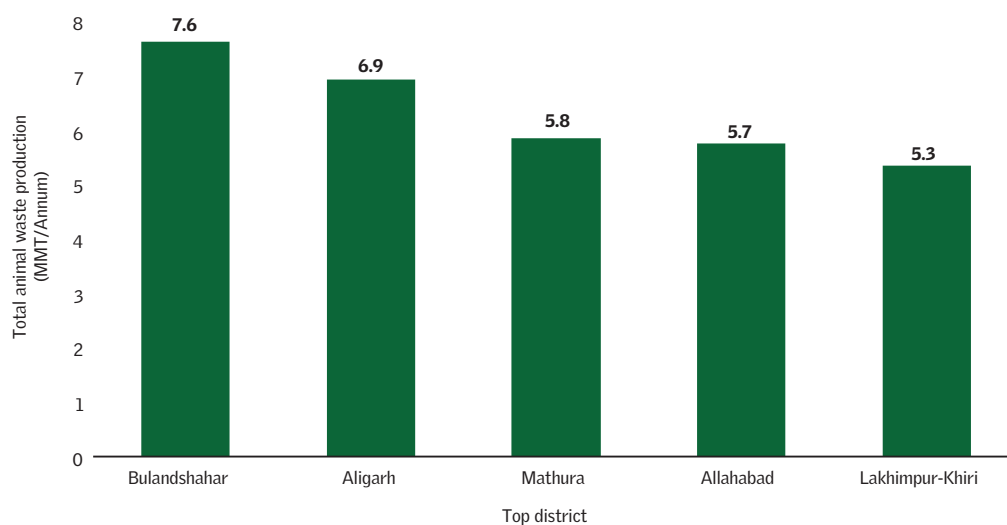
Source: Swachh Bharat Mission dashboard of Ministry of Housing and Urban Affairs

### *Animal waste*

The continuous rise in the population of animals has led to significant increase in livestock waste. Uttar Pradesh has the highest number of livestock among all states. Common practices for managing dung include composting for manure production, forming cakes to be used as fuel, and as a feedstock for family biogas and small biogas plants. Effective methods for managing dung have been developed traditionally. This involves gathering dung from individual households and assembling it in strategic locations within the village. Subsequently, the accumulated dung undergoes bacterial decomposition, ultimately producing compost that serves as fertilizer in agricultural fields. However, improper disposal of this waste could contribute to air pollution, groundwater contamination, and the release of potent gases like methane and nitrous oxide, posing environmental and public health risks. Therefore, urgent measures are needed for improperly managed livestock waste, emphasizing the importance of adopting organic and scientifically sound methods to prevent environmental degradation and overcome development obstacles.

Current estimates indicate that only 9 per cent of the total dung produced by livestock is being utilized for biogas recovery.<sup>10</sup> Implementing eco-friendly, cost-effective and energy-efficient technologies becomes crucial to address this issue and make proper use of livestock waste biomass. Large CBG projects offer a solution for generating energy from livestock waste. Graph 4 illustrates the amount of livestock waste generated in the top five districts of Uttar Pradesh.

**Graph 4: Districts in Uttar Pradesh with the highest production of animal waste**



Source: Author analysis based on the U.P. State Bioenergy Development Board's data



UP has the capacity to produce about 15 million metric tonnes (MMT) per annum of CBG if its full potential is harnessed (see *Table 1: CBG generation potential from four different feedstocks in Uttar Pradesh*). This quantity is equivalent to the CBG potential, which the SATAT scheme aims to tap throughout the country by installing 5,000 CBG plants. Notably, UP accounts for approximately 24 per cent of the total CBG generation potential in the country, with India’s overall potential estimated at around 62 MMT per annum.

Among the four available feedstocks, animal waste and agro-waste exhibit the highest potential, followed by MSW and pressmud. However, current trends indicate that most of the plants are focusing on utilizing pressmud due to its easily accessible supply chain and favourable economic factors compared to the other three feedstocks.

**Table 1: CBG generation potential from four different feedstocks in Uttar Pradesh**

Type of waste	Agri-residue waste	Municipal solid waste	Sugar industry waste	Animal waste	Total
Specification	Includes sugarcane trash (54.3 MMT), paddy straw (58 MMT), wheat straw (47.9 MMT), maize straw (3.7 MMT)	Organic fraction	Pressmud	Cross breed cattle (13.1 MMT), Indian breed cattle (58.3 MMT), Buffalo (167.7 MMT)	
Quantity (MMT/annum)	144.5	30.8	3.78	239.1	418.18
<b>CBG generation potential at 100% utilization of estimated feedstock</b>					
CBG generation potential (MMT/annum)	9.6	1.03	0.15	4.7	15.48
<b>CBG generation potential at 20% utilization of estimated feedstock</b>					
CBG generation potential (MMT/annum)	1.927	0.205	0.030	0.956	3.12

Source: CSE analysis (*Estimated feedstock potential indicates surplus availability*)

### ***Napier grass***

Napier grass, or elephant grass, is a highly productive and adaptable forage grass indigenous to Africa and southeast Asia. Its abundant yield makes it a popular choice for livestock feed and bioenergy applications. This rapidly growing perennial grass can attain a height of 10–15 feet and is harvestable 3–4 times annually. The initial harvest occurs four months post-planting, followed by subsequent harvests every three months for up to seven years.

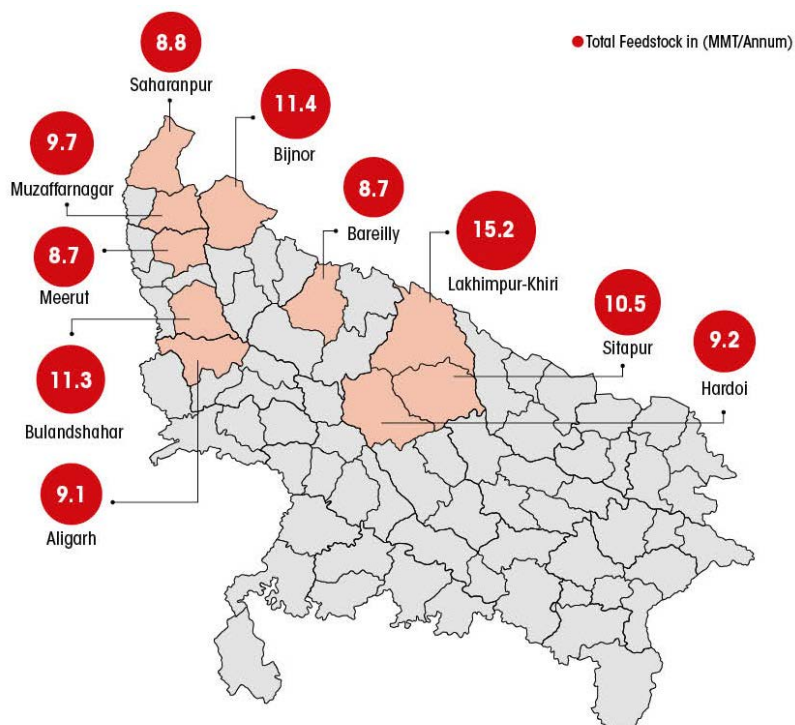
Categorized as lignocellulosic biomass, Napier grass has a carbohydrate composition of approximately 35–39 per cent cellulose, 19–23 per cent xylan and 15–19 per cent lignin on a dry mass basis. With an impressive energy output-to-input ratio of around 25:1, it stands out as a promising candidate for developing cost-effective and efficient bioenergy systems.<sup>11</sup> In India, the reported annual yield of Napier grass ranges from 150–200 tonnes per acre per year, surpassing other energy grasses like miscanthus and switchgrass.

It has been observed that approximately 18–20 tonnes of Napier grass can generate 1 tonne of CBG. Currently, the utilization of Napier grass in CBG plants in India is in its early stages, with no operational plants exclusively focused on this grass. However, numerous CBG investors are turning their attention to Napier grass for biogas production to reduce reliance on third-party sources for feedstock supply.

### Hotspot districts

Considering the varying quantities of the four mentioned feedstocks in different state regions, crucial districts with high potential have been pinpointed for the prompt installation of CBG projects. Map 1 illustrates the top 10 hotspot districts

**Map 1: Hotspot districts based on the highest organic waste production in Uttar Pradesh**



Source: CSE analysis

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in Uttar Pradesh and their respective waste quantities. Among these districts, Lakhimpur-Kheri (15.2 MMT), Bijnor (11.4 MMT), Bulandshahr (11.3 MMT), Sitapur (10.5 MMT) and Muzaffarnagar (9.7 MMT) stand out for having the highest availability of organic feedstocks. This does not necessarily indicate that these hotspot districts also possess readily available infrastructure for CBG offtake. Hence, it is recommended that a complete downstream value chain of CBG is studied in detail individually for these hotspot districts to understand potential based on the demand.

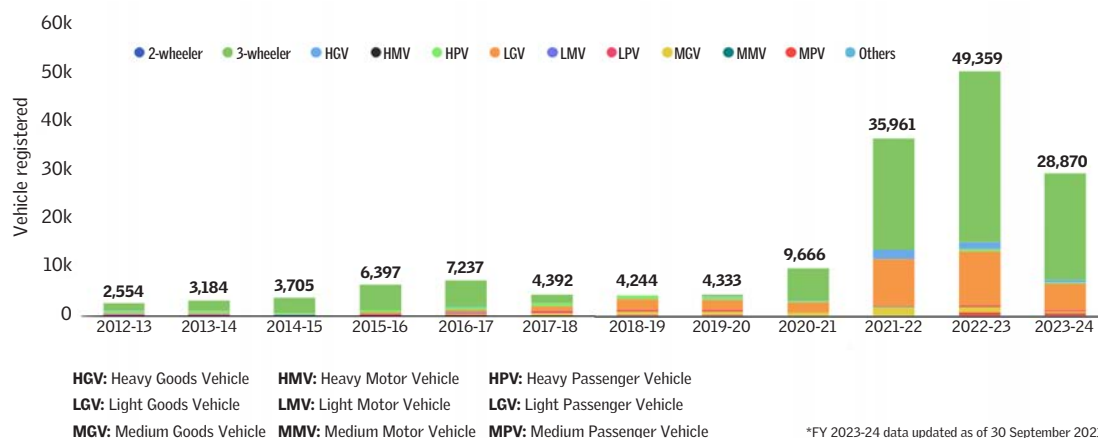
### **Supporting infrastructure for CBG off-take**

It becomes very important to understand the availability of supportive infrastructure as it has been reported that several developers in various states are facing a significant challenge in terms of 100 per cent CBG off-take. CBG finds diverse applications including catering to domestic, industrial and transport fuel requirements. However, its primary consumption occurs in the transport sector. Therefore, establishing robust CBG offtake infrastructure is crucial to utilize the total CBG production in the state. Since CBG is no different from CNG and requires no infrastructure modifications, the availability of a CNG pipeline network, the number of CNG stations and the registration of CNG vehicles determine its end-market or offtake capacity. As of October 2023, the state had 859 CNG outlets.

Additionally, with regard to domestic and industrial consumers, the state offers significant off-take opportunities with over 14.72 lakh domestic PNG connections, albeit in major urban centres, as well as 2,437 commercial and 2,959 industrial PNG connections.<sup>12</sup> As part of the SATAT initiative, public sector undertakings (PSUs) in the oil and gas marketing sector, including IOCL, HPCL, BPCL, GAIL and IGL, are seeking Expressions of Interest (EoI) from prospective entrepreneurs. They are inviting proposals for establishing CBG plants and obtaining gas from these facilities for distribution as automotive and industrial fuel. Indian Oil serves as the national coordinator for the SATAT initiative, with GAIL taking on the role of coordinator to synchronize CBG with CNG. Hence, developers can explore opportunities for off-take arrangements with these OMCs in line and beyond the requirements under SATAT. Graph 5 illustrates the growth in the number of CNG vehicles registered in Uttar Pradesh over time, showing a fivefold increase from 2020–21 to 2022–23.

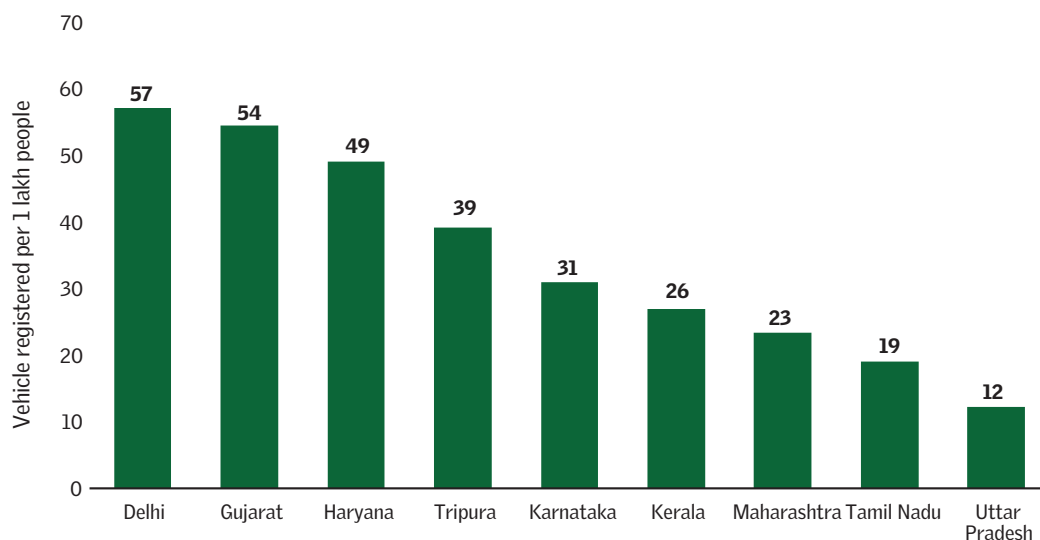
Despite this growth, there is a pressing need to accelerate this rate further. Additionally, efforts should be directed towards developing CNG tractors and other agricultural machinery to enhance CBG offtake, especially in rural or semi-urban

**Graph 5: Number of CNG vehicles registered in Uttar Pradesh since 2012**



Source: India Climate & Energy Dashboard - NITI Aayog - <https://iced.niti.gov.in/analytics/ice-and-ev-vehicle-registered>

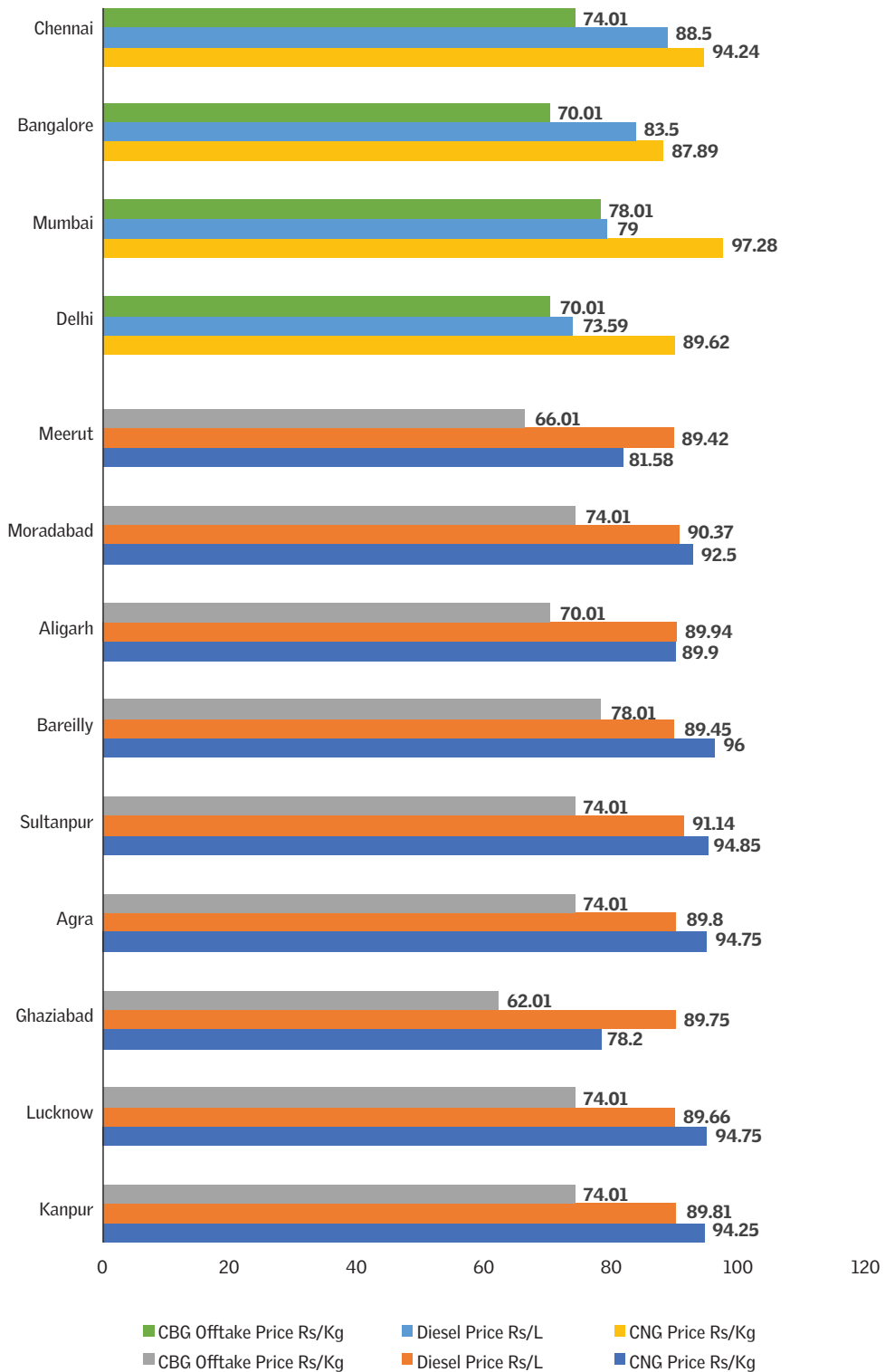
**Graph 6: CNG vehicles registered per 1 lakh people in different Indian states**



Source: India Climate & Energy Dashboard - NITI Aayog

areas. Uttar Pradesh lags significantly with only 12 CNG vehicles per lakh people compared to Delhi, Gujarat and Haryana (see *Graph 6: CNG vehicles registered per 1 lakh people in different Indian states*). This emphasizes the importance of expanding the CNG infrastructure and increasing the adoption of CNG vehicles in the state. The CBG offtake price falls between Rs 60–75/kg in most parts of Uttar Pradesh (see *Graph 7: CNG and diesel prices in major cities of Uttar Pradesh and Indian metropolitan cities with corresponding CBG offtake prices*).

