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File No.: VIS (2023-24)-PL715-616-943 **Dated: 02.04.2024**

TECHNO-ECONOMIC VIABILITY STUDY REPORT

OF

12,700 M3/DAY BIO GAS PRODUCING PLANT

5,000 KG PER DAY BIO CNG CAPACITY

SETUP BY

M/S NARUMA INDUSTRIES PVT LTD

- Corporate Valuers
- Business/ Enterprise/ Equity Valuations
- Lender's Independent Engineers (LIE)
- Techno Economic Viability Consultants (TEV)
- Agency for Specialized Account Monitoring (ASM)
- Project Techno-Financial Advisors
- Chartered Engineers
- Industry/ Trade Rehabilitation Consultants
- NPA Management
- Panel Valuer & Techno Economic Consultants for PSU Banks

REPORT PREPARED FOR

CORPORATE BANKING BRANCH, PNB DEHRADUN - 248001

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PART A — REPORT SUMMARY

S. No.	PARTICULAR	DESCRIPTION
1.	**Name of the Company:**	M/s Naruma Industries Pvt Ltd
2.	**Registered Address:**	Khasra Number 917, First Floor Ahmedpur Kadach Railway Road, Jwalapur, Haridwar, Uttarakhand, 249407.
3.	**Project Name**	5,000 Kg per day Bio CNG generating plant.
4.	**Project Location:**	Khasra No. 740, Village Tughalpur, Paragna Goverdhanpur, Tehsil - Laksar, District-Haridwar, Uttarakhand -247663
5.	**Project Type:**	Bio CNG generating plant along with solid and liquid fertilizers
6.	**Project Industry:**	Renewable Energy
7.	**Product Type / Deliverables:**	Bio CNG, Solid organic fertilizer and liquid fertilizer
8.	**Report Prepared for Organization:**	Punjab National Bank, Corporate Banking Brach (CBB) Racecourse Dehradun, 248001
9.	**TEV Consultant Firm:**	M/s. R.K Associates Valuers & Techno Engineering Consultants (P) Ltd.
10.	**Report type:**	Techno-Economic Viability Report
11.	**Purpose of the Report:**	To assess Technical & Economic Viability for the purpose of seeking external financial assistance to start a green field Project.
12.	**Scope of the Report:**	To assess, evaluate & comment on Technical, Economical & Commercial Viability of the Project as per data information provided by the client, independent Industry research and data/

		information available on public domain.
13.	**Date of Report:**	2nd April, 2024
14.	**Documents referred for the Project:**	**A. PROJECT INITIATION DOCUMENTS:** 1. Project Report 2. Financial Projections of the Project 3. Project proposed Schedule 4. Statutory Approval Details 5. Layout and Master Plan **B. PROCUREMENT DOCUMENTS:** 1. List of Plant & Machinery along with acquisition costs for the same 2. Major Existing Customer Line 3. List of Expected Raw material Supplier 4. Process Flow Chart 5. Sanction/proposed map of the sites 6. Lease/Sale deeds of the Land **C. STATUTORY APPROVALS, LICENCES & NOCs** a. MSME UDYAM Registration Certificate b. Pollution Control Application/Certificates c. Factory Permission Application/Certificate d. PESO Preliminary Application/Certificate
15.	**Means of Finance:**	Equity & Debt (D/E Ratio 2.20 TPC)
16.	**Key Financial Indicators:**	

Key Indicators	Value
Average DSCR	2.58
Average EBITDA Margin	56.14%
Avg. PAT Margin	25.06%
NPV & IRR	INR 26.09 Cr. & 10.33%
Payback Period	5.55 years

Note: *Above financial indicators are based on the financial projections of the proposed project provided by the firm and assessment and analysis of the same done by us.*

PART B — INTRODUCTION

1. ABOUT THE REPORT:

This is a Techno-Economic Viability Study Report of the proposed compressed biogas plant (Bio-CNG, 5,000 kg/day) at Khasra No. 740, Village Tughalpur, Laksar, Haridwar, Uttarakhand 247663, setup by M/s Naruma Industries Private Limited.

2. EXECUTIVE SUMMARY:

M/s Naruma Industries Private Limited, established on 1st June 2022 under the Company's Act, 2013 as per the certificate of incorporation shared by the client for the establishment of Waste to Energy Management based on the waste and residual organic substances from Urban, Industrial and Agricultural activities of Rural INDIA, such as Municipal Waste, Farm Residue, Vegetable Food Waste, Cattle Dung, Sugarcane Press mud, Napier Grass etc.,

The promoters of the company are Mr. Vanshaj Gupta and Mr. Rishabh Gupta who come from a business family and both are brothers in relation. They have conceived this Project to reap out the growing demand of Bio-CNG in the transport sector due to the phased mandatory blending of compressed biogas (CBG) in compressed natural gas (CNG) which has been announced by the Government of India in the recent Interim budget of FY 2024-25. The subject project is part of the Govt. initiative "Swachh Bharat Abhiyan" and for providing green energy.

M/s Naruma Industries Private Limited has proposed to set up this Greenfield project at Laksar, Haridwar in Uttarakhand, for the production of 5,000 Kg (7000 M3)/ Day of Bio-CNG (compressed biogas) along with 30 Ton/day of fermented solid organic fertilizer & 90 KL/ Day of fermented Liquid Fertilizer which will be sold as value added by-products. The Bio-CNG plant is proposed to be setup with total investment of INR 3,200.00 Lakhs.

Proposed Biogas Plant Capacity			
Sr. No.	**PARTICUALR**	**Capacity**	**Unit**
1	Bio-CNG Plant Design Capacity	14,100	M3/Day
2	Biogas Plant Generation (Design Capacity x 90 %)	12,700	M3/Day
3	Bio-CNG Plant Capacity	5,000	kg/Day
4	Fermented solid organic fertilizer	30,000	Kg/day

5	Fermented Liquid Fertilizer	90,000	L/day

Source: DPR/data/information provided by the company

For the sale of the produced CBG, the company has already secured a purchase agreement/ LOI from Indian Oil Corporation limited under SATAT initiative to promote Compressed Bio-Gas as an alternative, green transport fuel. ***(Ref No.: Indian Oil/SATAT/01/3646 Date: 02.01.2024).***

The project is proposed to be commissioned based on the CSTR mesophilic bio-methanation technology, which will be a semi-automatic plant i.e. 80% mechanical and 20% manual. For the purpose of establishing the Plant, company has appointed Ahmadabad-based solution provider M/s Jog Waste To Energy Pvt Ltd. as an EPC consultant as per the contract agreement dated 23rd December 2023 shared with us by the client.

As per the scope of work mentioned in the contract agreement, M/s Jog Waste to Energy Pvt Ltd. will be providing its services for Civil & Structural engineering required for the plant, supply of Machinery/Equipment as per scope, Installation, commissioning, testing and two months training. Layout plan has been prepared by the architect Mr Amit Chauhan (*CA/99/25096*) which is approved by Engineer and Additional Chief Officer, District Panchayat, Haridwar.

As shown in the below table, the cost of the proposed project from scratch to trial run is being estimated as INR 3,200 lakhs, which is proposed to be funded through promoter's margin of INR 1,000 lakhs and bank loan of INR 2,200 lakhs. Working capital requirements will be met through a WC loan of INR 50.00 lakhs. Project cost breakup is shown in later section of the report.

As per the sale deed shared by the client/company, the promoters have purchased 2.2540 hectares (22,540 sq. m.) of land at Khata Number 193, Khasra No. 740, Village Tughalpur, Paragna Goverdhanpur, Tehsil-Laksar, District Haridwar, Uttarakhand, -247663. This land has been leased out by the promoters in the name of the company for 29 years as per the shared lease deed. Change of land use (CLU) has been approved by Sub Divisional Magistrate, Laksar on 22nd August 2022, for setting up the proposed Bio-CNG plant.

As per data/information provided to us, the company has obtained some Statutory Approvals/NOC's such as NOC from village panchayat, Single window clearance, Pollution Certificate, PESO, Sanctioned Map approval, Fire NOC etc. from the respective authorities *(Refer the section Statutory Approval in the later part of the report).*

During the site visit, we found that the proposed land is a vacant land which is not demarcated and work on the Project has not been started yet. As per informed by client, land development work will start soon. (*Kindly refer the site pictures captured during the survey attached in the later section of the report).*

The plant needs about 500 kWh of power and 2 lakhs Litre/ day of water to meet process energy requirement. Currently, the company is in the process to apply for power load connection and ground water extraction approval. Company has planned to achieve the C.O.D by 1st April 2025.

At present, the company is in discussion with bank to fund the project through a term loan of INR 2,200 lakhs. In this regard Punjab National Bank, CBB Dehradun has appointed R.K. associates to assess the Techno-Economic Viability of the proposed Bio-CNG production plant at Tehsil-Laksar, Haridwar, Uttarakhand, -247663. The company plans to achieve the financial closure by April, 2024 (expected).

3. **PURPOSE OF THE REPORT:** To assess Project's Technical and Financial Feasibility for lender's requirement.

4. **SCOPE OF THE REPORT:** To only assess, evaluate & comment on Technical & Financial Feasibility of the proposed Bio-CNG generating plant being set up by M/s Naruma Industries Pvt Ltd as per the information provided by the company.

NOTES:

- *Project status is taken as per the Site inspection carried out by our survey team.*
- *Scrutiny about the company, background check, and credibility, credit worthiness of the company or its promoters is out-of-scope of this report.*
- *Any verification of the documents/ information from originals/ source is out-of-scope of this report.*
- *This report is only an opinion in respect to Technical and Financial Feasibility of the project as per the future Projections provided by the firm and independent analysis done by us and doesn't contains any recommendations including taking decision on the loan or any other financial exposure.*
- *This is not an audit activity of any kind. We have relied upon the data/ information shared by the company in good faith.*
- *Any review of the existing business of the promoters is out of scope of this report.*
- *Detailed cost estimation or detailed cost vetting is out of scope of the project.*

- *This is not a Detailed Project Report or a detailed design or architecture document. Land and property details mentioned in the report is only for illustration purpose as per the information provided to us by the client. The same doesn't tantamount for taking any responsibility regarding its legality, ownership and conforming to statutory norms.*

5. METHODOLOGY/ MODEL ADOPTED:

a. Data/ Information collection.
b. Review of Data/ Information collected related to TEV study.
c. Independent review & assessment of technology used and financial projections provided by the company.
d. Projections of Revenue, P&L, Balance Sheet, Working Capital Schedule, Depreciation Schedule, Loan Schedule as per the inputs given by the company and assessed by us
e. Calculation of key financial indicators and ratio analysis including DSCR, NPV & IRR and payback period of the project.
f. Report compilation and Final conclusion.

6. DATA/ INFORMATION RECEIVED FROM:

All the data/Information has been received from Mr. Vanshaj Gupta (Director) and the required details about him shown in the below table:

Particulars	Details
Designation	Director
Company	M/s Naruma Industries Pvt Ltd
Email Address	naruma.ena@gmail.com
Contact No.	+91-9766543977

7. DOCUMENTS / DATA REFFERED:

a. Detailed Project Report and Promoters Profile
b. Financial Projections of the proposed Bio CNG generating project.
c. Production flow chart,
d. Product profile along with Pricing Strategy etc.
e. List of expected Raw Material Suppliers.
f. Selling, Marketing & Distribution Plan, LOI with the OMC.
g. Approved Sit/Layout Plan, Sale/Lease deed of the land
h. Contract agreement with EPC consultant along with details of Plant & Machinery.
i. Certificates of Statutory approvals/NOC's.
j. Survey Report conducted at the site.

PART C	COMPANY PROFILE

1. COMPANY OVERVIEW:

As per certificate of incorporation shared by the client/company, M/s Naruma Industries Pvt Ltd was incorporated on June 1, 2022 as per the Companies Act, 2013 as an unlisted company limited by shares. As per Memorandum of Association (MoA), the company is incorporated with the objective to carry on the business to produce, market, sell, supply, distribute and dealing in all kinds of bio-gas, Bio-CNG likes or containing a mixture of H2S, CH4, hydrocarbon, and CO2 from agricultural residue, Ethanol and manure as well as dealing its by-products like biomass pellets and organic fertilizers. Below table shows the incorporation details of the company:

Incorporation Details of the Company	
Particular	**Description**
Company / LLP Name	M/s Naruma Industries Pvt Ltd
Date of Incorporation	1st June 2022
CIN	U24299UR2022PTC014131
Company Category	Unlisted Company limited by Share
Company Subcategory	Non-govt. company
ROC	Uttarakhand
Registered Address	House No. 46, Gandhi Ashram Wali Gali, Kankhal, Haridwar, Uttarakhand, India, 249408
Authorized Capital	INR 2,00,000/-
Paid up Capital	INR 2,00,000/-

The company is categorised as micro enterprise with Udyam Registration Number *UDYAM-UK-06-0035781*. The promoters of the company are Mr. Vanshaj Gupta (DIN: 09626875) and Mr. Rishabh Gupta (DIN: 09626874) whom are also appointed as Directors of the company.

Both are the major shareholders of the company by holding 50%-50% shares in the company. In this company, the promoters have proposed to setup 5,000 Kg (7000 M3)/ Day of Bio-CNG (compressed biogas) along with 30 Ton/day of fermented solid organic fertilizer & 90 KL/ Day of fermented Liquid Fertilizer.

2. KEY PROMOTER'S/DIRECTORS PROFILE:

Mr. Vanshaj Gupta and Mr. Rishabh Gupta are the promoters and directors of M/s Naruma Industries Private Limited. Currently, Mr. Vanshaj Gupta and Mr. Rishabh Gupta are looking after their Family business, which is Gupta Ji Jewellers and Mahadev Mine Minerals.

As a young entrepreneur, Mr. Vanshaj Gupta and Mr. Rishabh Gupta planned to enter into the new business domain i.e. setting up the Bio-CNG (CBG) generating plant at Lashkar, Haridwar after considering the initiatives of Government of India such as Ministry of Petroleum And Natural Gas is promoting the issuance of Letter of Intent (LOI) through OMCs to the Compressed Bio-Gas (CBG) Entrepreneur (producer) under the Sustainable Alternative towards Affordable Transportation (SATAT) scheme towards achieving the target for setting up of 5000 Compressed Biogas (CBG) plants for the production of 15 million Metric tons (MMT) per annum of CBG by 2023-24.

As a new entrant, they have made an agreement with an EPC consultant (M/s Jog Waste to Energy Pvt Ltd), who will be setting up the proposed plant from scratch to trail run along with 2 months of training. As per data/information provided to us, below table illustrate the educational & professional experience of the promoters along with the DIN and contact details:

(A) Directors/Promoters Details					
Name	**DIN**	**Age**	**Address**	**Designation**	**Contact Details**
Mr. Vanshaj Gupta	09626875	32	H.NO – 46, Vishnu Garden, Gandhi Ashram, Kankhal, Haridwar, Uttarakhand - 249408	Director	+91-9766543977 naruma.ena@gmail.com
Mr. Rishabh Gupta	09626874	30		Director	+91- 8859999667 naruma.ena@gmail.com
(B) Education & Experience					
Mr. Vanshaj Gupta	• Appointed as Director on 1st June 2022. • As per data/information shared by the client, Mr. Vanshaj Gupta is an alumnus of Institute of Hotel Management Aurangabad (Taj Group). He started his early career working in Taj Hotels Resorts and Palaces and later on in Marriott Hotels and Resorts.				

	• Mr. Vanshaj Gupta and Mr. Rishabh Gupta are also the Co-owners of Gupta Ji Jewellers, Haridwar. They have a big jewellery store in the city and they deal in the production and assortment of Silver, Gemstone, Diamond and Gold Jewellery. • Currently Mr. Vanshaj Gupta is looking after his Family business, which is Gupta Ji Jewellers and Mahadev Mine Minerals.
Mr. Rishabh Gupta	• Appointed as Director on 1st June 2022. • As per data/information shared by the client, Mr. Rishabh Gupta is an alumnus of Amity University Noida and EMDI Institute of Media Communication India. He started his early career as a freelancer and has done most of the successful events with PERCEPT Media, VIACOM, Lakshya Media, Tiger Productions, Mudrush event, FIFA India, Indian Premier League, YouTube fan fest and many more. • Currently Mr. Rishabh Gupta is looking after his Family business with his elder brother, which is Gupta Ji Jewellers and Mahadev Mine Minerals.

Source: *Data/ Information provided by the company*

PART D	PROPOSED INFRASTRUCTURE DETAILS

1. PROPOSED PLANT LOCATION:

The proposed Bio-CNG generating plant will be set up by M/s Naruma Industries Private Limited at Khata Number 193, Khasra No. 740, Village Tughalpur, Paragna Goverdhanpur, Tehsil-Laksar, District Haridwar, Uttarakhand 247663, which is spread over an area of 2.2540 hectare (22,540 Square meter) as per the lease deed provided to us by the company.

The required raw material availability is the advantage of the proposed location as many Sugar mill are situated near by the location as shown in the below table:

S. No.	Name of the Sugar Mill	Distance from location
1.	R. B. N. S. Sugar Mill Laksar, P2WH+WHW, Shekhpuri, Laksar, Uttarakhand 247663	~18 km away from the plant
2.	Rohana Sugar Mill, Shop No- 12, Amrit Inter College G.T Road, Rohana Mill Meerut, Uttar Pradesh 251202	~40 km away from the plant
3.	Uttam Sugar Mill Manglore, Lahboli - Mandawli Road, Lahvauli, Mundyaki, Uttarakhand 247656	~28 km away from the plant

Source: *Google Map*

During the site visit we found that the property is merged with adjacent plots and not demarcated till the date of survey done by us. The property is having the proximity to the civic amenities such as hospital is situated ~5 km away and market is situated ~10 km away from the proposed plant location.

Table: 1 is showing the details of the adjoining properties of the land for proposed CBG plant and Table: 2 is showing the Connectivity Details of the Proposed Location:

Table: 1 Adjoining Property Details	
Location	**Details**
East	Chakroad & Solar Power Plant
West	Drainage & Other agricultural land
North	Land of others
South	Road 15 ft. wide

Table: 2 Connectivity Details of the Proposed Location	
Connectivity	**Details**
Road	Laksar - Muzaffarnagar Road - ~4 km away
Rail	Laksar Junction - ~20 km away
Airport	Jolly Grant Airport – Dehradun - ~90 km away