**Graph 7: CNG and diesel prices in major cities of Uttar Pradesh and Indian metropolitan cities with corresponding CBG offtake prices**





## **2. UTTAR PRADESH BIOENERGY POLICY, 2022**

- **Uttar Pradesh is the first state in the country to release a bioenergy policy, promising handsome incentives**
- **Rs 750 Crore assigned as financial remedy towards CBG and the target is to produce 1,000 tonnes of CBG per day for the period of 2022-27**
- **Government land could be leased for the nominal amount of Rs 1 per acre per year to setup CBG plants**
- **To ease regulatory approvals, an online single-window clearance portal has been developed**

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In October 2022, Uttar Pradesh introduced its Bioenergy Policy with the aim of promoting the bio-economy and decreasing reliance on fossil fuels within the state. The policy focuses on four bioenergy components, namely CBG, ethanol, biodiesel and bio-coal, all of which are carbon-neutral fuels derived from biomass waste. Total funding of Rs 1,040.75 crore has been allocated, with a maximum contribution of Rs 750 crore specifically designated for CBG. The policy sets an ambitious target to produce 1,000 tonnes per day (TPD) of CBG, 4,000 tonnes per day of bio-coal, and 2,000 kiloliters per day of bioethanol and biodiesel by the fiscal year 2026-27. The Uttar Pradesh New and Renewable Energy Development Agency (UPNEDA) is the designated agency responsible for implementing this initiative throughout the state.

## **2.1 KEY HIGHLIGHTS OF THE POLICY**

- 1) Subsidy of Rs 75 lakh per tonne of CBG, capped at a maximum of Rs 20 crore.
- 2) Government-owned land can be leased for a nominal amount of Rs 1 per acre per year for the setup of CBG plants and the storage of feedstocks. The Revenue Department will facilitate the provision of land at a symbolic lease rate of Re 1 per acre annually, with a maximum lease period of 30 years, exclusively for the establishment of bio-energy enterprises/plants and for the collection and storage of feedstock. It's essential to note that this lease is non-transferable. For bio-energy plants based on urban solid waste, eligibility for land falls under the policies of the Urban Development Department in the respective region.
- 3) Waiver of development fees imposed by development authorities.
- 4) Full waiver of stamp duty and electricity duty.
- 5) Economic assistance is provided as an infrastructure subsidy for the construction of up to 5 km of approach road, with a maximum investment limit of Rs 50 crore.
- 6) A state subsidy, amounting to 30 per cent of the cost, up to a maximum of Rs 20 lakh, is accessible to acquire balers, rakers and trolley equipment. This subsidy is supplementary to the 50 per cent subsidy provided by the Central Government under the Agriculture Mechanisation Scheme.
- 7) Approvals for alterations in land-use and Land Ceiling Act are considered.
- 8) For enhanced convenience in application processes and increased transparency, the UPNEDA Bioenergy online portal was created and became operational on 15 October 2022. This portal offers a unified platform for potential investors, allowing them to submit and track the status of their applications through a single-window clearance system

## 2.2 OTHER ENABLING PROVISIONS

- 1)
- 1) The Agriculture Department will facilitate the formation, training and capacity-building of FPOs in their catchment areas for the supply of agricultural waste to CBG plants as well as for the execution of long-term supply contracts of agricultural waste between them and the letter of intent (LOI) holders.
- 2) The Agriculture Department and State Agricultural Universities will promote research, marketing and distribution of organic manure produced by CBG units. Sale and purchase of this biomanure at licensed fertilizers shops will be made mandatory.
- 3) The investor can use the produced CBG for sale in a CBG pump installed by him after obtaining all statutory clearances.
- 4) One bio-plant (CBG or bio-pellet or biodiesel) will be installed in each tehsil of Uttar Pradesh. The tehsil will be made the catchment area for the bio-plant.
- 5) Orders will be issued for stopping the use of by-products of sugar mills like pressmud anywhere else, and a long-term contract for their use by CBG plants will be issued in which the rate of purchase of feedstock and the rate for reverse supply of bio-manure will be decided by the sugar mills and the cane development department amongst themselves. Bio-manure, a by-product of CBG plants, will be distributed to the farmers of the sugar mill area.
- 6) By fixing the price, a mechanism will be developed for collection and supply of cow dung from private gaushalas to CBG plants.
- 7) A mechanism will also be developed for the collection of waste from State Agricultural Produce Markets and their delivery to CBG plants. For this, a long-term feedstock delivery contract will be signed between Krishi Mandies and CBG plants investors.
- 8) A project officer will be deployed in each district to help potential investors and will be a focal point of contact to facilitate necessary approvals from the district magistrate's office.
- 9) To motivate entrepreneurs and publicize the bio-energy policy in every district of the state, budgetary arrangements will be made at the rate of Rs 1.0 lakh per district.
- 10) The district-level committee will be constituted as follows to make agricultural waste readily available to investors at the market price in the districts.
  - District Magistrate: Chairman
  - Chief Development Officer: Member
  - Deputy R.M.O.: Member
  - Deputy Director of Agriculture: Member Secretary
  - District Panchayat Raj Officer: Member
  - District Agriculture Officer: Member

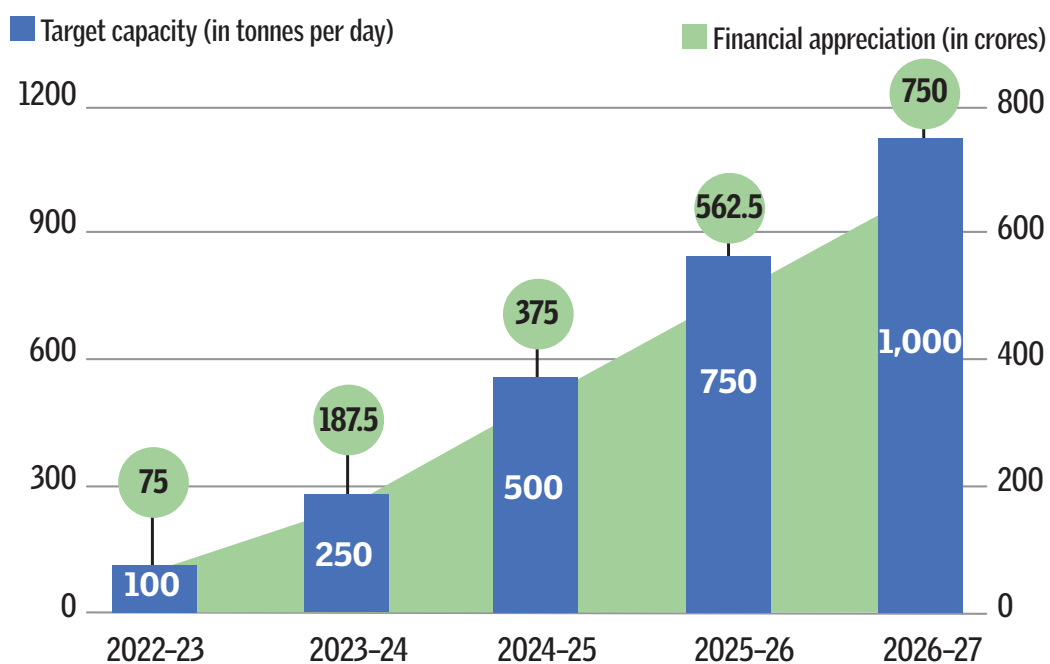


## 2.3 STATE'S BUDGET ALLOCATION FOR CBG

**Target capacity during policy period (2022–27):** 1,000 tonnes of CBG per day

**Financial remedy:** Rs 750 crore

**Graph 8: CBG target capacity and financial appreciation forecast: 2022–2027**



### **Additional grant on rakers, balers and trailers for collection of biomass**

- Number of farm machinery equipment units: 500
- Financial remedy: Rs 100 crore

### **Construction of approach road for projects more than Rs 50 crore**

- Financial remedy (200 km): Rs 100 crore

### **Propagation of policy**

- Financial remedy (Rs 1 lakh per district): Rs 0.75 crore

## 2.4 LIST OF REGULATORY APPROVALS

**Table 2: List of regulatory approvals to set-up a CBG plant in the state of Uttar Pradesh**

Sr. no.	Department name	Service name	Timeline in days	Category
1.	Department of Labour	Registration and grant of license under the Factories Act	30	Pre-establishment
2.		Registration of principal employer's establishment under provision of the Contracts Labour (Regulation and Abolition) Act, 1970	30	Pre-operation
3.		License for contractors under provision of the Contracts Labour (Regulation and Abolition) Act, 1970	30	Pre-operation
4.		Registration of establishment under the Inter State Migrant Workmen (RE/CS) Act, 1979	30	Pre-operation
5.		Registration under the Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996	30	Pre-operation
6.	Department of Stamp and Registration	Property registration	120	Pre-establishment
7.	Pollution Control Board	Consent to Establish Under Air and Water Act (NOC)	120	Pre-establishment
8.		Consent to Operate under the Air (Prevention and Control of Pollution) Act, 1981	120	Pre-operation
9.		Consent to Operate under the Water (Prevention and Control of Pollution) Act, 1974	120	Pre-operation
10.	Uttar Pradesh Fire Services	NOC from fire department (prior to commencement of construction activities) or provisional	15	Pre-establishment
11.	Uttar Pradesh Power Corporation Limited	Power connection (Inactive)	30	Pre-operation
12.	Forest and Wildlife Department	NOC for tree felling	15	Pre-establishment
13.	Union MSME Ministry	Udyog Aadhaar (MSME)	0	
14.	Public Works Department	Road-cutting permissions	7	Pre-operation
15.	Directorate of Electrical Safety	Initial inspection of medium pressure installation	4	Additional service
16.	Central Ground Water Board	Water connection		Pre-operation
17.	Concerned authority	Building plan approval from concerned authority		Pre-establishment

Source: <https://niveshmitra.up.nic.in>



### **3. PRESENT SCENARIO OF CBG PLANTS IN UTTAR PRADESH**

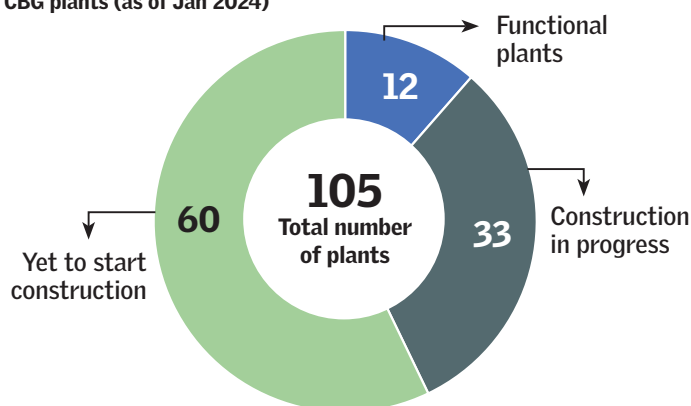
- **The state has the highest number of CBG plants in progress (105), followed by Maharashtra (78) and Punjab (70).**
- **Ten identified hotspot districts are about to host 40 CBG plants.**
- **As of January 2024, there are 12 CBG plants operational in Uttar Pradesh. Among these, 10 are situated in the western region of the state.**
- **More than half of the upcoming CBG plants target pressmud, a byproduct from the sugar industry, as feedstock.**
- **Uttar Pradesh could support 1,000 CBG projects out of 5,000 plants envisioned under the SATAT scheme nationwide, if only 20 per cent of its surplus feedstock is tapped.**

### 3.1 CBG PLANTS IN UTTAR PRADESH

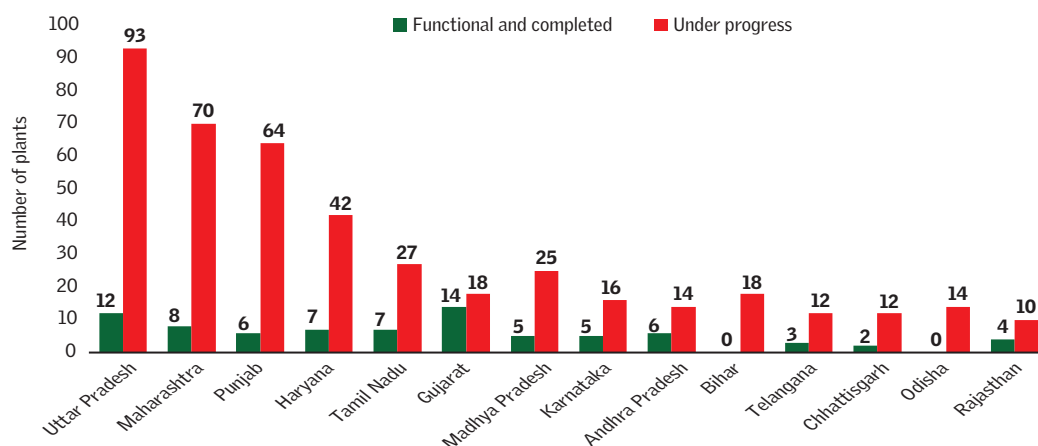
The bioenergy in-charge at Uttar Pradesh New and Renewable Energy Development Agency (UPNEDA) informed CSE that the agency has received over 350 detailed project reports (DPRs) related to various bioenergy sources, including CBG, ethanol, biodiesel and pellets, as of November 2023. Among the diverse bioenergy projects outlined in the received DPRs, CBG emerged as a prominent focus, constituting 60 per cent of the total. Out of the received DPRs for CBG, 80 projects have received the green light for implementation. Of the 80 approved projects, 80 per cent are based on pressmud, a byproduct from the sugar industry, while the remaining 20 per cent of projects aim to utilize agro-residue and cattle dung.

**Graph 9: Status of CBG plants in Uttar Pradesh**

CBG plants (as of Jan 2024)



**Graph 10: CBG state profile**



Source: CSE's depiction based on the information available on GOBARdhan portal

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As per the information on the GOBARDhan portal, the state takes the lead in the total count of CBG plants, encompassing those sanctioned, operational and currently under construction (105 out of 547). Following closely are Maharashtra with 78 plants and Punjab with 70. Additionally, the state, with 12 plants in operation, ranks second only to Gujarat which has 14 operational plants. Nevertheless, Uttar Pradesh is poised to take the lead, having the highest number of plants under construction at 33, compared to Gujarat's 9, Maharashtra's 16 and Haryana's 15.

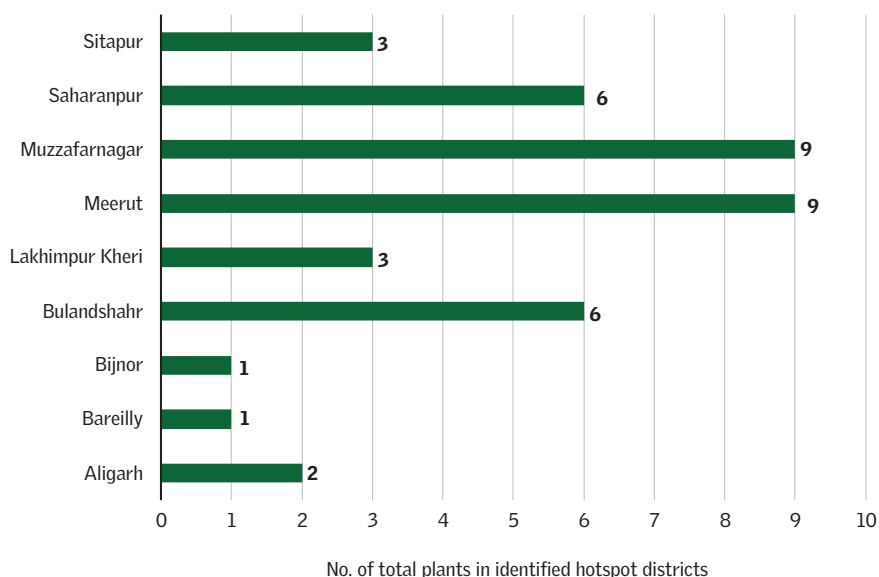
### **Capacities and feedstock availability of functional and upcoming projects**

Based on the analysis of the information available on the GOBARDhan portal, the 105 upcoming and functional plants with a total capacity of 1,820 TPD of CBG would require about 22,315 tonnes of feedstock per day. This would translate to an annual CBG production capacity of 665,000 tonnes with an annual feedstock requirement of 8.14 MMT.

Considering the feedstock utilization for CBG at its lower limit (20 per cent of the total estimated availability of feedstock in the state to the tune of 83 MMT/annum), the upcoming 105 plants are designed to consume about 10 per cent of this availability. This leaves space for 90 per cent untapped and readily available feedstock in the state which could be channelized to install another 945 CBG projects of similar capacity. Realistically, UP could support 1,000 CBG projects out of 5,000 plants envisioned under the SATAT scheme nationwide if only 20 per cent of its surplus feedstock is tapped properly for the CBG production.