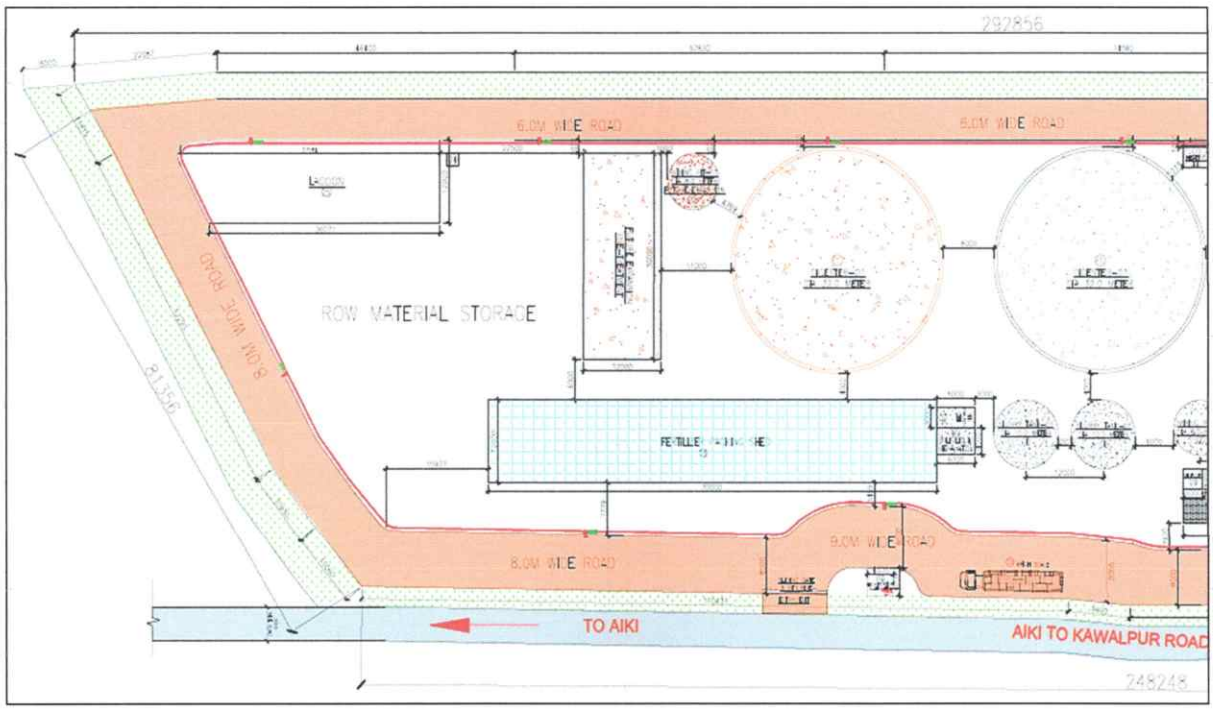
2. LOCATION MAP:

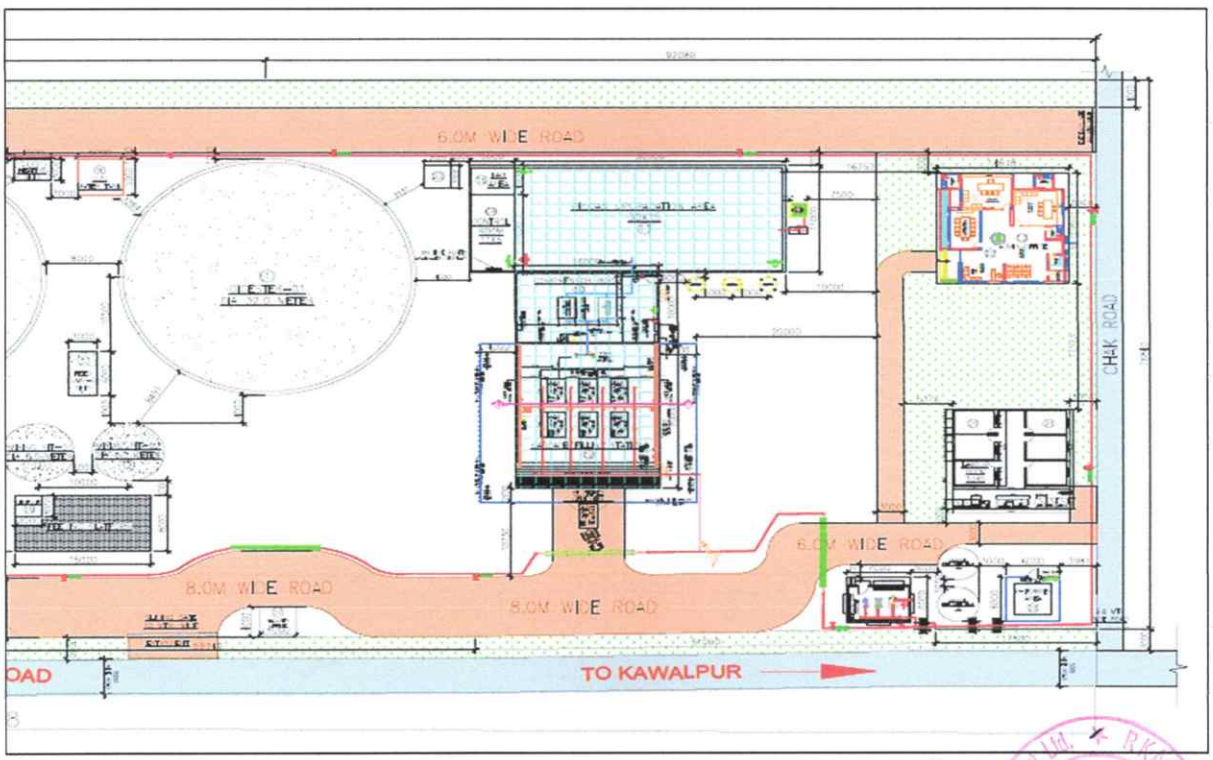
a) **Google Map Location**: The Bio-CNG plant is proposed to be commissioned at Khata Number 193, Khasra No. 740, Village Tughalpur, Paragna Goverdhanpur, Tehsil-Laksar, District Haridwar, Uttarakhand 247663 with GPS coordinates 29°37'25.6" North and 77°59'36.7" East as per the Google map attached below:

b) **Google Map Layout:** Demarcation of the land with approximate measurement on the Google map is attached in the below picture:

3. LAYOUT PLAN:

As per the data/information provided by the client/Company, the layout plan has been prepared by the architect Mr. Amit Chauhan (*Reg. CA/99/25096*) which is approved by Additional Chief Officer, District Panchayat, Haridwar. For reference, approved layout plan has been attached below:





4. LAND DETAILS:

The proposed Bio-CNG plant needs a total of about 22,267 Sq. Mt. land area for Project implementation. As per the sale deed executed on 29th June 2022, promoters of the Company has purchased a 2.2540 hectare (22,540 Sq. Mt.) land at Khasra No. 740, Village Tughalpur, Paragna Goverdhanpur, Tehsil-Laksar, District Haridwar, Uttarakhand 247663 in INR 29,60,000.

This land has been leased out by the promoters in the name of M/s Naruma Industries Private Limited for a period of 29 years on an annual lease rental of INR 12,000/annum (excluding all other charges) through an executed lease deed on 23rd August 2022. Change of land use (CLU) has been approved by Sub Divisional Magistrate, Laksar on 22nd August 2022, for setting up the proposed Bio-CNG plant.

During the site visit on 11th March 2024, we found it as a vacant land which was merged with the adjacent plots and the approach road which connects to the main road is narrow/ kuchcha road of 15 ft. wide. However, the representative informed that a formal letter in this regard has been posted to the Gram Panchayat to ensure the road widening. As informed by the client, they will start the demarcation and land development work after the sanction of term loan.

5. SITE PICTURES: Site pictures were captured during the site survey on 11th March 2024, for reference few of the pictures are attached below:

6. BUILDING & CIVIL WORKS:

The Bio-CNG generating facility is proposed to be commissioned through appointment of the EPC consultant. Company has executed a contract agreement on 23rd December 2023 and appointed M/s Jog Waste to energy Pvt Ltd as EPC consultant for implementation of the proposed plant. As per the scope of the agreement, EPC consultant will be supplying all civil & structural engineering required for the proposed plant.

According to the approved layout plan, the plant would be spreading over an area of 22,267 Sq. Mt. out of which ~600 Sq. Mt. is required for covered shed for Fertilizer Processing and storage in off season, ~3663 Sq. Mt. is required for open area for locating the hydrolysis

tanks, biogas digester tank, and sludge separator filter, besides connecting roads. About ~930 Sq. Mt. of built up area is required to house the technical buildings including MPSA separation plant and Bio CNG Compressor.

As per informed by the client/Company ~12,330 Sq. Mt. is reserved for Green Belt and future expansion. Detailed bifurcation of the proposed Building & Civil works has been shown in the below table along with the estimated cost:

Proposed Building & Civil Works					
S. No.	**Capital Cost Head**	**Area**	**Units**	**Unit Rate**	**Amount (INR)**
1	**Building**				
A	Admin Office	225	SQMT	1,400	3,15,000
B	Shed for Filling header with cylinder cascade	320	SQMT	6,700	21,44,000
C	Way Bridge cum Security Room	16	SQMT	7,500	1,20,000
D	Gate	3	No.	2,25,000	6,75,000
E	Boundary (Total Length 700Mtr.)	700	Mtr.	6,700	46,90,000
F	Internal Road 6 + 2 (Open Space) Mtr Wide) Length-625 Mtr	5,000	SQMT	1,100	55,00,000
G	Feed Preparation Platform with Pump	350	SQMT	2,800	9,80,000
H	Feed Mixing Tank (2 x300 CUM)	600	CUMT	5,000	30,00,000
I	Machinery Shed (Purification and Compressor)	610	SQMT	6,700	40,87,000
J	Main Digester (Dia 32 Mtr.)	7,234	CUMT	2,450	1,77,23,300
K	Main Digester (Dia 32 Mtr.)	7,234	CUMT	2,450	1,77,23,300
L	Underground Water/ Slurry Storage	100	CUMT	5,000	5,00,000
M	Solid Liquid Separator Platform	24	SQMT	10,000	2,40,000
N	Fertilizer Shed with Packing	600	SQMT	6,700	40,20,000
O	Digested Slurry Tank	400	CUMT	5,000	20,00,000
P	Lagoon	552	SQMT	1,000	5,52,000
Q	Technical room/panel room + Lab Area + Security Office	91	SQMT	9,000	8,19,000
R	Staff Room with Kitchen, Bathroom (3 BHK House)	225	SQMT	15,000	33,75,000
S	Labours Rooms	165	SQMT	10,000	16,50,000

T	Toilet Block + parcking	20	SQMT	6,500	1,30,000
	Sub Total				**7,02,43,600**
2	**Equipment Foundations**				
A	Gas Purification & Compressor Unit	519	SQMT	1,000	5,19,000
B	Agitator	150	SQMT	1,000	1,50,000
C	Technical Room	76	SQMT	1,000	76,000
D	Feeding Pump	100	SQMT	1,000	1,00,000
E	Ladder	238	SQMT	4,000	9,52,000
F	Heating System	12	SQMT	1,500	18,000
G	Solid Liquid Separator	36	SQMT	3,500	1,26,000
H	Drawing, Design, Architectural, Work	1	LOT	1,00,000	1,00,000
	Sub Total				**20,41,000**
3	**Building Service**				
A	Bore well with Motor, Piping and Pump	1	SET	2,87,400	2,87,400
B	Potable Water day Storage (1500 L)	2000	Litre.	6	12,000
	Sub Total				**2,99,400**
	Total Cost				**7,25,84,000**
4	**Applicable GST**				
A	**GST on Bio-Gas plant**	**12**	**%**		**87,10,080**
	Total For Civil Works				**INR 8,12,94,080**

***Sources**: Data/Information provided by the client.*

As per the above table, the estimated cost of the Building & Civil works is ~INR 812.00 lakhs including applicable 12% GST. As per the Cost vetting report shared by the client, the estimated cost has been verified by AR. Amit Kumar Chauhan *(Ref: Regd. Valuer F-20584, Panel Valuer (L.I.C) – DDV0017 Regd. No. -4/2023-14).*

However, as a TEV consultant, the estimated Building & Civil works cost has been verified independently by us, which we found reasonable & in the permissible range also the cost may change as per specifications & material brand.

7. PLANT & MACHINERY/ EQUIPMENTS DETAILS:

As per the contract agreement executed on 23rd December 2023 with EPC consultant, M/s Jog Waste to energy Pvt Ltd will be supplying all the required Plant & Machinery and equipment excluding miscellaneous assets as per scope of work of the agreement.

As per the contract, the cost of Waste & Bio-CNG handling equipment such as Tractor with loader, Tractor & Trolley and CNG transport vehicles will be borne by the Company separately. Detailed bifurcation of the proposed Plant & Machinery has been shown in the below table along with the estimated cost:

Proposed Plant & Machinery					
S. No.	**Capital Cost Head**	**QTY.**	**Units**	**Unit Rate**	**Amount (INR)**
1	**Biomass Handling Facility**				
A	Weighbridge & other equip.	1	SET	8,25,000	8,25,000
	Sub Total				**8,25,000**
2	**Waste and Bio-CNG handling Equipment**				
A	Tractor with loader	1	SET	11,75,000	11,75,000
B	Tractor and trolley	1	SET	10,60,000	10,60,000
C	CNG Transport vehicle	2	SET	24,35,000	48,70,000
	Sub Total				**71,05,000**
3	**Equipment/ Machinery For Feed Mixing Tank**				
A	Top Entry Type Agitator 15 HP/Variable RPM	15 X 2	HP	N/A	N/A
B	SS Bar Grill	2	SET	N/A	N/A
C	Platform mixing tank	2	SET	N/A	N/A
D	Valves	2	SET	N/A	N/A
E	Flanges	4	SET	N/A	N/A
	Sub Total	**2**	**Nos**	**35,14,000**	**70,28,000**
4	**Pumping Equipment & Grinder**				
A	Screw Pump for Slurry transfer	3	SET	N/A	N/A
B	Grinder	1	SET	N/A	N/A

C	Piping & Valves	1	SET	N/A	N/A
	Sub Total				**75,25,000**
5	**Equipment/ Machinery For Digester Tank**				
A	Heating System	2	SET	N/A	N/A
B	Side Entry Agitators For mixing and circulation	**12**	SET	N/A	N/A
D	Heating System Valves	**2**	SET	N/A	N/A
E	Manual Valves	**4**	SET	N/A	N/A
F	Flanges	**4**	SET	N/A	N/A
G	Wall Flanges	**8**	SET	N/A	N/A
H	Pipes	**2**	SET	N/A	N/A
I	Pipe fittings	**2**	SET	N/A	N/A
J	Inspection Window	**4**	SET	N/A	N/A
K	Other Fitting & Fixtures	**2**	SET	N/A	N/A
	Sub Total	**2**	**SET**	**1,80,00,000**	**3,60,00,000**
6	**Double Membrane Digester Roof/Balloon**				
A	Spider Ring	**2**	SET	**45,50,000**	**91,00,000**
B	Nylon Belts		SET		
C	Nylon Rope Net		SET		
D	Both side PVC coated fabric/Balloon -2 Set		SET		
E	Under Pressure protection & over pressure Valve-2 Set		SET		
	Sub Total				**91,00,000**
7	**Equipment/ Machinery For Fertilizer Tank**				
A	Top Entry Agitator	1	SET	N/A	N/A
B	Pump for slurry Transfer	1	SET	N/A	N/A
C	Auto Valves	1	SET	N/A	N/A
D	Manual Valves	1	SET	N/A	N/A
E	Flanges	2	SET	N/A	N/A
F	Wall mounting Flanges	1	SET	N/A	N/A

G	Fitting Material of Flanges	2	SET	N/A	N/A
	Sub Total	**2**	**SET**	**35,50,000**	**71,00,000**
8	**700 m3/hr Catalyst Tower based H2S Removal system (H2S <= 1500 ppm)**				
A	H2S Removal System	1	SET	NA	NA
B	Accessories	Lump sum	Sum	NA	NA
	Sub Total				**65,50,000**
9	**700 M3 /hr Biogas Up gradation Plant as per given scope of supply 4 Tower Based systems**				
A	Roots Blower	1	SET	N/A	N/A
B	700 m3/hr Biogas Moisture removal system Heat exchanger with moisture separator	1	SET	N/A	N/A
C	700 m3/hr Four Towers (Composite bed) VPSA Unit for removal of H2O, CO2 with Surge vessel and inter connected piping and valves & Instruments for safe operation of the plant	1	SET	N/A	N/A
D	Vacuum Pump with FLP Motor	1	SET	N/A	N/A
E	Bio-CNG Surge tank	1	SET	N/A	N/A
F	BIOCNG Storage Tank	1	SET	N/A	N/A
	Sub Total				**2,40,00,000**
10	**350 M3/hr Recovery System - 2 Tower Based System**				
A	350 m3 per hr Methane Recovery System	1	SET	N/A	N/A
B	Single membrane Balloon/Biogas Tank	1	SET	N/A	N/A
	Sub Total				**85,50,000**
11	**350-400 m3/hr Bio-CNG Booster compressor**				
A	350-400 m3/hr Biogas Booster compressors for Providing 250 bar pressure at outlet.	1	SET	**N/A**	**N/A**
B	High pressure Fittings	1	SET	**N/A**	**N/A**
C	High Pressure line up to Compressor to Cascade	1	SET	**N/A**	**N/A**
D	Other High pressure accessories	1	SET	**N/A**	**N/A**
	Sub Total	**1**		**1,45,00,000**	**1,45,00,000**

12	**BIOCNG Filling header**				
A	CNG cylinder Filling Header	1	SET	**N/A**	**N/A**
	Sub Total				**9,50,000**
13	**Bio-CNG Storage**				
A	40 Cylinder Cascade	5	SET	18,50,000	92,50,000
	Sub Total				**92,50,000**
14	**Electrical ,Instrumentation & Control Panel etc.**				
A	Electrical Control panel	1	SET	N/A	N/A
B	Electrical Wiring, Bus Bar, Joints, Protectors, Earthling etc.	1	SET	N/A	N/A
C	PLC Control panel, Power panel, Cable for all these from field to panel room	1	SET	N/A	N/A
	Sub Total				**81,65,000**
15	**Automation Elements**				
A	Pressure & temperature measuring system	1	SET	N/A	N/A
B	Flow measuring system	1	SET	N/A	N/A
C	Automatic valves for Biogas line and slurry line	1	SET	N/A	N/A
D	PH sensor ,Level sensor, Ammonia sensor	1	SET	N/A	N/A
E	Methane leak detection and alarm system	1	SET	N/A	N/A
	Sub Total				**78,21,000**
16	**Electrical & Electronics Requirements**				
A	Electrical distribution panel	1	SET	N/A	N/A
C	Grid Transformer/LBS/HTMC for Plant	1	SET	N/A	N/A
D	DG Set FOR Backup Power 10 kVA	1	SET	N/A	N/A
E	Cables	1	SET	N/A	N/A
F	Earthings	20	SET	N/A	N/A
	Sub Total				**85,20,000**
17	**Organic Fertilizer Plant**				
A	Solid/ Liquid Fertilizer Separator Unit	2	SET	31,00,000	62,00,000

B	Fertilizer Unit bagging system and accessories	1	SET	71,50,000	71,50,000
C	Liquid Fertiliser Filling System	1	SET	51,50,000	51,50,000
	Sub Total				**1,85,00,000**
18	**Other Important Items**				
A	Product Gas Analysers Online gas Monitoring system with Analyser for H2S,CH4,O2,Co2 Online dew point meter (Optional)	1	SET	10,50,000	10,50,000
C	Laboratory and Analytical Equipment	1	SET	7,00,000	7,00,000
B	Annual Operational Spares	1	LOT	25,80,000	25,80,000
D	Fire Fitting Equipment	1	SET	41,00,000	41,00,000
	Sub Total				**84,30,000**
19	Clearing Forwarding, Handling & Freight Cost				**27,42,000**
	Sub Total				**19,26,61,000**
20	GST on Plant and Machinery	12	%	2,31,19,320	2,31,19,320
Grand Total		**INR 21,57,80,320**			

Source: *Data/information provided by the client.*

Thus the estimated cost for plant & machinery will be ~INR 2,158.00 lakhs including the applicable GST of 12%. The estimated cost of the Plant & Machinery has been provided to us by the client as per the mutually signed MOU agreement. However, as a TEV consultant the cost of major plant & machinery has been verified by us independently, which we found reasonable & in the permissible range although the cost may change as per specifications & brand.