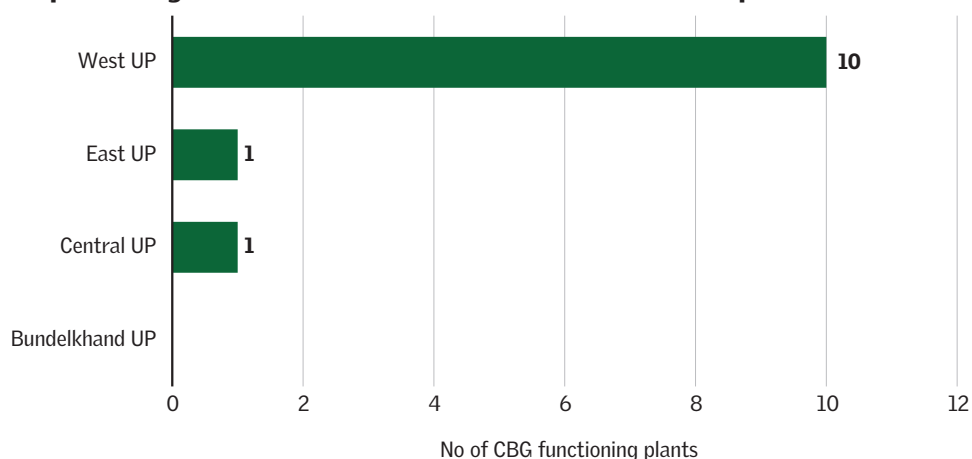
On the other hand, the identified hotspot districts account for 25 per cent of the total feedstock available in the state—estimated at around 418 MMT/annum. These hotspot districts are about to host 40 CBG plants, contributing 38 per cent of total 105 plants in the state. In turn, these 40 CBG plants would require 3.5 MMT of feedstock annually to produce about 106,000 tonnes of CBG. Considering 20 per cent availability of estimated feedstock for CBG generation in the hotspot districts to the tune of 20 MMT/year, feedstock requirement of 3.5 MMT/year by these 40 plants only stands at 17 per cent of that amount, which leaves space for another 200 CBG plants with combined CBG production of 1,500 TPD.

It should be noted that while nine out of ten identified hotspot districts have seen significant development in CBG, Hardoi district is yet to witness any CBG projects despite feedstock availability at par with Muzaffanagar, Meerut, Saharanpur and Bulandshahr which are hosting the highest number of CBG projects. This could be because the focus is primarily on pressmud-based CBG plants which is a by-product of the sugar industry prevalent in these districts.

**Graph 11: Number of plants in identified hotspot districts**

### 3.2 FUNCTIONAL CBG PLANTS IN UTTAR PRADESH

As of January 2024, there are 12 operational plants in Uttar Pradesh. Among these, eight utilize pressmud as their primary feedstock, and ten are situated in the western region of the state (see *Graph 12: Region-wise breakdown of the functional CBG plants in the Uttar Pradesh*). However, all these plants are currently operating below their actual capacity due to various issues such as incomplete gas offtake, disposal challenges related to FOM, inefficiencies in the feedstock supply chain and operational difficulties, among other factors.

**Graph 12: Region-wise breakdown of the functional CBG plants in Uttar Pradesh**

**Table 3: Details of the functional CBG plants in Uttar Pradesh**

Sr. no.	Name of the plant	Type of feedstock	Design capacity (tonnes of CBG/day)	Gas production capacity as of Nov 2023	Feedstock capacity (tonnes/day)	Bio-slurry production capacity (KLD)	FOM production capacity (Tons/day)	LFOM production capacity (KLD)
1	GOBARdhan Varanasi Foundation SPV	Cow dung, pressmud, organic MSW	3	Under maintenance	90	110	18	55
2	P S Green Gas	Pressmud, cow dung	5.6	2.6	325	85	15	115
3	Mittal Enterprises	Pressmud, cattle dung, chicken litter	6.4	3.5	130	30	18	12
4	Samagra Agro	Cattle dung	2	1	100	100	20	80
5	Indian Potash Limited, CBG Unit, Rohana Kalan, District, Muzaffarnagar	Pressmud, spent wash	10.2	6	450	250	60	225
6	Anandmangal Infra Developers Pvt Ltd	Pressmud, cow dung	5	1.7	700	100	30	100
7	A.A. Bioenergies	Mandi waste, cattle dung, poultry litter, dairy waste	2.4	2	150	150	35	100
8	Hindustan Petroleum Corporation Limited, CBG Plant at Budaun	Agro-residue	14.25	Started operation on Jan 27	100	250	65	110
9	Girvar Bioenergy Private Limited	Pressmud, cow dung	5	4	240	200	50	150
10	Biospark Energy Pvt Ltd	Pressmud	4	2	100	200	25	125
11	Sobti Engineering Works Pvt Ltd	Pressmud, cow dung,	2.4	Under maintenance	150	150	35	100
12	Greater Noida CBG Plant	Municipal solid waste	0.8	0.6	25	35	6	30

In addition to the plants set up by private companies as discussed above, oil and gas marketing companies (OMGCs) are coming up with a total of 14 CBG plants in Uttar Pradesh.

**Table 4: Paddy straw based plant locations and corresponding CGD entities**

Location	CGD entity
Prayagraj	IOAGPL
Barabanki	Torrent Gas

**Primary feedstock:** Paddy straw (80%)

**Secondary Feedstock:** Cattle dung or chicken litter (20%)

**Feedstock quantity:** 100 TPD for 10 TPD CBG production

**Table 5: Paddy straw and Napier grass based locations and corresponding CGD entities**

Location	CGD entity
Ghazipur	IOAGPL
Jaunpur	IOAGPL
Bulandshahr	IOAGPL
Kaushambi	IOAGPL
Hardoi	HPCL

**Primary feedstock:** Paddy straw and Napier grass (80%)

**Secondary feedstock:** Cattle dung or chicken litter (20%)

**Feedstock quantity:** 100 TPD for 10 TPD CBG production

**Table 6: Pressmud based locations and corresponding CGD entities**

Location	CGD entity
Sambhal	Megha Engineering
Meerut	GAIL Gas Ltd.
Bijnor	HPCL
Pilibhit	HPCL
Sitapur	BPCL
Bulandshahr	IOAGPL
Baghpat	Baghpat Green Energy

**Primary feedstock:** Pressmud (90%)

**Secondary feedstock:** Cattle dung or chicken litter (10%)

**Feedstock quantity:** 200 TPD for 10 TPD CBG production

The chapter highlights the status of CBG plants and it clearly indicates that the state has been progressively undertaking relevant measures to promote CBG industry and leads the country in realizing CBG generation targets. It is a role model for other states.





## 4. ECONOMICS OF CBG PRODUCTION

- **Municipal solid waste (MSW) presents the most favourable economic scenario, offering the highest profit margin (70%) as it is available at zero cost provided it is segregated at source.**
- **When solely focusing on gas as the revenue product, pressmud, a byproduct arising from the sugar manufacturing process, emerges as a highly practical option. It ranks second only to MSW and exhibits a net margin of 43%.**
- **When factoring in both fermented organic manure (FOM) and carbon credits alongside gas, paddy straw outperforms pressmud, yielding a net margin of 76%. In comparison, pressmud stands at 64%, and Napier grass registers a margin of 46%.**
- **The net margins of the CBG plants significantly improve when FOM is being sold as product in addition to the gas.**
- **The economic viability of the plant is affected if the plant operator has to transport the gas using cascades over a 20 km distance, leading to a reduction in net margins. Hence, offloading the gas at the factory outlet through gas grid connections is crucial.**

## 4.1 CONSIDERATIONS FOR THE ANALYSIS

The performance of CBG facilities is significantly impacted by various factors, such as the choice of raw materials, their acquisition cost, the selling price of CBG, the distance of gas transportation from the plant, the marketability of byproducts such as fermented organic manure, and the carbon credits obtained due to the plant's environmentally friendly components. The following analysis aimed to comprehend the economic aspects of CBG plants by considering diverse feedstocks, unit gas production costs under various circumstances and the related profit margins. The analysis was conducted under the following conditions:

- The production capacity of the plant is assumed to be 5 tonnes per day for CBG.
- The plant is expected to operate at 100 per cent capacity for 330 days per year.
- Although the capital expenditure for establishing the plant is outlined in the table, it is not factored into the analysis.
- The analysis does not account for land costs.
- MSW is assumed to be segregated at its source, and the landing cost of MSW at the plant is considered zero.
- The electricity tariff is assumed to be Rs 7 per kWh.

Table 7 displays the overall expenses linked to a CBG project, encompassing human resources, electricity, maintenance and consumables, interest components within term loan EMIs, and feedstock prices for different feedstocks. In contrast, Table 8 illustrates the net earnings from CBG sales at the factory gate, the corresponding unit production cost and the related margins.

## 4.2 LEARNINGS FROM ANALYSIS OF PLANTS

1. The viability of a CBG plant is partly dependent on the type of feedstock employed. Utilizing cow dung for CBG production poses challenges in terms of revenue generation due to its cost of Rs 1.5/kg, in contrast to the more economical option of Napier grass (Rs 1/kg) and press mud (Rs 0.60/kg). Although paddy straw shares the same market price as cow dung, its biogas yield is higher, resulting in the requirement of nearly four times less paddy straw compared to cow dung. Given that cow dung constitutes the largest quantity (55 tonnes) among all feedstocks needed to produce 1 tonne of CBG, it is expensive, with a net margin of -63% in the first year of operations. Therefore, constructing a 100 per cent cow dung-based plant at current procurement prices is not advisable. However, if cow dung is available at no cost, such as in the case of cow shelters, the economic feasibility could improve. Additionally, using cow dung in smaller quantities alongside other primary feedstocks to sustain anaerobic bacteria in the biodigester is a viable alternative.

**Table 7: Cost of CBG production**

Feedstock	CBG yield potential	Quantity of feedstock required for 5 TPD CBG plant	Unit price including transportation from 20 km	Capital cost	Operating cost in the 1st year of operation				Total cost	
					Human power	Feedstock	Electricity	Maintenance and consumables		Interest component in term loan EMI @10.45%/year
	Tonnes of feedstock/tonne of CBG	Tonnes/year	Rs/tonne	Rs (in lakhs)	Rs (in lakhs/year)	Rs (in lakhs/year)	Rs (in lakhs/year)	Rs (in lakhs/year)	Rs (in lakhs/year)	
Cow dung	55	90,750	1,572	2,000	46	1,427	111	18	142	1,744
Pressmud	26	43,560	672	2,000	46	293	111	18	142	610
Paddy straw	15	24,757	1,572	2,000	46	389	111	18	142	707
Napier grass	20	32,670	1,072	2,000	46	350	111	18	142	668
MSW	31	50,820	-	2,000	46	-	111	18	142	317

**Table 8: Revenue, cost, earnings and margin from CBG only**

Feedstock	Quantity of CBG produced @ 5,000 kg per day for 330 days a year	Unit price of gas (offtake price)	Total revenue in the 1st year from sale of gas	Total cost in the 1st year	Net earnings in the 1st year	Net earnings per unit of gas sold in the 1st year	Unit cost of CBG production	Margin
	Kg/year	Rs/Kg	Rs (in lakhs)	Rs (in lakhs)	Rs (in lakhs)	Rs/Kg	Rs/Kg	%
Cow dung	1,650,000	65	1,073	1,744	(672)	(41)	106	-63%
Pressmud	1,650,000	65	1,073	610	462	28	37	43%
Paddy straw	1,650,000	65	1,073	707	366	22	43	34%
Napier grass	1,650,000	65	1,073	668	405	25	40	38%
MSW	1,650,000	65	1,073	317	755	46	19	70%

2. MSW presents the most favourable economic scenario, offering the highest profit margin as it is available at zero cost. For the CBG plant to be viable and efficient when using MSW, it is crucial to maintain the quality of the feedstock, particularly the wet waste. This requires cities to establish a system for integrating with the CBG plant, ensuring that collected wet waste from households and bulk waste producers is directed to the plant for gas processing. An example of this approach is seen in Indore, where the concept of a CBG plant has been introduced. It is essential to note that segregation cannot take place at the CBG plant itself.
3. Utilizing 'waste' substances such as pressmud, a by-product generated during the sugar manufacturing process, stands out as the most practical choice, second only to MSW. Employing this waste material not only proves to be a feasible option but also contributes to addressing issues related to waste disposal and environmental degradation from sugarcane manufacturing refuse. But clearly, while MSW will be available more widely, pressmud plants should be located in the vicinity of sugarcane factories to reduce transport costs.
4. If the plants work at optimum capacity (except those running on cow dung) and can sell the compressed gas at the stated rate, then all plants have positive revenue of 30–70 per cent. This is at the current rate of feedstock. This also means that there is some amount of elasticity in economics of the plants in terms of increased cost of feedstock.
5. However, the key factors influencing the feasibility of the plants will be the gas off-take directly at the plant site. Our economic assessments have factored in the sale at the factory gate. If the plant operator is required to transport the gas using cascades over a distance of 20 km or more, it will negatively impact the economics. Table 9 illustrates the decline in profit margins when transporting CBG to a location 20 km away from the plant using cascades. This emphasizes the necessity for careful planning of gas off-take right from the plant's clearance. To ensure optimal CBG functionality, the state could consider mandating the use of CBG in vehicles within the radius of the plants.
6. The financial viability of the plants can be enhanced by selling fermented organic manure (FOM). Under the Union government's market development assistance (MDA) scheme, all CBG plants are entitled to receive Rs 1.5 per kg for producing FOM from CBG projects. This income is in addition to the revenue generated from selling FOM to farmers. Table 10 outlines the quantity of FOM generated from various feedstocks and the percentage increase in profit margins when it is treated as revenue alongside gas sales. This approach offers a means to further enhance the economic performance of the plants. However, the sale of FOM to farmers will require building confidence in the quality of the produce for soil nourishment.

**Table 9: Revenue, cost, earnings and margin from CBG sale including cost of CBG transportation over 20 km distance**

Feedstock	Quantity of CBG produced @ 5,000 kg per day for 330 days a year	Total revenue in the 1st year from sale of gas	CBG transport cost over 20 km distance	Total cost in the 1st year	Net earnings in the 1st year	Net earnings per unit of gas sold in the 1st year	Unit cost of CBG production	Margin
	Kg/year	Rs (in lakhs)	Rs (in lakhs/year)	Rs (in lakhs)	Rs (in lakhs)	Rs/Kg	Rs/Kg	%
Cow dung	1,650,000	1,073	31	1,775	(702)	(43)	108	-65%
Pressmud	1,650,000	1,073	31	641	431	26	39	40%
Paddy straw	1,650,000	1,073	31	738	335	20	45	31%
Napier grass	1,650,000	1,073	31	699	374	23	42	35%
MSW	1,650,000	1,073	31	348	724	44	21	68%

**Table 10: Revenue, cost, earnings and margin from CBG sale including revenue from FOM**

Feedstock	Quantity of solid FOM produced (65% moisture content)	Total quantity of solid FOM produced per year	Price of FOM including MDA of Rs 1.5/kg	Revenue generated from FOM in the 1st year	Total revenue in the 1st year from sale of gas and FOM	Total cost in the 1st year	Net earnings in the 1st year	Net earnings per unit of gas sold in the 1st year	Unit cost of CBG production	Margin
	% of input feedstock	Tonnes/year	Rs/Kg	Rs (in lakhs)	Rs (in lakhs)	Rs (in lakhs)	Rs (in lakhs)	Rs/Kg	Rs/Kg	%
Cow dung	7%	6,039	3.00	181	1,254	1,744	(490)	(30)	95	-46%
Pressmud	15%	6,596	3.00	198	1,270	610	660	40	25	62%
Paddy straw	61%	15,031	3.00	451	1,523	707	817	50	15	76%
Napier grass	9%	2,800	3.00	84	1,157	668	489	30	35	46%
MSW	34%	17,061	3.00	512	1,584	317	1,267	77	(12)	118%

**Table 11: Revenue, cost, earnings and margin from CBG sale including revenue from FOM and carbon credits**

Feedstock	Quantity of carbon credits (CC) generated	Total quantity of CC produced per year	Revenue generated from CC considering price of 1 CC as Rs 200	Total revenue in the 1st year from sale of gas, FOM and CC	Total cost in the 1st year	Net earnings in the 1st year	Net earnings per unit of gas sold in the 1st year	Unit cost of CBG production	Margin
	CC/tonne of CBG	CC/year	Rs (in lakhs/year)	Rs (in lakhs)	Rs (in lakhs)	Rs (in lakhs)	Rs/Kg	Rs/Kg	%
Cow dung	20	33,000	66	1,320	1,744	(424)	(26)	91	-40%
Pressmud	8	13,200	26.4	1,297	610	687	42	23	64%
Paddy straw	10	16,500	33	1,556	707	850	52	13	79%
Napier grass	1.6	2,640	5.28	1,162	668	494	30	35	46%
MSW	20	33,000	66	1,650	317	1,333	81	(16)	124%

7. The third source of revenue for CBG projects involves selling carbon credits. Table 11 presents the quantity of carbon credits obtained per tonne of CBG production from various feedstocks (according to the UPNEDA consultant) and the resulting augmentation in net margins. Nevertheless, there is a lack of clarity among CBG producers regarding the precise number of carbon credits that can be generated, and a clear methodology is absent. There is an urgent requirement to establish a transparent methodology for calculating carbon credits, as this is crucial for assessing the credibility of carbon removal.
8. It is important to note that CBG plants will require a secured supply of raw material or feedstock for their plants. This means that they must work to incentivize the ‘producers’ of the raw material. For instance, the farmer when it comes to rice straw, the sugar mill when it involves pressmud and the city municipality when it comes to the supply of MSW. For a sustainable raw material supply chain, it is critical that the revenues are shared so that there is an equal incentive for suppliers and producers.



## **5. CHALLENGES FACED BY THE CBG SECTOR IN UTTAR PRADESH**

- **Inadequate planning for the integration of the supply chain and offtake of gas from the plants so that the plant functions at full capacity and can make profit.**
- **Poor offtake of fermented organic manure because of lack of confidence in farmers regarding the quality of the product.**
- **Lack of capacity in lending institutions (banks) to evaluate CBG proposals resulting in delayed decision making.**
- **Unstable biomass supply chain due to low availability of agro-residue harvesting machinery like balers.**
- **Inefficient district-level committees and farmer producer organizations.**
- **Lack of sample testing facilities for feedstock characterization so that the product is marketable.**

## Inadequate planning for the integration of the feedstock supply chain and offtake of gas from the plants

Due to lack of proper planning on both the upstream and downstream sides, most of the plants are running below their actual designed capacity. On the upstream side, the plants are not able to source enough quantity of feedstock to run the plant. It is advisable to plan for availability of surplus feedstock over and above the amount required in the plant on an annual basis. This requires plant operators to work with the suppliers (farmers, sugarcane mill owners and city municipalities) to get the feedstock. On the downstream side, the sale of gas is a big challenge due to low CNG infrastructure presence near the CBG plant. It is critical to set up the plant either near the CNG gas grid or where there is a high CNG demand for industrial or transport applications.