8. MISCELLANEOUS ASSETS:

Apart from the major plant machinery and equipment, few miscellaneous assets are also proposed by the company to run the unit smoothly. Detailed bifurcation of the proposed miscellaneous assets has been shown in the below table along with the estimated cost:

Proposed Miscellaneous Assets					
S. No.	**Capital Cost Head**	**QTY.**	**UNITS**	**UNIT RATE**	**Amount (INR)**
1	**Office Equipment & Furniture**				

A	Computer at factory	2	No.	45,000	90,000
B	Multifunction laser printer at factory	1	No.	25,000	25,000
C	AC for factory 1.5 Ton	2	No.	47,000	94,000
D	CCTV Camera system	1	SET	1,20,000	1,20,000
E	Table chair set	2	SET	50,000	1,00,000
F	Conference chair and table set	1	SET	1,25,000	1,25,000
G	Provision for others	1	SET	46,000	46,000
	Total For Misc. Assets				**6,00,000**

Source: *Data/information provided by the client.*

9. **UTILITIES:** Details of Water, Electricity and other utilities are describes as below:

a. WATER:

Company has taken the "No Objection Certificate" for groundwater extraction on 19th March 2024 (*Ref: CGWA/NOC/IND/ORIG/2024/20044*), which permits the Company to extract 80 m³ water per day. As informed by client, the water supply of local Jal Board is also available.

The total requirement of the plant will be ~2 lakh Litre per day. As per the data/information provided by the client, ~4 lakh litre water will be required to initiate the plant for dilution of first charge. Out of which ~2.28 lakh litre water can be recycled and use for the plant as shown in the below table.

Expected Water Consumption	
Particular	**Quantity**
Initial water for dilution of first charge	4,28,000 L
Daily Recycled Water	2,28,000 L
Total water requirement	2,00,000 L/day

Source: *Data/information provided by the client.*

b. ELECTRICITY:

As per the data/information provided to us by the client, Company has applied for sanction of 800 KVA power load. Supply of AC power 415 V, 50 Hz, 3P & N required to

run the plant, for consumption of different components of the unit as described in the bellow table:

Parasitic Consumption Of Power	
Particular	**Required Power**
Load of Biogas Section	200 KWh
Load of Biogas Up-gradation Section & Recovery	140 KWh
Load of auxiliaries at Bio-CNG Unit	40 KWh
Load of Bio-CNG Compression Unit	120 KWh
Total	500 KWh
Running Load	**380 KWh**

Source: *Data/information provided by the client.*

The estimated connected load requirement would be 800 KVA out of which the total running load would be 500 KVA, the total Power consumption per daywill be 6080 kWh.

Thus, ~INR 6.40 Crore per ton will be the CAPEX for the proposed Bio-CNG generating plant including GST, pre-operative and preliminary expenses, transportation costs, Operating & Maintenance expenses up to 1 year and laboratory charges, convey vehicle etc. considering the fact that the plant would be commissioned by the appointed EPC contractor from scratch to the successful trial run and the cost of setting up the plant is as per the contract agreement signed between the Company & EPC contractor.

However as a TEV consultant we have verified the all the major costs which we found reasonable & in the permissible range as per the tertiary research done by us, data/information available in the public domain and information provided by the third party consultants/vendors. (*Ref:* https://pib.gov.in/PressReleasePage.aspx?PRID=1868887).

Asia's largest Compressed Bio Gas (CBG) plant inaugurated in Sangrur on 18th Oct 2022 by Ministry of Petroleum & Natural Gas. The Plant was commissioned with an FDI investment of ~INR 220 crores, which is spread over an area of 20 acres. The installed capacity of the plant is 33 TPD. The capital expenditure of the plant is ~INR 6.67 Crore per ton. Some of the other references are shown in the below table:

Reference for Bio Gas Plant			
S. No.	**Name of the Party**	**Contact details**	**Remarks**

1.	M/s Jog Waste to Energy Pvt Ltd	info@jogwte.com +91 9723269295 www.jogwte.com	• As per JOGWTE, the average installation cost as per EPC basis from scratch to successful trial run would be ranging INR 5.5-6.5 Crore per ton including preliminary and pre-operative expenses and other contingent costs.
2.	The Global Green Growth Institute, GGGI India	nishant.bhardwaj@gggi.org	• As per information provided by GGGI, The capital expenditure (CAPEX) for a typical 8-10 TPD Bio-CNG plant varies from INR 32-50 Crore which varies based on the type of biomass feedstock and technology deployed. • It has been estimated that the plant and machinery costs contributes ~76% of CAPEX. (Excluding preliminary and pre-operative expenses and excluding all other costs such as engineering, consultancy, installation costs etc. i.e. EPC Costs)
3.	Ministry of New & Renewable energy	MNRE	• The economics of a CBG plant can vary depending on various factors such as the scale of the plant, technology used, feedstock cost, government incentives and market demand for CBG. • ~INR 20-25 crore is the cost of installing a 5 TPD capacity CBG plant, while ~75-80% of the CAPEX cost is for purchasing plant machinery.
4.	Others vendors	On the public domain	• CSTR technology which is flexible for all types of organic wastes including mixed wastes. Capital cost for this technology is approximately INR 4-6 Crore per ton including all the costs from scratch to Successful trial run.

PART E — PROJECT TECHNICAL DETAILS

1. CAPACITY OF THE PROPOSED BIO-CNG UNIT:

This Bio-CNG generating plant is proposed to be set up with a designed capacity of 14,100 M3/Day to generate the 5,000 kg/day bio CNG along with 30 Ton/Day of solid organic fertilizer, and 90,000 Litre/day of liquid fertilizer as illustrated in the below table:

Capacity of the proposed Bio-CNG plant	
Particular	**Capacity**
Bio-CNG Plant Design Capacity	14,100 M3/Day
Biogas Plant Generation (Design Capacity x 90 %)	12,700 M3/Day
Bio-CNG Plant Capacity	5,000 kg/Day
Compost Plant Capacity	30,000 kg/Day
Liquid Fertilizer Concentrate Capacity	90,000 L/day

Source: *Data/information provided by the client.*

2. PRODUCTION PROCESS OF BIO CNG (CBG):

OVERVIEW:

Biogas is commercially produced by a process called anaerobic digestion. The process involves breakdown of organic waste materials such as animal waste, food waste and industrial sludge to produce biogas and digestate. The latter is further treated to be used as a fertilizer. Anaerobic digestion process is carried out in a sealed, oxygen-free tank, also called an anaerobic digester.

The biogas produced is subjected to scrubbing, upgradation and compression processes to produce Bio-CNG (CBG). The present organic waste to biogas system operates in a thermophilic process in continuous stirred tank reactor.

Bio-CNG or bio-compressed natural gas, also known as sustainable natural gas or bio methane, is a biogas which has been upgraded to a quality similar to fossil natural gas and having a methane concentration of 90% or greater. The process of bio-methanation consist of four steps i.e. Hydrolysis, Acidogenesis, Acetogenesis and Methanogenesis as described below:

a) HYDROLYSIS:

In the first step of hydrolysis, the pulped material is sent to the Hydrolysis Tank, where the organic matter is enzymolyzed externally by extra cellular enzymes such as cellulose, amylase, protease and lipase etc. of microorganisms. The pulveriser stimulates this step by converting solid waste into liquid form.

Bacteria start decomposition of the long chain of the complex carbohydrates, proteins and lipids into shorter parts. Proteins are split into peptides and amino acids and fats into fatty alcohols. Hydrolysis occurs in the two hydrolysis tanks which are maintained at a high temperature and provided with insulation.

Various types of bacteria are involved in the remaining three processes which occur in the two digester tanks, which are likewise maintained at high temperature with insulation and continuously stirred.

b) ACEDOGENESIS:

Acid-producing bacteria involved in the second step convert the intermediates of fermenting bacteria into volatile fatty acids along with ammonia (NH3), hydrogen sulphide (H2S) and Carbon-dioxide (CO2). The pH of the raw slurry falls from 7.5 to about (4.5 to 5.5) in this stage.

c) ACETOGENESIS:

In Acetogenesis, bacteria which are aerobic and facultatively anaerobic, and can grow under acidic conditions, produce acetic acid, during which they use the oxygen dissolved in the solution or bounded oxygen. These bacteria largely convert the products of Acidogenesis into acetic acid (CH3COOH) carbon-di-oxide (CO2) hydrogen (H2) and traces of methane. Various zones are formed in fermentation pond and different bacteria dominate these zones.

d) METHANOGENESIS:

A consortium of archaebacteria belonging to methanococcus group is involved in the fourth step and decomposes compounds with a low molecular weight. They occur to the extent that anaerobic conditions are provided, for instance under water (in marine sediments), in ruminant's stomach and in marshes. They are obligate anaerobic and very sensitive to environmental changes. They have very heterogeneous morphology

and a number of common biochemical and molecular-biological properties that distinguish them from all other bacteria.

The heat used for maintaining the temperature of the slurry in the hydrolysis tank and the digester tank is recovered in a cooling tank with the help of a heat pump coupled to heat exchangers. The undigested lingo-cellulosic and hemi-cellulosic materials are then passed to the sludge separator which recovers solid organic fertilizer from it. This fertilizer is dried packed and sold to the farming community.

e) BIOGAS GENERATION:

The biogas produced is a mixture of methane, carbon dioxide water vapour and small quantities of contaminants such as H2S NH3 and N2. The average composition of biogas is as follows:

Particular	Concentration
Methane (CH4)	50-60 %
Carbon dioxide (CO2)	36-40 %
Water vapour (H2O) saturated mass	3- 4 %
Hydrogen sulphide (H2S)	50-2500 PPM
Ammonia (NH3)	0-300 PPM
Non-gaseous particulates and oil	Low concentration

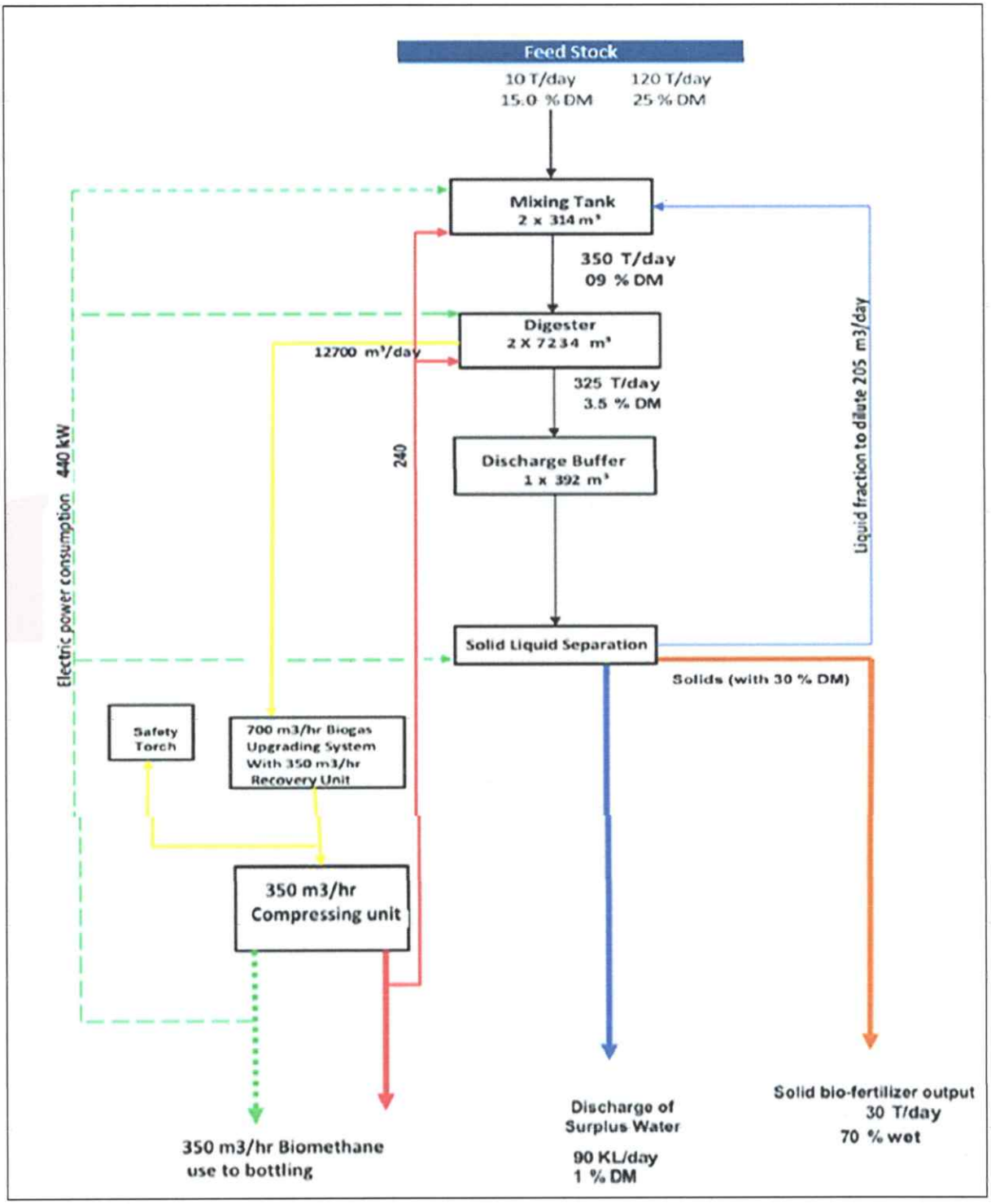
f) BIOGAS UPGRADATION:

Biogas upgradation is the process of removing impurities like H2S, Moisture and Co2. The catalytic removal process is being used to remove H2S. The moisture is being removed in two steps, first by the chilling process and second by the desiccant adsorption process. The removal of CO2 is being done by four tower VPSA system, it's a versatile and a proven technology for gas separation, in this system the company will be using four steps for removing CO2, as Adsorption, desorption (evacuation by vacuumed), purging and pressurization.

The process of Co2 adsorption on solid surface of porous material called molecular sieve at pressure of 0.7 bra G by Roots type gas Blower, after its saturation this tower will come in desorption in this step the vacuum shall be taken up to minus 0.8 bar by using water ring type vacuum pump, after the completion of the step tower will come in next step call purging during purging the product gas will be purged and final step is depressurization then the tower will be depressurize by equalize with the tower in

process and tower purged and then pressurize with product gas. This process is the cyclic and repeated in cycle of 5 minutes. The system is controlled by programmable logical control system through a control panel.

3. PROCESS FLOW CHART OF THE PROPOSED BIO-CNG PLANT:



4. TECHNICAL SPECIFICATIONS OF THE PROPOSED BIO-CNG PLANT:

The present Bio-waste to Bio-CNG system operates on a two phase thermophilic process. Technical specification of the proposed Bio-CNG plant is presented in the below table:

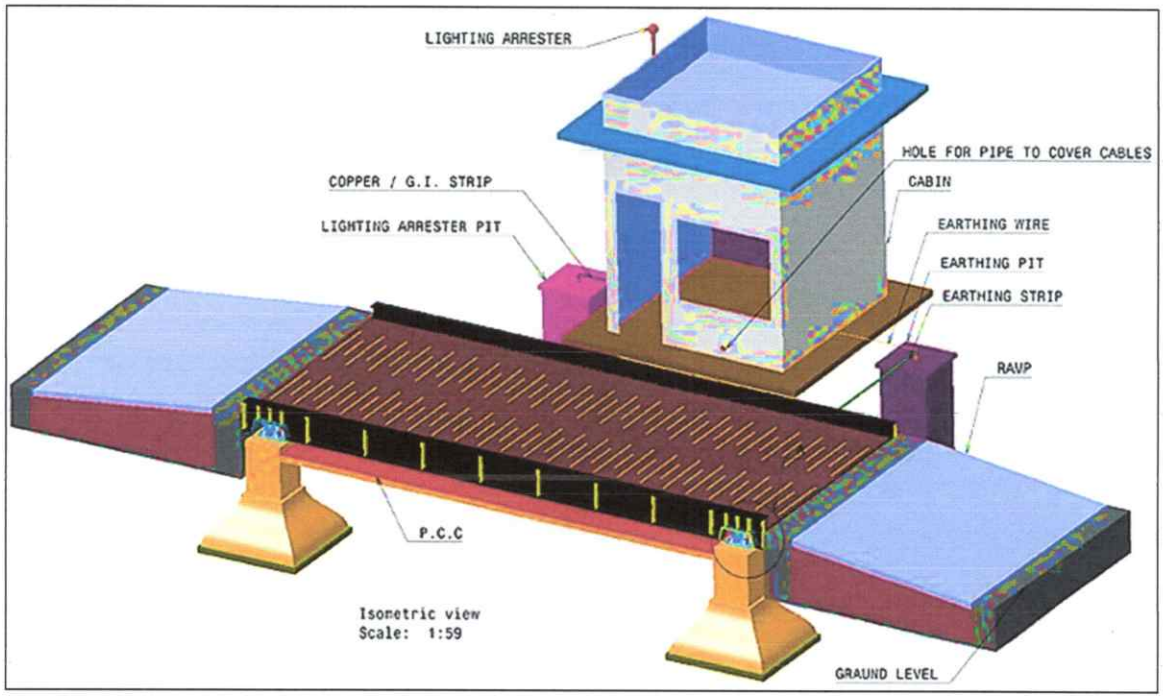
Biogas Plant Technical Specification			
S. No.	**Characteristics**	**Values**	**Figures**
1	Quantity of feedstock	Tons / day	125 to 130
2	TS% & VS%	%	As Per Given Data
3	Biogas Plant Design Capacity	M3/ day	14,000
4	Biogas yield(Generation)	M3/ day	12,762
5	Methane content CH4	%	55-60
6	Calorific value	Cal	4500-4708
7	Number of digesters	Pcs.	2
8	Digester volume (overall)	M3	7234
9	Number of gasholders	Pcs.	2
10	Temperature in the digester	0C	36 – 38
11	Pressure in the digester	KPa	0.5
12	Overall dimensions of the digester (diameter / height) Approx.	Mtr	32/9
13	Solid fertilizers yield (70-80% wet)	T/day	30
14	Liquid fertilizers (99% wet)	KL/day	100
Biogas to Bio-CNG plant characteristics			
15	Biogas Upgrading Capacity	M3/hr	700
16	Methane	%	>95-96
17	Booster Compressor	M3/hr	350-400
18	electrical power Connected Load	KW	440
19	Total Electrical power Running Load	kW	345

As per the data/information provided to us by the client/company, major component of the proposed Bio-CNG generating plant are as follows:

a) WEIGHT BRIDGE:

Weighbridges are used throughout the world as a way of quickly assessing the weight that a truck or train is carrying. Their basic configuration is almost the same. All needs sensors, junction box, printer, weighing instrument, nowadays weighbridge can match with computer and weighing software.

When a weight is applied to the platform, a portion of the load is transmitted to each load cell. Each load cell sends an electrical signal to the weigh controller via the junction box which sums the signals from a number of cells. The weigh controller converts the summed signals to a weight reading.