## Limited offtake of fermented organic manure (FOM)

There is a lack of uptake of FOM from the CBG plants. Instead of being considered a potential revenue source, it is perceived as a disposal challenge. Plant owners are either providing it for free to nearby farmers or disposing of it on vacant lands. The lack of awareness regarding the characteristics of FOM, appropriate application methods, optimal application durations and potential benefits, exacerbates the issue. Furthermore, the enrichment of FOM is not commonly practiced due to this lack of awareness. In certain instances, solid FOM is pelletized and utilized as a fuel instead of as manure, defeating the intended purpose of the plant.

**Table 12: Characterization of fermented organic manure**

Feedstock type	Total carbon (%)	Total nitrogen (%)	Total phosphates (%)	Total potash (%)	Moisture (%)
Cattle dung	12	6.4	1.86	2.65	29
Paddy straw	33	1.2	0.60	3.04	70
Pressmud	25	2.7	11.3	1.47	67
Municipal solid waste	29	3.1	1.91	1.62	20

Source: Environment Monitoring Laboratory, CSE

Moreover, the fertilizer control order (FCO) for FOM standards have been different for three years and relaxed (increasing the moisture content from 30 to 70 per cent), which implies industry will get benefits but not the farmers. Changing the standard does not instil confidence around FOM quality and characteristics among farmers. Findings from CSE's laboratory analysis of FOM samples collected from various operating plants on different feedstock consistently suggest that FOM is





*Image 1: Liquid FOM carrying containers through which LFOM is supplied to farmers from the CBG plant*

rich in carbon and low in nitrogen, potassium and phosphorous. FOM's uptake and use by farmers can be encouraged by strictly adhering to FCO norms and, more importantly, farmer sensitization.

### **Banks lack interest in financing CBG projects**

Uncertainty surrounds the funding provided by financial institutions, as bank officials often engage in discussions about risks, low margins and the non-standardized nature of the industry. Banks commonly require 100 per cent collateral as a standard practice, and interest rates start at a minimum of 11.5 per cent. India stands out as a costly destination within the clean energy sector, with bank loans carrying interest rates ranging from 10–14 per cent. This is notably higher when compared to the United States or Europe, where interest rates for similar endeavours typically range between 5–7 per cent.

### **Low CNG demand in rural areas resulting in low offtake**

The demand for CNG in rural areas is hampered by the scarcity of CNG vehicles in these regions. The low prevalence of such vehicles contributes to an overall inadequate demand. To address this issue and stimulate demand, exploring the conversion of tractors and other vehicles to operate on CNG becomes necessary.



Image 2: CBG being filled in a vehicle at the retail outlet

### **Frivolous players taking letters of intent without any actual intention of developing the project**

The recipients of letters of intent, commonly referred to as Lol holders, are expected to furnish general information regarding the availability of land, water and raw materials. However, they are not required to provide specific details about existing contracts, as this information is typically covered in the Detailed Project Report.

This situation has resulted in the issuance of numerous letters of intent without a thorough assessment of the feasibility of the project site. Unlike many infrastructure projects in the country awarded through a stringent process with time-bound constraints and strict penalty clauses for delays in commissioning, the award of letters of intent for plant establishment currently lacks specific time-bound clauses imposed by the Oil and Gas Marketing Companies (OGMCs) regarding penalties for project delays. Consequently, this loophole has allowed numerous frivolous entities to obtain letters of intent without a genuine commitment to project development.

### **Lack of sample characterization or scientific analysis in laboratories**

Performing scientific analysis presents difficulties, including a lack of awareness regarding laboratories for sample characterization and the absence of easily accessible monitoring instruments for operations. Additionally, there is an absence of a Biogas Development and Training Centre (BDTC) in Uttar Pradesh. Users often find themselves obligated to make significant payments for analyses, which are frequently treated as consultancy projects.

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### **Lack of knowledge of upcoming plant locations**

At the state level, geo-tagging of CBG plants at various stages of construction and operation can be made available with detailed information on the state bioenergy online portal. This will greatly help authorities and investors in planning CBG interventions following a catchment approach to ensure sustainable supply of feedstock and assessing local demand for CBG use and its off-take.



*Image 3: Pressmud stored in a CBG plant*



*Image 4: Paddy straw bales being stacked in the trolley*



*Image 5: Balers being used to make bales of the agricultural residue*

### **Partial gas off-take by OGMCs**

OGMCs acquire gas from the plants on a best-effort basis, depending on market demand. This exposes plant owners to the risk of being unable to sell their entire gas production. Some plants are operating below their capacity because they cannot fully offload their gas. The absence of CNG gas pipelines near plant locations is another challenge faced by these facilities. It has been noted that gas transport through cascades is a viable option for plants with capacities below 5 TPD. While above this threshold, the most effective offtake model is through gas pipelines.



*Image 6: Offtake of CBG gas from the production plant using cascades*

## GOOD PRACTICES ADOPTED BY THE STATE

1. Introduction of a pioneering, state-specific bioenergy policy, the first of its kind in the nation, outlining distinct objectives, incentives and policy support tailored explicitly for CBG. Other states are also planning to adopt state-specific bioenergy policies.
2. Establishment of a collective pool for all CBG investors to facilitate the execution of carbon credits across all CBG plants. The Uttar Pradesh New and Renewable Energy Development Agency (UPNEDA) will cover the application charges, eliminating the need for separate charges for each CBG plant.
3. Launch of an online application and approval system through the bioenergy portal, streamlining the regulatory approval process and eliminating the need for complex hard copy documentation, thereby enhancing efficiency.
4. Inclusion of a roster of farmer producer organizations (FPOs) on the online portal to foster transparency and accessibility.
5. Formation of a district-level committee dedicated to ensuring the economic viability of bioenergy plants, fostering a level playing field for all investors. This committee acts as a liaison between farmers, feedstock aggregators and bioenergy plant owners to ensure a consistent supply of feedstock to bioenergy plants.
6. Implementation of a strategic plan to install one bio-plant (CBG, bio-pellet or bio-diesel) in each tehsil of Uttar Pradesh, designating tehsils as catchment areas to prevent feedstock competition between plants.
7. Deployment of a project officer in each district to assist potential investors and serve as a central point of contact for facilitating necessary approvals from the district magistrate's office.
8. Collaboration with IIT Delhi for bioenergy related technical assistance in the state.
9. Inviting public sector undertakings to install CBG projects in the state.
10. Demonstrating dynamic and proactive leadership at UPNEDA, characterized by a receptive mindset and a clear commitment towards effective implementation of bioenergy initiatives.

## Shortage of skilled technical manpower

Operational challenges frequently confront functioning plants, resulting in issues like gas leakage, inefficiency and operating below optimal capacity. This arises from a lack of skilled personnel with inadequate understanding of biogas production systems involved in plant operations. These individuals lack awareness of the technical intricacies and resort to trial-and-error methods to address operational problems.



*Image 7: The water being mixed with the feedstock in the mixing tank to be fed into the bioreactor*



## 6. POLICY RECOMMENDATIONS

- **Ensure and integrate backwards (feedstock supply chain) and forward (gas offtake) linkages for CBG plants to operate sustainably for the designed period.**
- **Government-backed guarantee programme shall be initiated to mitigate collateral requirements, thereby encouraging financial institutions to extend loans more readily.**
- **Strengthening feedstock supply chain with capacity building of farmer producer organizations and district-level committees.**
- **Incentivize and sensitize farmers to utilize fermented organic manure in accordance with the recommended standards.**
- **Immediate requirement to establish CBG training centres and sample characterization labs in the state.**

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### **Making farmers into shareholders**

Encourage farmer-producer organizations through awareness campaigns to assume the role of feedstock aggregators, replacing third-party private entities. This ensures their active participation as project partners, fostering overall profit sharing in bioenergy projects.

### **Capacity building of district-level committee and other local stakeholders**

Securing feedstocks is crucial for the sustainability of CBG projects and district committees can play a pivotal role in this regard. These committees should give priority to bioenergy initiatives and conduct regular meetings, preferably at least once a month. They should be tasked with facilitating negotiations with privately-owned sugar mills, and generators of vegetable mandi waste, agro-residue and other organic waste within the district.

### **Incentivize and sensitize farmers to utilize FOM**

Farmers should be made aware about the potential benefits of using carbon-rich FOM. The possibility of institutionalizing incentive programmes for farmers for utilization of FOM can be explored. To amplify awareness among farmers about the positive effects of FOM, Krishi Vigyan Kendras (KVKs) can play a pivotal role in education and outreach efforts. Additionally, highway construction companies could be mandated to acquire FOM from nearby CBG projects for use in roadside plantations. Furthermore, disseminating short media clips in local languages at schools, villages and panchayats can effectively contribute to creating awareness and promoting the utilization of FOM in the region.

### **Addressing challenges in bank loan procurement**

A practical approach would be to initiate a government-backed guarantee programme to mitigate collateral requirements, thereby encouraging financial institutions to extend loans more readily. To enhance transparency and efficiency in the loan application process, the Reserve Bank of India (RBI) should oversee and monitor CBG project applications through a centralized online portal, implementing fixed deadlines for streamlined progress tracking. Additionally, to enhance the understanding of bankers regarding CBG projects, it is recommended to organize 4–5 zone-wise seminars covering various aspects of CBG, targeting senior managers within financial institutions.

### **Ensuring complete gas offtake**

To achieve the complete offtake of gas, a strategic plan should be formulated to expand gas pipeline infrastructure near CBG plant locations. To stimulate demand

in rural regions, introduce incentives for the conversion of tractors and two-wheelers to run on CNG or advocate for the adoption of CNG-powered agricultural machinery. Notably, in November 2023, Mahindra Tractors introduced its first CNG mono-fuel tractor, demonstrating proficiency in various agricultural and haulage applications comparable to existing diesel tractors. Another crucial step is to initiate awareness campaigns promoting the environmental and economic advantages of CNG adoption in rural areas.

### **Capacity building of farmer producer organizations (FPOs) and other stakeholders**

Organize workshops and training sessions for FPOs and district-level officers to improve their understanding of various aspects of CBG and associated challenges. Create a dedicated state-specific forum for collaborative discussions with stakeholders, addressing queries and concerns on a regular basis. Ensure the participation of representatives from various state departments, farmer cooperatives, OGMCs, and members of district-level committees in this forum to foster comprehensive and inclusive discussions.

### **Broaden the feedstock variety**

While 80 per cent of CBG plants currently rely on pressmud, there is a need to diversify the sources. In addition to solid organic waste, efforts should be directed towards utilizing liquid effluents such as spent wash from distilleries, industrial discharges from paper and pulp manufacturing, and other liquid industrial waste.



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# Annexures

## Uttar Pradesh State Bio-Energy Policy-2022

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## **1 Preface**

The Government of Uttar Pradesh has implemented The State Bio-Energy Promotion Programme-2018 with the aim of promoting Bio-Energy enterprises in the State. Under this programme, facilities such as Capital Subsidy to Bio-Energy Enterprises, 100% reimbursement of State GST for 10 years and 100% exemption in Stamp Duty on the purchase of land for the establishment of these enterprises were provided by the state government. So far 14 projects related to various Bio-Energy products and technologies have been issued sanction letters under the said programme.

In the present scenario, it is necessary to promote agricultural waste Bio-Energy enterprises more effectively based on agricultural waste to solve the problem of environmental crisis and loss in fertility of soil which arises from the burn in of agricultural waste in the fields itself.

The establishment of Bio-Energy enterprises will also create additional income for farmers and generate new employment opportunities in rural areas. Similarly, there seems to be a need for rectification in the present policy structure to generate Bio-Energy from the widely available urban solid waste, livestock waste, waste generated from agricultural markets and waste of sugar mills in the state.

- 1.1 The name of this policy is “Uttar Pradesh State Bio-Energy Policy-2022”
- 1.2 Under this policy, Bio-Energy units will be established by the construction, operation and ownership through private investors/developers based on attraction by various facilities and incentives provided by the state government.
- 1.3 The period of this policy should be for five years from the date of notification and the bio-energy units registered and commissioned under this policy will get the benefits and facilities admissible under the policy for the entire life of the projects. The State Bio-Energy Enterprise Promotion Program-2018 and State Bio-Energy Policy-2014 shall be deemed to have ended from the date of notification of the

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new policy. Under the Bio-Energy Enterprise Promotion Program-2018 issued earlier, the units to whom the letter of acceptance has been issued, will continue to get the benefits mentioned in the above approval letters, subject to terms and conditions mentioned in current policy.

- 1.4 Under this policy, benefits and facilities will be admissible only in the case of establishment of new plant and machinery and in the case of establishment of new plant and machinery in the already registered unit.
- 1.5 Under this policy for the promotion of Bio Energy enterprises different ministries coming under the Government of India will play a vital role in timely execution of policies and programme in already established Bio energy enterprises and for proper policy structure has been framed which depicts the desired cooperation from state government. Under this policy Ministry of Petroleum and Natural Gas, Government of India, the Letter of Interest (LoI) holders and various other enterprises related to bio-energy will be issued Expression of Interest (EoI) as per rules, Under this policy,. After that, on providing DPR etc., the benefits of the policy will be given to the registered enterprises.
- 1.6 The main thrust of this policy is to promote production of Bio-CNG and Bio-Coal etc., through waste-based Bio-Energy enterprises but in the seasonal reduction of the availability of waste or as an alternative arrangement of feed stock for bio-energy plants, non-edible oil seeds/plantation of crops like karanj, neem, castor, jatropha etc. will be encouraged. Small rotation crops likes weet jowar and energy grass etc. will be planted in the barren lands to create additional feed stock for the production of bio-energy in the state. The work of plantation and production and value chain development of non-food oilseed crops, small rotation crops and energy grasses will be done through farmer producer companies or rural entrepreneurs on barren and infertile lands off farmers and village Panchayats.

## 2. Agricultural Waste Based Bio-CNG / CBG Enterprises

- 2.1 Up front subsidy will be provided on rakers, balers and trollers involved in the collection of bio-mass for the projects registered under the policy and to Farmer Producer Companies (FPOs) / Co-operative Societies/Sugar cane Societies operating in their catchment area/command area, by schemes running under the Agriculture Department Under the Sub Mission on Agriculture Mechanization program by the Department of Agriculture and Farmers Welfare, Government of India, additional targets will be sought from the Government of India, if necessary, to provide subsidy on these equipments to the units established under the policy by the Department of Agriculture. The material-based equipment containing the ingredients will be provided to the Farmer Producer Companies / Co-operative Societies / Aggregators operating in their catchments to provide agricultural waste to CBG plants. Additional subsidy will be given by the Government of Uttar Pradesh in addition to the subsidy given by the Government of India.
- 2.2 At least one Farm Producer Company will be formed, training and hand holding will be done in each block for biomass collection by the agricultural department. The Agriculture Department will facilitate formation, training and capacity building of FPOs in their catchment areas for the supply of agricultural waste to Compressed Biogas (CBG) plants as well as for execution of long-term supply contract of agricultural waste between them and the LOI holders.
- 2.3 District level committee will be constituted as follows in order to make agricultural waste (Parali) easily available to the investor at market price in the districts.
- |                                      |                  |
|--------------------------------------|------------------|
| 1. District Magistrate:              | Chairman         |
| 2. Chief Development Officer:        | Member           |
| 3. Deputy R.M.O.                     | Member           |
| 4. Deputy Director of Agriculture:   | Member Secretary |
| 5. District Panchayat Rajya Officer: | Member           |
| 6. District Agriculture Officer:     | Member           |

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- |                                 |        |
|---------------------------------|--------|
| 7. Project Officer, UPNEDA:     | Member |
| 8. FPO Organization/Aggregator: | Member |
| 9. Bio-Energy Entrepreneur:     | Member |

- 2.4 Bio-Manure obtained as a by-product from Bio-CBG plants has been included in the “Fermented Organic Manure” by the Government of India under the Fertilizer Control Order- 1985 vide Gazette Notification dated 13.07.2020. Agriculture Department State Agricultural Universities will promote research, marketing and distribution of organic manure produced by Bio Energy units. Sale and purchase of this Bio Manure at licensed fertilizers shops will be made mandatory by the agriculture department.
- 2.5 The investor can use the produced CBG for sale in a CBG pump installed by him after obtaining all statutory clearances.
- 2.6 Subsidy on production will be given to the investor by the State Government. This subsidy will be in addition to the benefits given in the waste/biomass based bio-energy projects of the Government of India.
- 2.7 Establishment of bio-coal projects based on agricultural waste on the basis of non-applicable land availability and commercial terms and conditions in the premises of coal based power plants of Rajya Vidyut Utpadan Nigam Limited or on the basis of commercial terms and conditions, their supply/use along with coal for power generation. Private investors will be encouraged for burning and other uses. Apart from this, bio-coal will also be purchased by the independent power producer as per the guide lines of the Ministry of Power, Government of India.
- 2.8 One Bio Plant(CBG or Bio-pellet or Bio diesel) will be installed in each Tehsil of Uttar Pradesh Tehsil will be made as a catchment area for Bio Plant.

### **3. Urban Solid Waste, Livestock Waste, Agricultural Produce Market Waste and Sugar Mills Waste Based Bio CNG /CBG Enterprises**

- 3.1 Urban solid waste-based enterprises will be allowed to use facilities mentioned under the policy issued by the Urban Development Department of the state.
- 3.2 Bio-CBG plants will be set up in Uttar Pradesh according to the arrangement given in the Cooperative Societies Act, 1965 and with the permission of Uttar Pradesh Co-operative Sugar Mills Federation Ltd., in the premises of sugar mills of the cooperative sector. While issuing orders not to use the by-products of sugar mills like press mud etc., anywhere else and it will be used through long-term contract for bio-CNG plants, in which the rate of purchase of feed stock and the rate for reverse supply of bio-manure will be decided amongst themselves by the sugar mills and the cane development department. Bio-Manure, a by-product of CBG plants, will be distributed to the farmers of the sugar mill area.
- 3.3 Under the Government of Uttar Pradesh, the Animal Husbandry Department will cooperate in the establishment of CBG plants through selected LOI holders under SATAT scheme of Government of India executing long-term contracts for the availability of land and cow dung available in state animal shelters. By fixing the price a mechanism will be developed for collection and supply of cow dung from private Gaushalas to CBG plants.
- 3.4 Mechanism will also be developed for the collection of waste from State Agricultural Produce Markets and their delivery to CBG plants, for this a long term feedstock delivery contract will be entered in between Krishi Mandies and CBG plants investors.

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#### **4. Incentives**

- 4.1 Under this policy, 100% exemption in electricity duty will be provided to the bio-energy enterprises established for 10 years from the date of commencement of commercial production.
- 4.2 In case of acquisition of land through lease or purchase from private tenants for setting up of bio-energy enterprises/plants or feedstock collection and storage, 100% exemption of stamp duty payable on rent deed/lease/sale deed/registration will be provided.
- 4.3 Bio-energy enterprises will be given 100% exemption from the development charges charged by the development authorities of the state.

#### **4.4 Subsidy**

- (a) In addition to the maximum 50% subsidy given on the plants under the Central Government's Submission on Agricultural Mechanization scheme to the aggregators defined devices like belar, raker and troller will be provided by the state government through UPNEDA under this policy, [30 percent subsidy (up to a maximum limit of Rs. 20 Lakh)].
- (b) In addition to the policy/scheme of the Government of India, subsidy based on their production capacity will be given to the bio-energy enterprise units. Under this, on Compressed Bio-gas production at the rate of Rs. 75 lakh per ton to a maximum of Rs 20 crore, on Bio-coal production at the rate of Rs 75,000/- per ton up to a maximum of Rs 20 crore, on production of Bio Diesel at the rate of Rs 3 lakh per kiloliter. Maximum upto 20 crore will be given. This subsidy can be used by the unit for plant and machinery, infrastructure, construction, power supply and transmission system related works, which will not include the cost of administrative building and land.
- (c) The detailed project proposal regarding the project will be examined by a team of subject experts before deciding the liability of the subsidy by Government component to the unit the amount of capital subsidy will be released in the bank loan account after the commencement of

commercial production at full capacity of the concerned unit. Apart from this, if no bank loan is taken by the investor of the unit, then the amount of capital subsidy will be released in the bank account of the unit. Additional Chief Secretary/Principal Secretary, Additional Resources of Energy Department will be the competent authority to allow extension in the time of acceptance of the subsidy and completion of the project.

- 4.5 If an entrepreneur invests 50 crores or more in a bio-plant, then he will be given the facility of approach road upto a maximum of 05 km from the unit to the main road.

**5. Nodal Agency:**

Under this policy, UPNEDA will be the nodal agency to promote the execution of bio-energy units policy. The nodal agency will provide assistance in registration of investors/developers, resolving their queries and problems and speedy disposal of pending applications lying with different departments related to bio energy.

**6. Procedure for registration of enterprises to be established under the policy.**

- 6.1 Under the Sustainable Plan of the Ministry of Petroleum and Natural Gas, Government of India, the developers who have already been issued LOI and other bio-energy units will be registered under the current policy.
- 6.2 UPNEDA will obtain and notify district wise/tehsil wise information from the concerned departments such as Agriculture, Animal Husbandry, Urban Development, Agriculture Marketing Department. District/ Tehsil wise surveys will be conducted by UPNEDA at regular intervals to upgrade the reports of biomass production capacity and viability of different type of biomass.



- 
- 6.3 Based on energy generation from waste bio-mass based bio energy generation in tehsil, a bio plant up to the extent of maximum 40percent of the waste based energy generation capacity of the tehsil will be registered, the entire capacity cannot be registered so that it can be used for alternative uses other than bio energy and biomass should also be available in abundance to the local community. On the basis of the recommendation of the District Magistrate's committee, the registration of the unit will be done by UPNEDA after assessing the work and capacity of the unit and accordingly increase or decrease in the affiliated area.
- 6.4 The developer will have freedom to choose the actual site of the project within the tehsil. According to the capacity of the project and the requirement of biomass and the area covered for the same, no other bio-energy project will be registered in the tehsil so that continuous availability of sufficient biomass can be insured for the operation of the said plant and overcome the conflict between the projects for the supply of biomass and their financial viability should not be affected. Based on the capacity of the plant and the availability of biomass, the District Magistrate of the concerned district can increase the catchment area. The waste available in the Tehsil will be used in the concerned Tehsil. If someone establishes a large capacity plant, then two Tehsils can also be declared by the district magistrate as catchment area.
- 6.5 The Developer (Developer / Promoter) will be required to follow the guidelines issued by the Ministry of New and Renewable Energy, New Delhi and the relevant guidelines /regulation is issued by the Government of Uttar Pradesh from time to time in relation to the proposed project.
- 6.6 Under this policy, the developer willing to setup a waste/biomass-based bio-energy enterprise will submit the application for EOI in UPNEDA along with the following documents :-
- (1) Application in the prescribed format.

- (2) A certified copy of the Memorandum and Articles of Association of the company/bye-laws of the registered society.
- (3) A certified copy of the partnership deed (if applicable).
- (4) Copy of the accounts (balance sheet)of the last three years, in case of start-up, the balance sheet of the promoter company /mother company.
- (5) Pre-feasibility report.
- (6) Registration fee, Bank Demand Draft of ten thousand rupees per unit. This registration fee is non-refundable.

6.7 The following documents will be submitted by the developer for approval within the prescribed time limit(three months):

- (1) Detailed Project Report.
- (2) Bio-mass Assessment Report.
- (3) Land related documents (marked site for the project).
- (4) CPM/PERT Chart (for the proposed project implementation)
- (5) Water allocation order based on the availability of water at the project site.
- (6) In case the project is located in urban area / rural area, no objection certificate from the concerned urban body /village Panchayat.

6.8 On the basis of per area net worth with respect to applied areas Implementation agreement will be executed after obtaining 3% performance guarantee on the basis of DPR submitted for bio- plants after approval from competent level, The time limit for setting up the plants will be of 2 years from the date of implementation agreement.

#### 6.9 **Extension of Time**

As mentioned in Para 6.7 of this Policy, if there is a delay in the completion of the requisite activities and the delay is beyond the control of the developer, after reconciliation (according to the specific circumstances of the case) extension of two terms of two months can be given to the developers.

6.10 After verification of the records submitted by the developer at UPNEDA, if found satisfactory, LOI will be issued to the developer after

the approval of the following state level committee constituted under the chairmanship of Additional Chief Secretary, Additional Sources of Energy Department, Government of Uttar Pradesh:-

1. Additional Chief Secretary, Department of Additional Sources of Energy.	Chairman
2. Additional Chief Secretary, Finance Department or Nominated Representative not be low the rank of Special Secretary.	Member
3. Additional Chief Secretary, Revenue Department or Nominated Representative not be low the rank of Special Secretary.	Member
4. Additional Chief Secretary, Department of Justice or Nominated Representative not be low the rank of Special Secretary.	Member
5. Chief Executive Officer, Invest UP or Nominated Representative not below than the rank of Special Secretary.	Member
6. Additional Chief Secretary, Agriculture Department or Nominated Representative not below the rank of than Special Secretary.	Member
7. Additional Chief Secretary, Planning Department or Nominated Representative not below the rank of Special Secretary.	Member
8. Distinguished Subject Experts from Central /State(Nominated byUPNEDA)	Member
9. Director,UPNEDA	Member Secretary

The services of subject experts will be taken for examination of the records as and when required.

On the basis of the sanctioned letter, the developer will get the benefit of area affiliation mentioned in para 6.3 and 6.4 of the policy and they will be able to execute long-term contract related to feed stock supply from the concerned agreement. And FPOs / rural entrepreneurs operating in the catchment area, etc. will be able to get incentives related to the benefit of subsidized agricultural equipment. In case of non-commissioning of the plants by the scheduled commissioning date mentioned in the acceptance letter, the said approval and related benefits, incentives and facilities can be transferred in favor of other developer considering the above approval as cancelled. In addition to the above, this committee will ensure the discharge of the following additional responsibilities:

1. Get maximum investment under this policy.
2. To review the progress of implementation of such investor, who have been approved, and if there is any problem in their implementation, then redressal of them.

3. In this policy if any practical problem comes to notice, then recommendations will be made for amendment.

## 7. **Allocation of land and related Permissions**

7.1 For establishment and operation of bio-energy enterprises in Uttar Pradesh, 10 acres of land is required for 10 ton capacity CBG plant and 25 acres of land for storage at various places. 02 acres of land is required for 100 ton per day bio-coal plant and 1.5 acres of land is required for 100 kiloliter bio-diesel /bio-ethanol plant. Accordingly, applications of developers for grant of land related permissions such as exemption from land ceiling etc. will be processed.

7.2 Deemed exemption from land ceiling and provision for conversion from agriculture to non agriculture land used for setting up of bio-energy enterprises/plants and for collection and storage of feed stock will be allowed.

7.3 (A) Land will be made available by the Revenue Department on token lease rent of Re 1 per acre annually for a maximum lease period of 30 years for setting up of bio-energy enterprises/plants and for collection and storage of feed stock. This lease will be non transferable.

(B) Land for Urban solid waste-based bio-energy plants will be admissible under the policy of the Urban Development Department of the land region.

## 8. **Development of Waste Supply Chain**

8.1 Ensuring waste supply remains a significant challenge in bio-energy enterprises. To address this problem, the entire supply chain has been developed in the policy. Under this, the aggregator model has been developed. In this model, along -term contract will be established between the bio-energy entrepreneur, was teaggregator and the farmer. For this, an IT based portal and mobile app will be developed by UPNEDA, through which the aggregator, farmer and developer will be brought on one plat form. Any FPO, Cooperative society and sugarcane society will work as aggregator.

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This aggregator has to be registered on the above-mentioned platform. On the basis of the recommendation of the District Level Committee, one or more aggregators can be registered under a Tehsil. The District Level Committee will ensure that the number of aggregators is limited as per the requirement. Subsidy for machinery will be given to the aggregators registered by UPNEDA. In addition to the Submission on Agriculture Mechanization scheme, Government of India, 30 percent subsidy will be given by the Government of Uttar Pradesh up to a maximum limit of 20 lakhs. The district level committee constituted under the chairmanship of the District Magistrate will have the following responsibilities for the development of supply chain:

1. To establish coordination amongst the farmers, aggregators and entrepreneurs for establishing a supply chain of agricultural waste.
2. To determine the appropriate rate of agricultural waste in the entire district on the basis of mutual consent. Same price of agricultural waste in the district will be determined with the consent of the farmers.
3. Provide regulatory support to aggregators for transportation of agricultural waste.
4. To establish co-ordination of the entrepreneur with the organizations like Agriculture Department, Horticulture. Department, Municipal Body, Development Authority etc. for marketing of organic fertilizers.
5. Encouraging the entrepreneur for all regulatory clearances, such as fire, land sealing, conversion from agricultural to non agricultural land, availability of government land, electricity supply, transmission system, waiver of development charges of development authority etc.
6. To ensure compliance of command area by each aggregator.
7. Review of farmer's payments.
8. Facilitation of the contract for organic manure, compressed bio-gas, bio-pellets.

9. In case there is more than one aggregator the committee can recommend UPNEDA to grant subsidy on agricultural equipment's to more than one.

A route chart will be prepared by the aggregator as per the minimum cost principle by which the agricultural waste received from the farmers can be easily transported to the plant. The farmers will be paid by the aggregator within 15 days and the aggregator will be paid by the entrepreneur within 15 days. The produced bio-coal will be supplied by the entrepreneur to the thermal power projects. For this, the entrepreneur will enter into a contract with thermal power projects.

#### **9. Bio-Diesel and Bio-Ethanol**

Under the notification of Ministry of Petroleum and Natural Gas dated 30.4.2019, under the guidelines issued for the sale of bio-diesel for mixing with high-speed diesel for transportation purposes.

- 9.1 Uttar Pradesh government will take appropriate action to fix the retail sale and inspection of Bio Diesel (B 100).
- 9.2 Bio-diesel and Bio-mass/Agriculture Waste based Bio Ethanol will be procured and sold as per Oil Marketing Companies/BIS Standards.
- 9.3 Under the latest bio-energy policy of the Government of India, subsidy will be provided by the State Government with admissible central financial assistance to promote the establishment of bio-diesel and biomass/agro-waste based bio-ethanol production units in the state. To provide feed stock to these units in the state through Farmer Producer Companies/Government Societies, plantation of non-oil edible plants oilseed plants/trees/energy grass will be promoted for this purpose a basic structure for allotment of Gram Panchayat/Government lands, publicity, training and creation of necessary infrastructure will be framed.

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10. **Miscellaneous**

- 10.1 It will be mandatory for the bio-energy units to be established under this policy to comply with the relevant environment allaws, regulations, and orders.
- 10.2 A high-powered committee will be constituted under the chairmanship of the Chief Secretary for monitoring, review, inter departmental co-ordination, redressal of difficulties and better implementation of the policy.
- 10.3 Under this policy, facilities and incentives will be payable only on technologies approved by the Ministry of New and Renewable Energy, Government of India. Mixing of fossil-based fuels with waste/bio-mass will not be permissible.
- 10.4 Financial support for the establishment and running of project management unit to implement the U.P. State Bio-Energy policy 2022 and to support U.P. State bio energy development board will be provided by the budgetary allocation by the State Government.
- 10.5 In every district of the state, a budgetary arrangement will be made at the rate of 1lakh per district with the aim of motivating the entrepreneurs by giving wide publicity to the bio-energy policy.



कॉर्पोरेट कार्यालय  
Corporate Office

इंडियन ऑयल कॉर्पोरेशन लिमिटेड  
कॉर्पोरेट कार्यालय : स्कोप कॉम्प्लेक्स, कोर-2  
7, इंस्टिट्यूशनल एरिया, लोधी रोड, नई दिल्ली-110 003  
**Indian Oil Corporation Limited**  
Corporate Office : SCOPE Complex, Core-2  
7, Institutional Area, Lodhi Road, New Delhi-110 003  
Website : www.iocl.com



Ref: CO/AE&SD/01  
Date: 20.05.2022

To  
Stakeholders of SATAT Scheme

Sub: Purchase price of Compressed Bio-Gas (CBG) under SATAT scheme

You are kindly aware that, 'SATAT' (Sustainable Alternative Towards Affordable Transportation) scheme on CBG was launched on 1.10.2018. As per the scheme, procurement price of CBG purified as per IS 16087: 2016 standards, compressed at 250 bar pressure and delivered to OMC Retail Outlets in cascades (up to 25 km one way distance from CBG Plant) was fixed at Rs. 46/kg + applicable taxes for period from 1.10.2018 to 31.3.2024. It was also informed that minimum procurement price will not be lower than Rs. 46/kg + applicable taxes up to 31.3.2029.

To facilitate entrepreneurs for financial closure of the projects as well as promote setting up of CBG Plants, it has been decided that the CBG prices shall be indexed to the prevalent Retail Selling Price (RSP) of CNG in the market (or CBG RSP for markets where CNG is not available).

Accordingly, the following revised procurement pricing of CBG shall be implemented:-

- 1.0 The minimum procurement price of CBG will not be lower than Rs. 46/kg + applicable taxes for the period up to 31.3.2029.
- 2.0 The Retail Selling Price of CBG in a market shall be at par with RSP of CNG (as provided by the authorized CGD entity).
- 3.0 The following slabs for CBG procurement price have been decided, which will be the procurement price of CBG delivered at IndianOil Retail Outlet situated at any distance (up to 75 km one way) as per IS 16087 2016 specification (or its latest version) and compressed at 250 bar pressure: -

S No	Lower Retail Selling Price of CBG in Slab	Higher Retail Selling Price of CBG 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

**Note: The above table is applicable strictly for supply of CBG at a one-way distance up to 75 km from the CBG Plant. For distance beyond 75 km, the price will be first adjusted as defined in para**

Page 1 of 2

पंजीकृत कार्यालय : इंडियन ऑयल भवन, जी-9, अली यावर जंग मार्ग, बान्द्रा (ई.), मुम्बई - 400051, महाराष्ट्र (भारत)  
Regd. Office : IndianOil Bhawan, G-9, Ali Yavar Jung Marg, Bandra (E), Mumbai - 400051, Maharashtra (India)  
CIN : L23201MH1959GOI011388



***5.0 to bring it to 75 km distance table as above and then procurement price shall be fixed as per the table. For further increase in slabs beyond Rs. 100/kg, procurement price will be extrapolated as per the above. If the RSP of CBG falls below Rs. 70/kg, there will be immediate revision in the procurement pricing.***

- 4.0 The upward and downward movement of CNG price will change the slab for a particular market at any point in time and the rate applicable for CBG procurement will change accordingly.
- 5.0 Additional transportation cost for transportation of CBG beyond 75 km (one-way distance) from CBG Plant shall be considered separately, at mutually discussed & agreed rates. This additional transportation costs shall be recovered from the market through inclusion in the Retail Selling price (RSP) build-up of CBG. If the recovery from market is not possible for additional transportation, the same shall not be paid.
- 6.0 This revised procurement price of CBG is being offered considering in view that presently RSP of CNG is greater than Rs. 70/kg in nearly all markets. If there is a reduction in CNG RSP from these levels, there will be revision in the price as agreed by Oil & Gas Company committee. The minimum procurement price of CBG as announced earlier will not be lower than Rs. 46/kg + applicable taxes for the period up to 31.3.2029.
- 7.0 The revised procurement pricing of CBG as detailed above shall form part of the Expression of Interest (EOI), Letter of Intents (LOIs) issued by IndianOil and Commercial Agreements executed by IndianOil under SATAT scheme with due acceptance by both parties.

The above pricing shall be effective from 1.6.2022 for one year or subsequent revision, whichever is earlier.