WEIGHBRIDGE STRUCTURE DETAILS	
Type of Platform	Fully Welded Modular Type Weighbridge
Platform Size	**7.5 X 3.0 Meter**
Main U-Beam	300 mm X 140 mm - U Beam – 04 NOS
Cross Support	16 mm Thick Plate Between Two Main Long Beam
Top Plate	08 mm Top Plate with anti-skid strips
Foundation Frame	100 mm X 50 mm Long Frame with Fully Welded 350 mm X 350 mm X 16 mm Plane Plate
Border Frame	100 mm X 50 mm - Both Side Heavy Duty Frame with Side Wall Mounting
Load Cells MS Plates	150 mm X 150 mm X 16 mm - Load Cell Top & Bottom Plate
Guide Rail	Round Pipe Based Side Frame - Ø 100 mm - Both Side
Fasteners	As per Required & IS Standard
Paint	2 coat of ant-corrosive primer and 2 Coat Enamel Paint
Material	All Material will be IS 2062 Standard
Computer with printer	1 Nos.
Civil Work	Foundation with weighbridge Room
Note: *It would be a U Beam Type Weighbridge From HT-350 Grade Steel Approved By Weights & Measure Department*	

b) PRINCIPLE OF OPERATION:

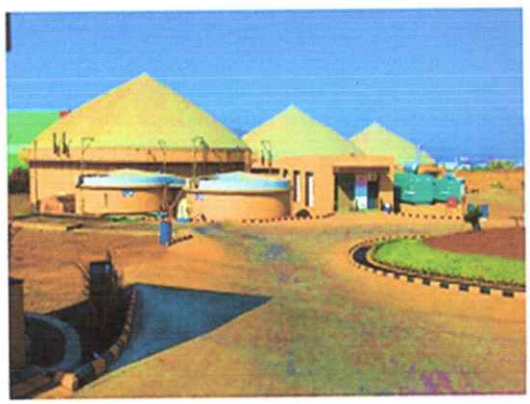
Principle Of Operation		
Feeding	**Coarse Crushing**	**Fine-comminution**
Feeding devices are applied in case to feed shredders with light or bulky materials. Apart from the standard feeding devices, also special designs are possible that, adapted to the relevant feeding materials, effect an optimal feeding.	The size reduction can be coarse or medium course, in two or four shaft design, as a single-stage or multi-stage system.	Granulating systems for an additional shredding if a fine particle size reduction is to be achieved.

FEEDING PROCESS:

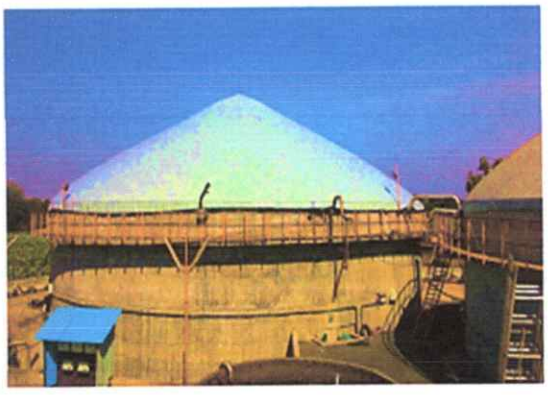
The bio mass will be put into a Feed preparation pit. A top mounted mixer, which will mix different feed stocks and bring it to unpacked, fluffy and consistency. From time to time it releases small quantities of feedstock into an open mouth pump. This screw pump joins an additional quantity of liquid with the biomass and pushes it forward.

The liquid itself comes in the beginning of the daily preparation period from a Fertilizer pit or sometimes directly from digester. The mixture of feedstock will be pumped into the digester. The Fertilizer pit and the Feed prep pit are complete of the same design. Digester is comprised of a standing cylindrical tank of reinforced concrete with a net volume of 7,200 M3 of digesters.

Digesters are also covered with a double membrane gas roof with inbuilt gas storage capacity. This will reduce emission as well as it increases the gas storage capacity of the whole system.



Substrate Supply Pump



Preliminary (Mixing) Tank

Feed preparation pit are fully mixed by high quality agitators. Whilst its way from the Feed preparation pit to the digester, the biomass passes through and additional chopper to refine the whole mixture for better pumping, piping and mixing consistence. This way of maintaining an acceptable fluid viscosity even of high dry matter containing. Mixtures will also reduce the demand of electrical self-consumption of the plant.

c) ANAEROBIC DIGESTER DESIGN AND SIZING FOR MULTI-FEEDSTOCK:

The feeding of the anaerobic digester will work as a semi-automatic storage flow-process, by which the biomass is guided into the digester from the feed prep pit per day. Any process of pumping from, and to any containment will be monitored by level switches.

CSTR Technology based Anaerobic Digester

The Digesters are mounted with quality side entry agitators and will be operated in a mesophilic (35°C ± 2) temperature range. This leads to a stable process and an economical optimized demand for process heat and 30 days of retention time. So, a maximum gas yields.

The digester is comprised of a standing cylindrical tank of reinforced concrete with a net volume of 12,700 M3 including a freeboard head space for gas release. The Digester is covered with a double membrane gas roof.

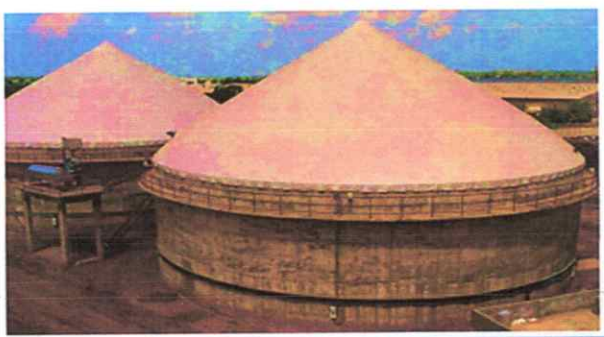
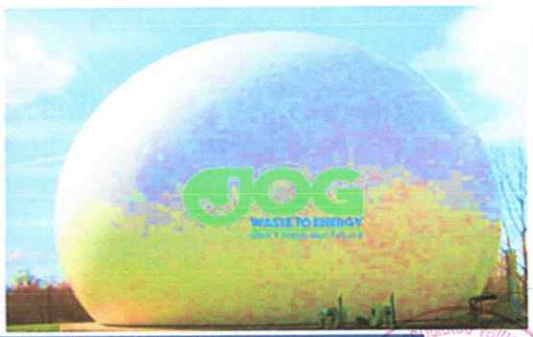
The solids that are fed into the Digestion System for decomposition or degradation of the Volatile Solids (VS) (Organic Dry Matter) present inside the feed substrate (Bio mass). The degradation is done in the digester. Bio mass is guided into digester by the pumping system several times per day. Additionally, re-circulated slurry will be pumped into the digesters. The treated sludge will be pumped to the liquid fertilizer.


Side Entry Type Agitator (Mixer)

As described above, the digester is fully mixed by high quality side entry agitators and will be operated in a mesophilic temperature Range. This combination leads to a stable process with good mechanization results and a minimized effort as far as area requirements and digester volume are concerned. On the other hand, it aims at maximum gas yield which results in maximum greenhouse gas reduction.

d) BIO GAS STORAGE:

The digester as well as the feed preparation pit is installed with a top dome covering. The digester is covered with Double membrane balloon and an approximate pressure of 4-5 Milli Bar Gas Pressure is maintained. The technology used in CSTR (continuously stirred reactors.) The Agitators will be installed inside the digester to ensure extremely homogenous mixing of the slurry.

Gas Storage -Double membrane Balloon

The digested feed material has VS content in it to produce a gas comprising of maximum pure biogas and the rest of containing of CO2 and H2S. This gas is called biogas. After digestion the feed material is taken for further storage. This technology ensures that the maximum biodegradable feedstock is degraded and maximum efficiency is attained out of the biogas generation plant.

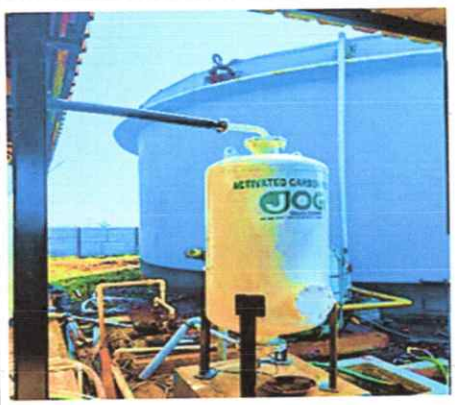
Specification: Dimension as per Digester, Diameter 32 Mt., shape conical, PVC Coated Fabric, Fire Retardant, temperature resistant up to 50 degree c., UV protected, 1100 gsm +/- 50 gsm, Fabric: Fire Behaviour B1 Grade

e) MPSA BASED BIOGAS UP-GRADATION/PURIFICATION TECHNOLOGY:

Biogas is the bio fuel having number of impurities in it, which may create problems for man, machine and environments if consume directly for heating, power generation or cylinder filling. So, we need to remove all the impurities as per the gas application norms and standards governed by the controlling agencies or equipment manufacturers.

The system which the company is going to design for cylinder filling, so the company have to follow the Norms of PESO for all constituents present in the final product which will be filled in cylinders. As per given input data of the gas by user, company will process as per the following steps to get the desired quality of product gas.

- Pre cleaning or H2S removal.
- Pressurization and dehydration.
- Co2 removal.
- Methane recovery from exhaust stream.
- Gas analysis and control system



H2S Removal -Biogas cleaning

Moisture & Co2 Removal

DESIGN BASIS FOR BIOGAS UP-GRADATION UNIT: The composition of biogas and plant load characteristics is indicated in the tables below:

INLET GAS SPECIFICATION	
B-GAS inlet flow	700 M^3/hr
B-GAS inlet pressure	ATM
B-GAS Pressure by After Blower	Up to 0.8 Bar G
B-GAS Composition	
Methane	55-60 %
Carbon Dioxide	35-40 %
Hydrogen Sulphide	2000 PPM (± 500 PPM)
H20	Saturated (3 to 4 %)
Nitrogen & Oxygen	< 2 %

Outlet Gas Specification	
B-GAS OUTLET flow	350 - 400 M3/hr
B-GAS OUTLET pressure	0.2 - 0.4 Bar G
B-GAS Composition (As Per BIS STD 16087:2016)	
Methane	> 95% (+ -1%)
Carbon Dioxide	< 4%
Hydrogen Sulphide	< 8 PPM (±5 PPM)
H20	Dew Point (–)65°C or 5 PPM
Nitrogen & Oxygen	Balance

f) BIO-CNG BOOSTER COMPRESSOR:

For transportation and storage, Bio CNG must be compressed up to 250 bars to save space. This application requires compressors and lubricants specifically designed for this use. Air compressors have been used in industry for well over 100 years because air as a resource is safe, flexible, clean and convenient. These machines have evolved into highly reliable pieces of equipment that are almost indispensable in many of the applications they serve.

g) FERMENTED ORGANIC FERTILIZER PLANT (SOLID/LIQUID SEPARATION SYSTEM):

For each Digester the effluent would be of the order of some amount with 5.5 - 7% TS. The Digester Effluent has wide ranging use as organic fertilizer including for farming. But have preferential applications for, short cycle, forage/energy crops, & horticulture products farming. The effluent from the Biogas Digester is sent to the organic fertilizer unit where the solids & the liquid are separated.