For Indian Oil Corporation Ltd.

  
(Shantanu Gupta)  
Executive Director (AE&SD)

F.No. CC-13008/238/2022-CC (E-187765)

Government of India  
Ministry of Environment, Forest and climate Change  
(HSM Division)

6th Floor, Jal Wing,  
Indira Paryavaran Bhawan,  
Jor Bagh, New Delhi-110003

Date: 20.02.2023

OFFICE MEMORANDUM

**Subject: List of activities under bilateral/ cooperative approaches in India under article 6.2 mechanism of Paris Agreement - reg.**

This is in reference to the list of activities for trading of carbon credits under bilateral/ cooperative approaches in India under article 6.2 mechanism of Paris Agreement.

2. The list was deliberated in the 2nd meeting of National Designated Authority for the Implementation of the Paris Agreement (NDAIAPA) held on 17.01.23 under the chairpersonship of Secretary, MoEFCC.

3. Upon recommendation of NDAIAPA, the list has been finalized and enclosed at **Annexure I**.

4. These activities will facilitate adoption/transfer of emerging technologies. The list of activities will initially be for first 03 years and may be updated/revised by NDAIAPA.

This issues with approval of the Competent Authority.

Yours sincerely,

Encl: As above.

  
(Dr. Satyendra Kumar)  
Director

Email: satyendra.kumar07@nic.in

To,

1. CEO, NITI Aayog
2. Secretary, Ministry of External Affairs
3. Secretary, Department of Economic Affairs
4. Secretary, Department of Industry and Internal Trade
5. Secretary, Ministry of New and Renewable Energy
6. Secretary, Ministry of Power
7. Secretary, Department of Agriculture & Farmers Welfare
8. Secretary, Ministry of Science & Technology
9. Secretary, Ministry of Steel

- 
10. Secretary, D/o Fertilizers, MoCF
  11. Secretary, MoPNG
  12. Secretary, Ministry of Heavy Industries
  13. Secretary, MoMSME
  14. Secretary, Railway Board, MoR
  15. Secretary, MoHUA
  16. Secretary, MoRD
  17. Secretary, D/o Drinking water & Sanitation, MoJS
  18. Secretary, D/o Water Resources, MoJS
  19. Secretary, Ministry of Civil Aviation
  20. Secretary, Ministry of Mines

**Copy to:**

1. PPS to Secretary, MoEFCC
2. PPS to AS(NPG), MoEFCC
3. PPS to JS(NP), MoEFCC

Annexure- I**National Designated Authority for the Implementation of Article 6 of Paris Agreement (NDAIAPA) - Activities under Bilateral/Cooperative Approaches in India under Article 6.2 Mechanism**

In the backdrop of the Paris Agreement Rulebook being finalized in respect of Article 6 which focuses on carbon trading through bilateral/cooperative approaches and international market mechanisms, India has taken steps mandated on the Host Party/Country.

India has notified the National Designated Authority for the Implementation of the Paris Agreement (NDAIAPA) vide Gazette Notification dated 30.05.2022. The Authority is mandated *inter-alia* to take decisions in regard to the type of projects that may take part in international carbon market under Article 6 mechanisms.

Following list of activities has been finalized to be considered for trading of carbon credits under bilateral/ cooperative approaches under Article 6.2 mechanism.

**I. GHG Mitigation Activities:**

1. Renewable energy with storage (only stored component)
2. Solar thermal power
3. Off- shore wind
4. Green Hydrogen
5. Compressed bio-gas
6. Emerging mobility solutions like fuel cells
7. High end technology for energy efficiency
8. Sustainable Aviation Fuel
9. Best available technologies for process improvement in hard to abate sectors
10. Tidal energy, Ocean Thermal Energy, Ocean Salt Gradient Energy, Ocean Wave Energy and Ocean Current Energy
11. High Voltage Direct Current Transmission in conjunction with the renewal energy projects

**II. Alternate Materials:**

12. Green Ammonia

**III. Removal Activities:**

13. Carbon Capture Utilization and Storage

These activities will facilitate adoption/transfer of emerging technologies and may be used to mobilise international finance in India. The activities will initially be for first 03 years and may be updated/revised by NADAIPA.

\*\*\*\*\*



No. 11017/29/2021-PMI-II (Part-1) (e-34602)

भारत सरकार/Government of India

रसायन और उर्वरक मंत्रालय/Ministry of Chemicals & Fertilizers

(उर्वरक विभाग/Department of Fertilizers)

शास्त्री भवन/Shastri Bhawan,

नई दिल्ली/ New Delhi-1

दिनांक/Dated: 20<sup>th</sup> September, 2023

कार्यालय ज्ञापन/OFFICE MEMORANDUM

**Subject: Guidelines on Market Development Assistance (MDA) for Promotion of Organic Fertilizers - Regarding**


Organic fertilizers are decomposed derivatives of plant and animal sources such as agri-waste, cattle dung, poultry droppings and domestic sewage. They help in improving the soil texture, increase carbon content of soil, enhance water holding capacity of soil and increase the bacterial and fungal activity inside the soil. Increased use of organic fertilizers will help in balanced use of nutrients thereby reducing excess use of chemical fertilizers which is one of the key elements for sustainable agriculture.

II Fermented Organic Manure (FOM), Liquid Fermented Organic Manure (LFOM) and enriched Phosphate Rich Organic Manure (PROM) are organic fertilizers which are by-products of Bio-Gas (BG) and Compressed Bio-Gas (CBG) plants established under umbrella of Galvanizing Organic Bio-Agro Resources Dhan (GOBARdhan) initiative. Government of India has approved the Market Development Assistance Scheme for promotion of FOM/LFOM/PROM produced in the BG/CBG units under GOBARdhan with a budget outlay of ₹1451.82 Crore for 3 years, i.e., from FY 2023-24 to FY 2025-26.

III The detailed guidelines for Market Development Assistance (MDA) are as follows:

1. **Eligibility Criteria:**

1.1 The Market Development Assistance @ ₹1,500/MT will be provided for the sale of FOM/LFOM/PROM produced at BG/CBG plants established under umbrella Galvanizing Organic Bio-Agro Resources Dhan (GOBARdhan) initiative only. These GOBARdhan units are supported under Sustainable Alternative Towards Affordable Transportation (SATAT) scheme of Ministry of Petroleum & Natural Gas (MoP&NG), 'Waste to Energy' programme of Ministry of New & Renewable Energy (MNRE), Swachh Bharat Mission (Grameen) of Department of Drinking Water & Sanitation (DDWS), etc.

  
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- 1.2 Registration of the BG/CBG units with the GOBARdhan portal of the Department of Drinking Water & Sanitation is the pre-requisite condition for availing Market Development Assistance (MDA).
2. **Marketing Strategies:**
  - 2.1 The manufacturing units registered under Unified GOBARdhan portal will have the option to market FOM/LFOM/PROM through Fertilizer Marketing Companies in packed form or they can market themselves either in packed form or in bulk or both.
  - 2.2 **Marketing of Packed Fertilizers:** Marketing of FOM/LFOM/PROM should be done in packed form by Fertilizer Marketing Companies and/or by manufacturing plants.
  - 2.3 **Bulk Sale:** Marketing of FOM/LFOM/PROM in bulk/loose form by manufacturing plants is allowed for two quarters (October, 2023 to March, 2024) on experimental basis, subject to necessary notification by the Department of Agriculture & Farmers Welfare (DA&FW) and maintaining of quality standards of Fertilizer Control Order (FCO), 1985, as amended from time to time. On the basis of sustained supply and certified quantity during experimental period, appropriate decision will be taken regarding bulk sale.
  - 2.4 **Conformity to FCO Specifications:** FOM/LFOM/PROM should be in conformity to the specifications mentioned in Fertilizer Control Order (FCO), 1985, as amended from time to time.
  - 2.5 **Quality Assurance for Packed/Bulk Fertilizers:** Quality testing shall be ensured at Government notified laboratories/NABL accredited private laboratories. The quality test report is to be validated by State Agriculture Department or State Energy Development Agency, before issuing 'B2-MDA' Certificate.
    - 2.5.1 **Packed Sale:** In case of marketing in packed form, batch-wise quality test should be done.
    - 2.5.2 **Bulk Sale:** In case of bulk sale, sampling and quality testing will be done for every dispatch.
  - 2.6 Primary Agricultural Cooperative Societies (PACS) may be engaged as aggregator by the Fertilizers Marketing Companies/manufacturers, wherever feasible.



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3. **Application for Market Development Assistance (MDA):**
  - 3.1 **Marketing through Fertilizer Companies:**
    - 3.1.1 **EoI, Tender and MoU Process:** In case of marketing through Fertilizer Marketing Companies, the Fertilizer Marketing Companies will float an Expression of Interest (EoI) inviting tenders from the manufacturers of FOM/LFOM/PROM and thereafter, marketing arrangements, including base price for procurement, packaging and transportation may be finalized mutually through MoU. The modalities for transfer of MDA amount is to be decided through mutual consent.
    - 3.1.2 **Setting up of manufacturing facilities for PROM:** Fertilizer Marketing Companies will explore the feasibility for setting up of PROM manufacturing facilities units in / near the premises of CBG plants for enrichment of the FOM/LFOM and marketing the enriched product. There will be a Committee consisting of members from NFL, RCF, FACT, HURL & IFFCO to study and suggest modalities of setting up PROM manufacturing facilities units in/near the premises of CBG plants for enrichment of the FOM/LFOM, including costs involved.
    - 3.1.3 **Intimation of willingness to market - Application to DoF:** The Fertilizer Marketing Companies interested to market FOM/ LFOM/PROM are required to submit a letter intimating their willingness to market the FOM/LFOM/PROM along with details of registered manufacturers, with whom purchasing agreement for supply of FOM/LFOM/PROM has been made and other information as per **Annexure-I**, to the Department of Fertilizers (DoF) for approval.
    - 3.1.4 **Uploading data on iFMS:** The Fertilizer Marketing Companies which are already having iFMS ID will upload the details regarding quantity of FOM/LFOM/PROM purchased from the manufacturers and quantities sold, MRP, etc. as per existing procedure.
  - 3.2 **Marketing by Manufacturers:**
    - 3.2.1 **Intimation of willingness to market - Application to DoF:** The manufacturers interested to market FOM/LFOM/PROM in packed form or in bulk/loose form are required to submit a letter intimating their willingness to market FOM/LFOM/PROM along with details of manufacturing unit and other information as per **Annexure-II**, to the Department of Fertilizers (DoF) for approval.
    - 3.2.2 **New Module for capturing data:** A new module will be introduced on iFMS portal for registering manufacturing companies intending to market their products, either in packed or bulk form. DoF will allot an ID to the manufacturing units to enable them to upload the quantity of FOM/LFOM/PROM produced, data relating to sales, MRP, remaining stock, quality certificate, 'B1-MDA' & 'B2-MDA' forms, etc. on the new module. Adequate safeguards will be introduced in the system to ensure quality of FOM/LFOM/PROM.

  
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- 3.2.3 The production/sale data and quality certificate are to be verified regularly by State Agriculture Department/State Energy Development Agency.
4. **Packaging Regulations:**
- 4.1 All packaged commodities rules are to be adhered to by the marketing companies. The marketing entities will be required to print Maximum Retail Price (MRP) along with applicable Market Development Assistance (MDA) on the bags clearly. Any sale above the printed Net MRP will be punishable under the EC Act/Relevant Act.
- 4.2 Apart from Market Development Assistance given by the Department of Fertilizers, in case any State provides subsidy on FOM/LFOM/PROM, the MRP will be reduced by the marketing entities to that extent and the subsidy so passed will also be passed on to the farmers in terms of lower MRP.
- 4.3 Each bag of FOM/LFOM/PROM should display its constituents as given in FCO, the marketing entities names, the manufacturers' name, shelf-life and other facts as per relevant rules.
5. **Monitoring:** A Steering Committee chaired by Secretary (Fertilizers) and comprising of at least Joint Secretary level officers from the Department of Expenditure, NITI Aayog, Department of Agriculture & Farmers Welfare, Department of Drinking Water & Sanitation, Ministry of New & Renewable Energy, Ministry of Housing & Urban Affairs, Ministry of Petroleum & Natural Gas, and Department of Animal Husbandry & Dairying will oversee operational aspects and detailed guidelines for Market Development Assistance including packaging size, retail price, manner of disbursement of MDA, subject to the approval of Hon'ble Minister of Chemicals & Fertilizers on the recommendations of the Steering Committee.
6. **General Payment Procedure for claiming Market Development Assistance (MDA):**
- 6.1 The marketing entities of FOM/LFOM/PROM are allowed to claim MDA from DoF for the quantity sold through PoS based on the requisite information provided by them in prescribed Proforma 'B1-MDA' duly certified by the State Agriculture Department/State Energy Development Agency.
- 6.2 State Agriculture Department/State Energy Development Agency is required to issue Quality Certificate (Proforma 'B2-MDA').
- 6.3 The marketing entity is required to submit a copy of Quality Certificate issued by the Government approved laboratory/NABL accredited private laboratory duly certified in Proforma 'B-2 MDA' by State Agriculture Department/ State Energy Development Agency, along with the claim for MDA payment for that particular month.



Handwritten signature and date: 20 Sept 2023



- 6.4 DBT claims shall be generated through iFMS portal by the marketing entities (**Annexure**). The claims will be processed in the Department of Fertilizers and the Market Development Assistance will be released to the marketing entities. The marketing entities are required to claim MDA within two months from the month of sale of FOM/LFOM/PROM.
7. **Documentation/Submission of Records:** The marketing entities/manufacturers are required to maintain the records of permanent nature in continuity year after year and which may be made available to the DoF or Fertilizer Flying Squad of DoF or any agency authorized by DoF for audit/verification at the time of inspection or whenever otherwise called for as specified at **Annexure-III**.
8. **Research & Development proposals:** The detailed proposals on Research & Development are invited from Central/State Research Institutes and non-private fertilizer cooperatives, for seeking financial support from DoF.
9. The guidelines on procedure for submission and processing of claims for payment of Market Development Assistance (MDA) of ₹1,500/MT on sale of organic fertilizers/manures produced at plants under umbrella GOBARdhan initiative shall be applicable with effect from the date of actual sales captured on iFMS.
10. The Department of Fertilizers may, from time to time, call for any additional information from marketing entities as deemed fit for the smooth and efficient implementation of the scheme.
11. The above guidelines have the approval of Hon'ble Minister of Chemicals & Fertilizers.
12. These guidelines have been placed in the website of the Department of Fertilizers, <https://www.fert.nic.in>.

  
(मनोज कुमार/MANOJ KUMAR)

Deputy Secretary to the Government of India  
[E-mail: [manojkumar1616@nic.in](mailto:manojkumar1616@nic.in)]  
# 011-2338 7612

**To**

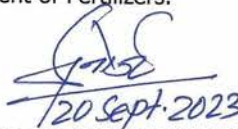
- (i) Secretary, Department of Agriculture & Farmers Welfare, Krishi Bhawan, New Delhi.
- (ii) Secretary, Ministry of Drinking Water & Sanitation, Pt. Deendayal 'Antyodaya' Bhawan, CGO Complex, Lodhi Road, New Delhi.
- (iii) Secretary, Ministry of Petroleum & Natural Gas, Shastri Bhawan, New Delhi.

-6-

- (iv) Secretary, Ministry of New & Renewable Energy, Atal Akshay Urja Bhawan, CGO Complex, Lodhi Road, New Delhi.
- (v) Secretary, Department of Expenditure (Ministry of Finance), North Block, New Delhi.
- (vi) Senior Adviser, NITI Aayog, NITI Bhawan, Sansad Marg, New Delhi.
- (vii) Secretary, Ministry of Housing & Urban Affairs, Nirman Bhawan, New Delhi.
- (viii) Secretary, Department of Animal Husbandry & Dairying (Ministry of Fisheries, Animal Husbandry & Dairying), Krishi Bhawan, New Delhi.
- (ix) Secretary, Department of Agriculture Research & Education (DARE) and Director General, Indian Council of Agricultural Research (ICAR), Krishi Bhawan, New Delhi.
- (x) Chief Secretaries of all States/UTs.
- (xi) Director (FS), Department of Fertilisers, Udyog Bhawan, New Delhi.
- (xii) Director (Agriculture)/Commissioner (Agriculture) of all State Governments/UTs Administration.
- (xiii) Chief Executive, State Energy Development Agencies.
- (xiv) CMD/MD of all Fertiliser Marketing Companies.
- (xv) CMD/MD of CBG Operators.
- (xvi) All Officers of Department of Fertilisers.
- (xvii) Director (NIC), Department of Fertilizers.
- (xviii) Deputy Secretary (IT), Department of Fertilizers - for uploading on website.
- (xix) Assistant Director (OL), Department of Fertilizers - for Hindi version.

**Copy to:**

- (i) PS to Hon'ble Minister of Chemicals & Fertilizers.
- (ii) PS to Hon'ble Minister of State for Chemicals & Fertilizers.
- (iii) PPS to Secretary, Department of Fertilizers.
- (iv) PPS to Additional Secretary, Department of Fertilizers.
- (v) PPS to Joint Secretary & Financial Advisor, Department of Fertilizers.



(मनोज कुमार/MANOJ KUMAR)

Deputy Secretary to the Government of India

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**Annexure-I**

**Details of Fertilizer Marketing Companies**

1. Name of Fertilizer Marketing Company:
2. Address of Plant:
3. Address of registered office of Fertilizer Marketing Company:
4. TIN No. of Fertilizer Marketing Company:
5. PAN No. of Fertilizer Marketing Company:
6. Quantity intended for marketing:
7. Brand name of organic fertilizer:
8. GOBARDhan Portal Registration No.  
(of Manufacturing unit)
9. Bank account details like Account No., IFSC Code, Name of account holder,  
address of the bank

Date:

Place:

Signature of the Authorized Signatory of the Company  
(Name, Designation with Seal)

**Annexure-II**

**Details of Organic Fertilizer Manufacturer**

1. Name of organic Fertilizer Manufacturing Company:
2. Address of Plant:
3. Address of registered office of manufacturer:
4. TIN No. of manufacturer:
5. PAN No. of manufacturer:
6. Installed capacity (Annual in MT):
7. Quantity intended for marketing:
8. Brand name of organic fertilizer:
9. GOBARdhan Portal Registration No.
10. Bank account details like Account No., IFSC Code, Name of account holder, address of the bank

Date:

Place:

Signature of the Authorized Signatory of the Company  
(Name, Designation with Seal)

### Annexure-III

#### List of documents to be maintained by manufacturers:

- Stock registers showing for each day opening balance, production, quantity dispatched and closing balance.
- Daily report of production and stock of each product duly authenticated by Manager (Production).
- Dispatch/stock transfer advice, serially numbered and signed by Manager (Sales).
- Dispatch instructions issued from Headquarters or other controlling entities.
- Gate passes, bearing printed serial numbers together with a register of gate passes issued, showing number and date of the gate pass issued each day and the quantities moved out of the factory on the basis of gate passes (i.e., the daily recapitulation statement).
- Register of dispatches giving the full particulars of gate pass numbers, date, dispatch/stock transfer advice and the number and date of the letter containing the dispatch instructions, against each entry in the register.
- Sales invoices should be serially numbered and supported by warehouse delivery note/orders.
- Sales day book.
- Delivery Challan issued from headquarter/company's godown or any entities controlling stocks, as also copies of Delivery Challan duly signed by the receiver in confirmation of receipt of consignment.
- Stock Register of raw materials purchased and consumed, separately for indigenous and imported raw materials. Registration/license details obtained from the concerned authorities.
- The marketing entities may ensure that the RG-1 register, stock register, gate pass register, raw material register and all other connected records are duly authenticated by the statutory auditors/chartered accountants with name, date, designation and stamp. These records shall also to be signed by the authorized officer of the company. The cuttings, over-writings and insertion of figures in the above records shall be attested by the authorized officer.

## Proforma 'B1-MDA'

## (Quantity Certificate for Organic Fertilizers)

Government of (\_\_\_\_\_)  
 Commissionate/Directorate of Agriculture (\_\_\_\_\_)

## QUANTITY CERTIFICATE

No.

Dated:

To

Joint Secretary/Additional Secretary,  
 Department of Fertilizers,  
 Ministry of Chemicals & Fertilizers,  
 Government of India, New Delhi.

(Kind Attention: Director (FS), Department of Fertilizers, Room.473, 'E' Wing,  
 Udyog Bhawan, New Delhi)

1. Name of the Claimant with full address: (\_\_\_\_\_)
2. Name of the State/UT/District where product(s) verified: (\_\_\_\_)/(\_\_\_\_\_)
3. Claim for the month in which product(s) verified in State/UT/District:  
 (Month)/(Year)
4. Report on the verification of fertilizers: (Quantity in MTs)

S. No.	Product	Brand	Total Quantity verified by the State	Sub-standard/ Short Quantity during the month	Net Quantity eligible for MDA
(1)	(2)	(3)	(4)	(6)	(6=4-5)
1.					

5. It is certified that the above statement is correct with regard to verification of (\_\_\_\_\_) fertilizer by State, exclusively for supply of the same to farmers, either directly or through the approved (marketer/retailer) for agriculture use only.

Place:

Date:

Director of Agriculture  
 (With Name and Seal)

Copy to: (Company's name)

Note: In case, the State Government /UT Administration is not able to certify the quality of fertilizer within stipulated period of one month, the same should be certified within a maximum period of three month and suitable action will be taken by the DoF accordingly.

**Proforma 'B2-MDA'**

**(Quality Certificate for Organic Fertilizers)**

Government of ( \_\_\_\_\_ )  
Commissionate/Directorate of Agriculture ( \_\_\_\_\_ )

No. ( \_\_\_\_\_ )  
Ref. No. of 'B1-MDA': ( \_\_\_\_\_ )

**QUALITY CERTIFICATE**

To  
Joint Secretary/Additional Secretary,  
Department of Fertilizers,  
Ministry of Chemicals & Fertilizers,  
Government of India, New Delhi.

(Kind Attention: Director (FS), Department of Fertilizers, Room. 473, 'E' Wing, Udyog Bhawan, New Delhi)

1. Name of the Claimant with full address:  
(Company's Name and address)
2. Name of the State/UT/District where product(s) received: (Name of State Government)
3. Claim for the month in which product(s) received in State/UT/District:  
(Month, Year)
4. Report on the verification of quantity of fertilizers by the State: (Quantity in MT)

1	Name of State/UT		
2	Name of Manufacturers & Location		
3	Office of the Brand(s)		
4	Month and Year for which Quality Certificate is being issued		
5	It is Certified that the samples have been tested in a notified laboratory as per Fertilizer Control Order (FCO) and following samples were declared non-standard and therefore are not eligible for MDA.		
S. No.	Product	No. of samples failed	Total quantity not eligible for MDA (in MTs)

Director of Agriculture  
(With Name and Seal)

Place:  
Date:

Copy to: (Company's Name)

## Annexure

**Proforma for claiming Payment of Market Development Assistance (MDA)  
by manufacturer/marketers for Organic Fertilizers under DBT**

Claim under Notification No. (\_\_\_\_) dated (\_\_\_\_)  
Bill No. (\_\_\_\_)  
Date: (\_\_\_\_)

To  
Director (FS)  
Department of Fertilizers,  
New Delhi

Sir/Madam,

We hereby submit the claim for payment of MDA as per details given below:

1. Name of Claimant with full address: (\_\_\_\_)
2. Claim for the week ending: \_\_/---/-----
3. Details of the Claim:

S. No.	Product	State	Opening Balance (MTs)	Supply Received (MTs)	Availability (MTs)	Quantity Sold (MTs)	Closing Balance (MTs)	Quantity Eligible (MTs)	Rate of MDA (Rupees/MT)	Total MDA payable (Rupees)
1	2	3	4	5	6 (4+5)	7	8	9	10	11(9*10)
1.										
2.										
3.										

4. Certified:
  - a. That the statement given above is correct to the best of my knowledge and belief.
  - b. That I/We undertake to refund the over payment due to quality issue or any other issue from future bills along with penal interest.
  - c. That the quantity claimed in the above bill will not be claimed in the future claims(s).
  - d. That the quantity sold and claimed has been used for agriculture purpose only.

Please pay by crediting Current Account No. (\_\_\_\_) with (---Bank--), (Bank Address), (IFSC Code) (MICR Code)

(Digital Signature of CA/Auditor/Statutory Auditor of Company)

(Digital Signature of Authorised Officer of Company)

Passed of Rs. (Amount in figures)  
(Amount in words)

DDO

(Digital Signature of DDO)



F. No. L-16020/02/2023-GP-1 (E-45833)  
Government of India  
Ministry of Petroleum and Natural gas  
(G P Division)

Shastri Bhawan, New Delhi  
Dated: 2<sup>nd</sup> February, 2024


**OFFICE MEMORANDUM**

**Subject: “Scheme guidelines for providing financial assistance to Compressed Bio Gas (CBG) producers for procurement of biomass aggregation machinery” – reg.**

Government of India has approved the Scheme for providing financial assistance to Compressed Bio Gas Producers (CBG) producers for procurement of biomass aggregation machinery to support collection of biomass with a total financial outlay of Rs. 564.75 crore for the period of FY 2023-24 to FY 2026-27.

2. The guidelines on Scheme for providing financial assistance to Compressed Bio Gas Producers (CBG) producers for procurement of biomass aggregation machinery is enclosed.
3. This issues with the approval of Hon'ble Minister of Petroleum and Natural Gas.

Encls: Scheme Guidelines

  
(Anand Kumar Jha)  
Director to the Government of India  
Tel.No.011- 2338-8764

**To,**

- (i) CEO, NITI Aayog, Parliament Street, New Delhi-110001.
- (ii) Secretary, Department of Expenditure, Ministry of Finance, North Block, New Delhi-110001.
- (iii) Secretary, Department of Agriculture & Farmers Welfare, Ministry of Agriculture & Farmers Welfare, Krishi Bhawan, New Delhi-110001.
- (iv) Secretary, Ministry of Environment, Forest and Climate Change, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi, 110003.
- (v) Secretary, Ministry of New & Renewable Energy, Atal Akshay Urja Bhawan, CGO Complex, CGO Complex, Lodhi Road, New Delhi, 110003.
- (vi) Secretary, Department of Fertilizers, Ministry of Chemicals and Fertilizers, Shastri Bhawan, New Delhi - 110001
- (vii) Secretary, Department of Drinking Water and Sanitation, Pandit Deendayal Antyodaya Bhawan, CGO Complex, Lodhi Road, New Delhi, Delhi 110003
- (viii) All Divisions of MoPNG.

**Copy for information to:**

- (i) PS to Hon'ble Minister of PNG.
- (ii) PS to Hon'ble Minister of State for PNG.
- (iii) PPS to Secretary, PNG.
- (iv) PPS to Additional Secretary & Financial Adviser, MoPNG.
- (v) PPS to Additional Secretary, MoPNG.
- (vi) PPS to Joint Secretary, GP
- (vii) NIC for web hosting on MoPNG's website

## 1. Introduction

1.1 India is endowed with a vast expanse of fertile agricultural landscape with a substantial quantity of biomass. However, the prevalent practice of burning biomass contributes to heightened air pollution. There is an urgent need to deploy biomass collection equipment, recognize the value in this biomass, and leverage it for production of Compressed Bio Gas (CBG).

## 2. Objective

2.1 The primary goal of this scheme is to facilitate biomass aggregation and marketing, preventing the burning of surplus biomass and generating extra income for farmers. This initiative also aims to extract economic value from untapped biomass resources/ agri residue such as paddy straw by converting them into CBG and bio-manure.

2.2 This scheme aims to support biomass collection for initial 100 biomass-based CBG plants by providing financial assistance to CBG producers for procurement of biomass aggregation machinery (BAM).

## 3. Scheme Execution

3.1 Steering Committee: The scheme would be overseen by a Steering Committee (SC), which will have the following composition:

S. No.	Composition
1.	Secretary, PNG (Chairman)
2.	Secretary, Department of Agriculture and Farmers Welfare or representative
3.	Secretary, Department of Drinking Water and Sanitation or representative
4.	Secretary, Ministry of New and Renewable Energy or representative

SC may co-opt any other member, as appropriate.

3.1.1 The Terms of Reference (ToR) of the Inter- Ministerial Steering Committee will be as follows:

- i. Finalization of scheme guidelines for approval by Minister, P&NG;
- ii. Provide overall direction for scheme implementation, monitoring and review of its progress;
- iii. Necessary amendment of scheme design to overcome operational difficulties, if so needed, during course of scheme implementation within the overall budget of the scheme;
- iv. Any other relevant matter.

3.1.2 SC will meet at least once in three months.

3.2 **Project Approval Board (PAB):** PAB shall consider the projects recommended by PAC. Approval of PAB shall constitute sanction for further action by Project Management Agency (PMA). PAB shall be chaired by Secretary, PNG and shall consist of Additional Secretary, PNG, Financial Advisor, PNG, Joint Secretary (GP), Director-in-charge of CBG, IOCL, GAIL and Head, PMA.

3.3 **Project Appraisal Committee (PAC):** The scheme shall have a PAC for appraisal of proposals and recommending projects under the scheme and for effective planning and implementation of the scheme. PAC shall have the following composition:

S.No.	Composition
1.	Additional /Joint Secretary, PNG (Chairman)
2.	Joint Secretary, Department of Agriculture and Farmer Welfare or representative
3.	Joint Secretary, Ministry of New and Renewable Energy or representative
4.	Joint Secretary, Department of Drinking Water and Sanitation or representative
5.	Representatives from Oil and Gas Marketing Companies

PAC may co-opt other members (domain experts), as appropriate.

3.3.1 The Terms of Reference (ToR) of the PAC will be as follows:

- i. Appraisal of the proposals and recommending projects under the scheme to PAB;
- ii. Effective planning and implementation of the scheme;
- iii. Assisting SC in monitoring of scheme and providing a quarterly progress report to the SC;
- iv. Recommend necessary amendment of scheme design to overcome operational difficulties, if so felt, during course of scheme implementation;
- v. Provide necessary guidance to Project Management Agency (PMA) for scheme implementation, including, finalization/ amendment of list of biomass aggregation equipment/machinery and their specifications;
- vi. Any other relevant matter.

#### 3.4 **Project Management Agency (PMA)**

3.4.1 The responsibilities of PMA include:

- a. PMA will implement and monitor the scheme, including the development of the dedicated portal.
- b. PMA will review and recommend a list of machineries and equipment to the PAC for approval.
- c. PMA will evaluate and process the applications from beneficiaries (CBG producers). It shall appraise and recommend suitable applications for sanction.
- d. After approval of PAB, PMA shall inform the beneficiaries regarding approval of application. It shall also convey the sanction to Central Nodal Agency (CNA).
- e. PMA will conduct physical verification of biomass aggregation equipment and upload the verification report.
- f. PMA will extensively deploy information and communication technology to ensure transparent implementation and efficient monitoring, enhancing the scheme's overall effectiveness.
- g. PMA will prepare template for maintaining data of quantity of biomass collection by beneficiary and visit CBG projects periodically to evaluate the effective utilization of machinery acquired under the scheme.
- h. Conduct capacity building, actively engage in promotional activities like workshops, seminars, and exhibitions across different regions, fostering awareness of biomass aggregation, document and disseminate the success stories.
- i. Assess state-wise availability of the biomass aggregation machinery and existing gap and identify the future requirements.
- j. Any other activity as may be decided by SC.

#### **4. FUNDING PATTERN**

##### **4.1 Standard Financial Assistance (SFA) pattern:** Standard pattern of financial assistance is as follows:

- 4.1.1 A maximum financial assistance of 50% of the procurement cost of biomass aggregation machinery or Rs. 90 lakh per set (whichever is less) will be admissible as grant to a CBG producer.
- 4.1.2 CBG producers will have the flexibility to choose equipment with in the approved list (as stated in Annexure II) based on their project requirements.
- 4.1.3 CBG producers must submit a Detailed Project Report (DPR) outlining the CBG project. The PMA will assess the biomass requirements and the number of biomass aggregation machinery sets based on the DPR.
- 4.1.4 The financial assistance of Rs. 1.8 crore for 4 TPD CBG capacity project would be provided with a capping of Rs. 9 crore per project on pro rata basis.
- 4.1.5 Approval of application for financial assistance will be followed by actual procurement of the equipment and uploading the documents for verification and subsequent processing for sanction of financial assistance.

#### **5. PROCEDURE FOR APPLICATION FOR FINANCIAL ASSISTANCE**

##### **5.1. Eligibility criteria of a beneficiary for getting financial assistance:**

- 
- i. All the existing and upcoming CBG projects using at least 50% biomass (Agri residue) as feedstock as per DPR.
  - ii. CBG projects must have an installed or proposed CBG production capacity of at least 2 tonnes per day (TPD) and be registered on the GOBARdhan portal.
  - iii. Under construction projects with at least 50% of physical progress as per DPR shall be considered eligible.
  - iv. CBG project has not availed any benefits/ subsidy/ assistance on the machinery/ equipment to be procured under this scheme from any other Central Government/State Government schemes.
  - v. Eligible applicant has to apply through designated portal only before the procurement of BAM.
  - vi. SC reserves the right to review the eligibility criteria.

## **5.2. Process for approval of application for financial assistance for BAM:**

- i. The application for grant of approval of financial assistance will be accepted through designated portal.
- ii. The application for financial assistance may be submitted on the designated portal on quarterly basis between 1<sup>st</sup> to 30<sup>th</sup> day of every quarter. For example, for the quarter April- June 2024, the applications can be submitted between 1<sup>st</sup> April to 30<sup>th</sup> April 2024.
- iii. The last date for submitting the applications under these guidelines shall be 30.09.2026 or as extended from time to time.
- iv. Incomplete proposal in any form and without requisite approvals/documents will be rejected. The rejection of the proposal will be intimated preferably within 60 days of submission of the proposal in the designated portal. However, fresh proposal complete in all aspects may be resubmitted before purchase of BAM or 30.09.2026 whichever is earlier.
- v. PMA shall assess the requirement of BAM on the basis of biomass requirement mentioned in the of the project DPR or current requirement of the project as mentioned by CBG producer (subject to cap as per the DPR assessment).
- vi. Three sets of BAM with a small baler shall be considered equivalent to one set of equipment with a large baler. A BAM set with large baler would collect around 4500 Ton biomass in a season.
- vii. CBG producer shall apply for number of sets required for collection of desired quantity of biomass. Further, he would also be able to select the required equipment per set within the approved list.
- viii. CBG producer shall be free to choose the equipment / machines of quality conforming to standard specifications. Relevant and valid test report of the authorized testing institutions and product warranty & after sales, service infrastructure from the manufacturer should be available.
- ix. CBG producer may apply for release of financial assistance in phased manner within two years from the date of approval of application.
- x. In case of capacity enhancement, CBG producer may submit fresh proposal for additional financial assistance within the upper ceiling of financial assistance.
- xi. CBG producer shall take utmost care in selection of the biomass aggregation machinery/ equipment considering local conditions viz. crop grown, land holding and storage facility etc.
- xii. PMA shall examine the applications, assess biomass requirement, biomass aggregation machinery required and assess the eligible financial assistance for

- procurement of BAM. The scrutiny and processing of the applications received shall be completed within 3 weeks of the end of cut off date.
- xiii. PMA shall forward the consolidated eligible proposals with its advise to the EC on monthly basis.
  - xiv. If required, PAC may request PMA or CBG producer for further explanation or justification of the proposal.
  - xv. The PAC shall appraise/ recommend approval of the financial assistance to PAB.
  - xvi. Approval of PAB shall be issued within 2 months of the end of cut off date.

### 5.3. Procedure after approval of application

- i. No change shall be allowed to the list of equipment for which approval has been granted. However, at the time of filling application, the applicant may indicate the phased manner of proposed procurement and request for grant of financial assistance in the phased manner within approved limits.
- ii. After approval of application,
  - a) CBG producer shall deposit the total cost of the BAM in OEM /its authorized dealer/distributor account from their own fund, or
  - b) CBG producer shall deposit margin money in OEM /its authorized dealer/distributor account and avail credit facility from banks/financial institutions for remaining cost of the BAM.
- iii. CBG producer has to receive the equipment from the authorized dealers/ distributors within six months from the date of approval of application.
- iv. In case of delay for reasons not attributable to the CBG producer, a suitable extension of time over the original period may be granted by PAC based on recommendation of PMA. An application in this regard maybe made by the CBG producer to PMA, 30 days before the end of time period prescribed in the approval of application along with supporting documents.
- v. After receiving the equipment, the beneficiary will write the scheme name and year of purchase on the equipment with paint.
- vi. After procurement of equipment/ machinery beneficiary shall upload the bill, sale invoice, registration number/ laser cutting serial number and photographs of the equipment on the portal. This process shall be completed within 2 weeks of the procurement of the equipment/ machinery.
- vii. PMA will conduct physical verification of biomass aggregation equipment and upload the verification report on the portal within three weeks of the uploading of the documents by the beneficiary. At the time of verification, the embossed/ laser cutting serial number will be matched with the number mentioned on sale invoice. The verification report shall contain, inter-alia, the photographs of the equipment, equipment number, latitude and longitude of the location.
- viii. Within two weeks of field verification, PMA will submit the proposal along with recommendation for release of FA to the Ministry.
- ix. Ministry shall process the proposal and, after due approval, release the funds to the CNA.
- x. CNA will release the financial assistance within two weeks of receipt of funds:

- 
- a) To Banks/ financial institutions from where the CBG producer has availed the loan for procurement of BAM, or
  - b) Into the account of the beneficiary in case of self-financed BAM procurement
- xi. After receiving the financial assistance, the bank shall deduct the amount from principal amount for the purpose of calculation of interest.
  - xii. PAC will constitute a team of verifying officers comprising of one officer each from MoPNG and DAFW and DDWS for audit of a fixed percentage, as determined by PAC, of verification reports and proposal for release of FA.

## **6. Criteria for Selection of beneficiary**

6.1 CBG producers fulfilling the criteria mentioned at para 5.1 shall be the beneficiary.

6.2 Order of preference for selection of beneficiary would be as under:

- i. Date of commissioning of the CBG plant.
- ii. Date of consent to operate from PESO.
- iii. Plan approval from PESO.
- iv. Consent to establish from CPCB.
- v. Date of filing of application.
- vi. Date of registration on GOBARdhan portal.

6.3 After receiving applications, beneficiaries will be selected till the approved budget of that FY is exhausted.

6.4 Approval of application will be conveyed to selected beneficiaries.

6.5 For the remaining applicants, a waitlist shall be prepared as per the order of preference specified in clause 6.2.

6.6 In case fund is not availed by the selected beneficiary after approval then, subject to para 5.3 (iii) and (iv), waitlisted applicants will be given approval for financial assistance.

6.7 Financial support to the beneficiary approved by the PAC but not released in the FY shall be considered in the next FY.

## **7. Responsibility of beneficiary w.r.t. BAM:**

7.1 The CBG producers will sign a 5 year bond of amount equal to the financial assistance undertaking, inter-alia,

- a) That the BAM procured under this scheme shall primarily be used for the collection/transportation of biomass for CBG production.
- b) BAM will not be sold, transferred, hypothecated, mortgaged or disposed off in any other manner within 5 years from the date of purchase.

- 7.2 Beneficiary shall maintain the equipment in good conditions and take necessary steps to ensure effective utilization of machinery.
- 7.3 Beneficiary shall get the eligible equipment/ machinery of value above Rs. 5 lakhs suitably insured against loss by damage, theft, fire, act of God, etc.
- 7.4 In case of irreparable damage to the machinery rendering it unworkable, scrap value in proportion to the subsidy released shall be returned to the Government by the beneficiary. All such cases shall be verified by the PMA and approved by PAC.
- 7.5 The beneficiary will be free to utilize the equipment in any manner as may be deemed fit for effective utilization of BAM.
- 7.6 During the scheme period, beneficiary shall furnish an annual declaration that the BAM procured under the scheme are well maintained and in working condition.
- 7.7 Beneficiary will upload a report of quantity of biomass collected from these BAM sets in last calendar year by 31st January of next year.
- 7.8 PAC may take suitable action if there is any mis-utilization of the BAM by beneficiary.
- 7.9 If a CBG producer fails in fulfilling its responsibilities, the PAC may recommend to suspend the benefits/incentives available to the beneficiary under any other schemes of Government of India. PAC may also ask PMA to recover the bond amount from beneficiary.
- 7.10 In case the beneficiary fails in effective utilization of the machinery, written notice will be issued starting with a onetime warning. Non-compliance can lead to a situation where ownership of the machines will be transferred to another beneficiary after consulting with the Committee.

## **8. Process and Fund Flow Mechanism**

- (a) CBG producers will apply on designated portal along with approved documents.
- (b) Application will be examined by PMA.
- (c) PMA will shortlist selected beneficiary within the approved budget and submit the same to PAC on monthly basis.
- (d) PAC will recommend to PAB.
- (e) After PAB approval, PMA will send the approval to beneficiary and CNA.
- (f) After approval, CBG producer shall deposit:
  - (i) CBG producer shall deposit the total cost of the BAM in OEM /its authorized dealer/distributor account from their own fund,

Or



- 
- (ii) Margin money in OEM /its authorized dealer/distributor account and avail credit facility availed from banks and financial institutions for remaining cost of the BAM.
  - (g) The CBG producer will receive the equipment as elucidated at point 5.3 (iii) and (iv).
  - (h) The CBG producer will upload the application for release of financial assistance along with relevant documents on the designated portal for release of funds.
  - (i) After receiving documents, PMA will conduct physical verification of the equipment and upload verification report.
  - (j) PMA will submit the proposal along with recommendation for release of FA to the Ministry.
  - (k) Ministry shall process the proposal and, after due approval, release the funds to the CNA for releasing the financial assistance in Bank/ financial institution/ Beneficiary' account as the case may be.
  - (l) CNA will release the financial assistance.

#### **9. Scheme Monitoring**

- 9.1 The Scheme envisages a coordinated approach for monitoring and evaluation with active involvement of PMA, beneficiaries and other stakeholders.
- 9.2 A combination of periodic desk review, field visits and web-based mechanism will be adopted by MoPNG for monitoring physical and financial progress and achievement of proposed outcomes of the scheme.
- 9.3 All beneficiary will ensure that an annual report of quantity of biomass collected from these BAM sets in last calendar year will be uploaded by 31<sup>st</sup> January of next year on designated portal.
- 9.4 Mid-term evaluation and end of scheme evaluation will be conducted through a suitably chosen third party. The funds towards evaluation will be used from within administrative expenses earmarked in the scheme budget.

\*\*\*\*

**Annexure-1**

**List of documents to be uploaded with the application:**

1. a) Declaration from Project Developer in case of self-financed projects  
OR  
b) Endorsement Letter from Lead FI/Bank in case of debt financing/loans
2. Detailed Project Report (DPR)
3. Loan sanction letter, if loan availed
4. GOBARdhan Registration certificate
5. Undertaking non-judicial stamp paper of Rs 500/- for not-availing/applying any subsidy/ benefits on procurement of same set of bio mass aggregation machinery under any other Central Government supported scheme.
6. Current Status of Latest High-Resolution Photographs of the plant site (with timestamp) along with geo coordinates.
7. For commissioned plant: Date of commissioning along with Consent to Operate (CTO) from State Pollution Control Board for the plant and consent to operate from PESO.
8. For under construction plant, Plan approval from PESO, Consent to establish from CPCB,
9. Non-NPA certificate from the lending banks/FIs if loan availed.
10. Loan disbursement letter, if available.
11. Estimated cost of biomass aggregation machinery along with their quotation from OEM/ authorized dealer and consent to supply with in stipulated period at same cost.
12. Consent to release financial assistance in the account of lender/Beneficiary account
14. Bank details

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## Annexure-II

### Indicative List of Machinery:

1.	Cutter /Rotary Slasher-	1 No.
2.	Tedder Machine-	1 No.
3.	Raker -	1 No.
4.	Tractor for baler-	1 No.
5.	Baler (Small/large/square/round/stationery)-	1 No.
6.	Tractor for Tedder & Rake-	2 No.
7.	Trolley (Flat, Single Axle, Local Fabricator)/Automatic bale loading trolley-	3 No.
8.	Tractor attachment for Stacking (grabber)/telehandler-	1 No.
9.	Moisture Meter-	1 No.
10.	Water tank-	1No
11.	Fire Extinguisher-	1 No.
12.	Lightening Arrestor-	1 No.

#### Note:

- a. A BAM set with baler above 300 kg. shall be considered as large baler set.
- b. BAM set with baler below 300 kg. shall be considered as small baler set.
- c. Financial assistance limit of BAM set with larger baler set may be utilized to procure 3 small baler sets.

**Annexure-III**

**List of documents for release of financial assistance:**

1. Application for release of Financial Assistance.
2. Approval letter along with list of machinery approved and estimated amount approved.
3. Copy of GST invoice of the equipment.
4. Proof for transfer/payment of beneficiaries share of the procurement cost in the account of OEM/ authorized dealer.
5. Proof of Loan disbursement in OEM/ authorized dealer account in case of bank financed project.
6. Bank details of lender/beneficiary for disbursal of financial assistance.
7. Proof of receipt of equipment.
8. Photographs along with geo tagging of equipment.
9. Registration certificate of equipment.
10. Verification report by PMA.

F. No. L-16020/1/2023-GP-I (E-45649)  
Government of India  
Ministry of Petroleum and Natural Gas  
(G P Division)

Shastri Bhawan, New Delhi  
Dated: 27<sup>th</sup> February, 2024

**OFFICE MEMORANDUM**

**Subject: “Mandatory blending of Compressed Bio-Gas (CBG) in Compressed Natural Gas (Transport) {CNG (T)} and Piped Natural Gas (Domestic) {PNG (D)} segments of City Gas Distribution (CGD) networks - CBG Blending Obligation (CBO)” -reg.**

The undersigned is directed to refer to the recommendation of National Biofuel Coordination Committee (NBCC) given in its meeting held on 24.11.2023 and to convey the introduction of Mandatory blending of Compressed Bio-Gas (CBG) in Compressed Natural Gas (Transport) {CNG (T)} and Piped Natural Gas (Domestic) {PNG (D)} segments of City Gas Distribution (CGD) networks- CBG Blending Obligation (CBO) to stimulate demand for CBG in CGD sector and to meet the commitments towards “Net Zero”. The salient features of the mandate are as under:

- i. CBG Blending Obligation (CBO) – CGD entities are mandated to blend CBG as a prescribed percentage of Natural Gas (NG) consumed in the CNG(T)/PNG(D) segment of CGD sector across the country.
  - ii. CBO will be voluntary till FY 2024-2025.
  - iii. CBO shall be kept as 1%, 3% and 4% of total CNG(T)/PNG(D) consumption for FY 2025-26, 2026-27 and 2027-28 respectively. From FY 2028-29 onwards CBO will be 5%.
  - iv. Till the operationalization of CGD network across the country, volume of CBG marketed without co-mingling with natural gas by all CGD entities will be considered as blending to fulfil CBO.
  - v. Further to protect renewable origin of CBG:
    - a. CBG shall be promoted as the green fuel by guaranteeing its renewable origin and which could be suitably monetized through tradability of green certificate system.
    - b. Mechanism like open access, book and claim, mass balancing etc. may be used for transfer and trading of energy and green certificate.
  - vi. Petroleum Planning and Analysis Cell (PPAC) shall act as Central Repository Body (CRB) to formulate operational guidelines for implementation of blending obligation. The detailed guidelines shall be issued with approval of Minister, PNG.
2. This issues with the approval of competent authority.



(Anand Kumar Jha)  
Deputy Secretary to the Government of India  
Tel.No.011- 2338-8764

**To,**

- i. Chief Executive Officer, NITI Aayog, Parliament Street, New Delhi-110001.
- ii. Secretary, Petroleum and Natural Gas
- iii. Secretary, Department of Rural Development

- iv. Secretary, Department of Agriculture and Farmers Welfare
- v. Secretary, Ministry of Environment, Forests & Climate Change
- vi. Secretary, Department of Science & Technology
- vii. Secretary, Department of Expenditure, Ministry of Finance
- viii. Secretary, Ministry of Road Transport & Highways
- ix. Chairman, Railway Board
- x. Secretary, Department of Food & Public Distribution
- xi. Secretary, Department of Heavy Industry
- xii. Secretary, Department of Bio-Technology
- xiii. Secretary, Ministry of New and Renewable Energy
- xiv. Secretary, Ministry of Housing & Urban Affairs
- xv. Secretary, Department of Financial Services
- xvi. Secretary, Department of Drinking Water and Sanitation
- xvii. Secretary, Ministry of Civil Aviation
- xviii. Joint Secretary, (E&BR), MoPNG (Member Secretary)
- xix. All Divisions of MoPNG
- xx. All CGD entities
- xxi. Chairman IOCL/ CMD-HPCL/BPCL/ONGC/GAIL/EIL/OIL/MD PLL/IGL
- xxii. Director General, Petroleum Planning and Analysis Cell (PPAC)
- xxiii. Chairman, Petroleum and Natural Gas Regulatory Board (PNGRB)

**Copy for information to:**

- i. PS to Hon'ble Minister of PNG.
- ii. PS to Hon'ble Minister of State for PNG.
- iii. PPS to Secretary, PNG.
- iv. PPS to Additional Secretary & Financial Adviser, MoPNG.
- v. PPS to Additional Secretary, MoPNG.
- vi. PPS to Joint Secretary, GP
- vii. NIC for web hosting on MoPNG's website

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## **Documents/ Checklist to be obtained for financing Compressed Biogas**

1. Details of the firm/Company like Certificate of Incorporation, Partnership Deed, KYC documents, MoA, AoA, etc
2. Audited balance sheet of the company/ firm, sister concerns, mother companies if any, for the last 3 years with all schedules.
3. ITR for promoters/ borrowers/ partners/ directors for the past three years.
4. Letter of Intent (LoI) from Oil Marketing Companies (OMCs) for procurement of CBG produced.
5. Details of land where the project will be established (whether own/lease)
6. Copy of all relevant agreements wherever applicable like tripartite agreement, agreement with vendor/ consultant, contract agreement, commercial agreement, Raw material/input supply agreement, buy back agreement, Concession Agreement, Turnkey agreement, etc.
7. Statutory Approval/ NoC as per [www.satat.co.in](http://www.satat.co.in)
8. Approved plan from competent authority along with estimates from Qualified Civil Engineer for all Civil Works.
9. Quotations for purchase of Plant & Machinery, Equipment, Vehicles, tools, Implements, etc from reputed vendors.
10. Certificate from a Chartered Accountant for the investments already made (if the project is underway).
11. Details of securities (both primary and collateral) mentioning the market value, owner, and address. (Only details and value of securities to be furnished).

F. No. L-16020/12/2022-GP-1 (E-45002)  
Government of India  
Ministry of Petroleum and Natural gas  
(G P Division)

Shastri Bhawan, New Delhi  
Dated: 15<sup>th</sup> March, 2024

**OFFICE MEMORANDUM**

**Subject: "Scheme for Development of Pipeline Infrastructure (DPI) for injection of Compressed Bio Gas (CBG) in City Gas Distribution (CGD) network." –reg.**

Government has approved "Scheme for Development of Pipeline Infrastructure (DPI) for injection of Compressed Bio Gas (CBG) in City Gas Distribution (CGD) network" with a total financial outlay of Rs. 994.50 crore during the period of FY 2023-24 to FY 2025-26.

2. The scheme shall provide financial assistance for creating CBG-CGD grid connectivity for 100 CBG projects and create ecosystem for offtake of CBG with reduced logistic cost.
3. The detailed guidelines of the scheme shall be issued separately.



(Anand Kumar Jha)  
Director to the Government of India  
Tel.No.011- 2338-8764

**To,**

- i. CEO, NITI Aayog, Parliament Street, New Delhi-110001.
- ii. Secretary, Department of Expenditure, Ministry of Finance, North Block, New Delhi-110001.
- iii. Secretary, Department of Agriculture & Farmers Welfare, Ministry of Agriculture & Farmers Welfare, Krishi Bhawan, New Delhi-110001.
- iv. Secretary, Ministry of Environment, Forest and Climate Change, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi,110003.
- v. Secretary, Ministry of New & Renewable Energy, Atal Akshay Urja Bhawan, CGO Complex, CGO Complex, Lodhi Road, New Delhi, 110003.
- vi. Secretary, Department of Fertilizers, Ministry of Chemicals and Fertilizers, Shastri Bhawan, New Delhi - 110001
- vii. Secretary, Department of Drinking Water and Sanitation, Pandit Deendayal Antyodaya Bhawan, CGO Complex, Lodhi Road, New Delhi, Delhi 110003

**Copy for information to:**

- i. PS to Hon'ble Minister of PNG.
- ii. PS to Hon'ble Minister of State for PNG.
- iii. Sr. PPS to Secretary, PNG.
- iv. Sr. PPS to Additional Secretary & Financial Adviser, MoPNG.
- v. Sr. PPS to Additional Secretary, MoPNG.
- vi. Sr. PPS to JS (GP), MoPNG



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Among the 28 states in India, Uttar Pradesh stands out with the highest potential for biomethane generation due to abundant organic feedstock availability. The state, demonstrating ambition, introduced a dedicated bioenergy policy in 2022 and is currently leading the nation with around 100 CBG projects underway.

According to the report, Uttar Pradesh has the capability to install 1,000 CBG projects by harnessing just 20% of its surplus organic feedstock. Along with delving into the economic aspects of CBG projects, the report showcases successful practices within the state, identifies grassroots challenges, and offers policy recommendations. This information is invaluable for policymakers, think tanks, researchers and investors interested in promoting clean energy and effective waste management in both the state and across India.



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