The separated solids can be used as organic fertilizer by further processing such as composting. The Separator separates water from solids. It operates continuously and automatically according to the press screw separator principle and separates thin and viscous compounds. The solid matter / liquid compound are pumped from the inlet chamber by the press screw into the horizontal screen. Some of the water flows due to the force of gravity through the screen.

The press screw conveys the rest of the water with solid particles (also smallest particles) into the press zone in the last section of the screen. Here a permanent regenerative, compact solid matter is generated and is then pressed out through the outlet of the machine, which can be easily filled into containers. The separated fluid slows through the outlet underneath the machine. On the grounds of narrow tolerance the inside of the screen is permanently kept clean.

Solid liquid Separator Plant

Specification: Make: Italy, Model: Q=65 5.5 KW

h) AUTOMATICS AND ELECTRIC EQUIPMENT:

Process control equipment is used for the supervision and regulation of the operation of the plant and for the limitation of damage. In case of emergency, for example, breakdown of the electrical power supply, the biogas plant is automatically transferred to safe operating conditions by the process instrumentation.

Necessary electrically driven devices are supplied with emergency power. Automatic system allows to supervise the plant parameters in real time and to recognize and correct aberrations immediately; to run the plant on its optimum and thereby to save resources and costs; to make recordings for the electronic journal of operation parameters. Automatic system consists of control cabinet, sensors for parameter control of technological process and execution devices.

Control cabinet is designed on the basis of industrial controller with using periphery distributing system and operator panel Touch with touch-sensitive control. Communications is executed physical interface RS-485.

ELECTRIC EQUIPMENT

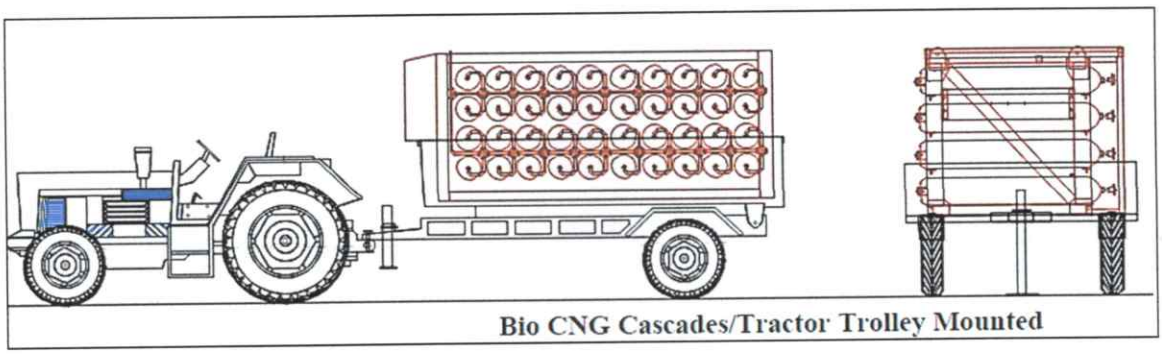
Upper part has power box, central, and front-end processor. Below periphery distributing system is installed with input – output unit. In lower part the interface relay and clips are installed for connecting execution devices. The plant can be operated by 1 or 2 operators.

i) CNG STORAGE SYSTEM FOR COMPRESSED BIOGAS/BIOCNG:

As per information provided to us, Compressed Biogas Cylinder designs are built as per the customer's requirements and specifications prescribed by the Indian or International Standards. Design calculation and drawings are duly verified by BIS and finally approved by the Petroleum and Explosives Safety Organisation (PESO), Nagpur.

The industrial cylinders for domestic market are manufactured as per IS-7285 standard whereas the CNG cylinders for on-board usage in automobiles are manufactured as per IS-15490, both the standards are duly certified by Bureau of Indian Standards (ISI) and later approved by Petroleum and Explosives Safety Organisation (PESO), Govt. of India.

Bio-CNG CASCADE



Bio CNG Cascades/Tractor Trolley Mounted

Specification: 40 Cylinder Cascade @ 260 Kgf/cm². Water Capacity-75.0 Litres per Cylinder, Cascade Water Capacity- 3000 Litres, Working pressure of 250 Kgf/cm², OD-267 mm, Dim-3.2 x1.85 x1.90Mtr, Cascade Weight-5.0 Ton Approx. (***Note:*** *All cylinders are Hydro static Tested).*

5. TECHNOLOGY USED:

a) TECHNOLOGY SUPPLIER, EPC CONTRACTOR:

As per the contract agreement executed on 23rd December 2023, M/s Jog Waste to Energy Pvt Ltd has been appointed as the EPC consultant by the Company for commissioning the proposed Bio-CNG plant. As per the data/information provided by the client/company, M/s Jog Waste To Energy Private Limited was incorporated on 13th June 2016, having registered office at 16/3 Shivbhumi Estate-2 Gatrad-Kunjad Road, Bakrol-Bujrang Ahmedabad Gujrat, 382433. The Corporate Identification Number of the

company is (CIN) *U40100GJ2016PTC092443, (GST)-24AADCJ7356G1ZJ* and its registration number is 92443.

The company provides cost effective innovative products and services, to cater ever emerging needs of the domain, of solar energy, Biogas and other waste to energy technologies. Also provides the cost-effective equipment to expert consulting and training in order to set up own Biogas generation & Up-gradation plant.

M/s Jog Waste To Energy Pvt Ltd has the expertise of all the stages of the upgrading process, focus on every stage starting from Raw Biogas collection, Biogas to power project, Biogas cleaning, Biogas drying, Biogas purification, Biogas compression, and finally Biogas Bottling. It is an established solar venture concentrated on off-framework and on- lattice (with net metering) Solar Power plant applications.

b) PROPOSED TECHNOLOGY:

BIO-METHANATION TECHNOLOGY:

- The **CSTR Mesophilic bio-methanation technology** along with its purification system is supplied by M/s Jog Waste to Energy Pvt Ltd, Ahmadabad based solution provider, having expertise and collaboration with German specialists in biological degradation of organic wastes.
- The manufacturing process uses **mesophilic CSTR bio-methanation** for ensuring high efficiency in converting substrates to biogas, low environmental footprint and low capital cost of the plant and machinery, and 100% availability of plant independent of local climate and weather conditions.
- The plant has a low physical foot print as the hydraulic residence time of the mesophilic plant is just 28-30 days.
- The plant operates 24 X 7 throughout the year as the temperature is maintained at 36-40°C, and hence has constant output of biogas independent of the external temperature and climatic conditions. This ensures high plant availability throughout the year.

BIO-GAS UP-GRADATION TECHNOLOGY:

- The biogas so generated is separated into bio methane and CO2 using PSA system that recover approximately over 96-98% of the methane form biogas at methane purity 95-96%.

- The separated bio methane is compressed to 250 bar g using high efficiency compressor and filled in cascades of standard cylinders of 75 Litre of water capacity. The gas is directly supplied to IOCL CNG Pump Outlets/ consumers as automobile fuel at a retail outlet in the market areas, using state of art gas dispensers. The separated CO2 is released to the atmosphere.

- Most of the water used for the process is recovered and recycled from the biogas slurry, to cut down the requirement of make-up water for process requirement, thus reducing the water footprint of the project.

- All the macro and micro nutrients in the feedstock are recovered in the form of solid and liquid fertilizers, with ultra-filtration and reverse osmosis process plants, thus forming a virtuous closed loop.

PROCESS TECHNOLOGY:

- There are three temperature ranges in which bio methanation takes place mesophilic (35-38°C) and thermophilic (40 - 55°C) in this project about 10-15 MT/ day of cattle dung will be co-digested with about 120-125 MT/ day of Sugarcane Press Mud ,which may be collected from nearby Sugar industries.

- The pH and C: N ratios will be adjusted and the entire hydrolyser and digester are thermally insulated and heated to 35-38°C with a heat pump to provide the required temperature for thermophilic bacteria to thrive and maximize biogas output.

- The present project proposes to employ two stage thermophilic processes using a continuous stirred tank reactor configuration to optimize plant size and conversion efficiency.

6. LATEST TECHNOLOGY/TECHNOLOGICAL ASSESSMENT:

Empirically, biological methanation of H2/CO2 has been tested for 151 days in a CSTR with no nutrients added. It is found that the Maximum CH4 yield was 355.8 mL/(L·d) at a CH4

content of 94.8% and Maximum CH4 content was 99.5% at a CH4 yield of 249.3 mL/(L·d), however, reactor ran stably at a pH around 8.5, and CO2 flow was adjusted for pH control.

Hence, the CSTR is found as a historically proven and well-established technology. ~95% of the currently used bioreactors are of CSTR-type due to providing effective mixing to obtain efficient gas-liquid mass transfer. Applying CSTR in biological methanation is conductive to the application of existing equipment and reliable technology.

Thus as per the above technical assessment, M/s Naruma Industries Pvt Ltd is using the appropriate Mesophilic (25-40 Degree Celsius) CSTR technology which is a going on, recognized and trending in the market at present. It can be commented positively that the plant will be running smoothly. Technology & specification of the plant are matching with the need to run the plant smoothly and achieve the economies of scale.

7. EFFLUENT TREATMENT AND ABETMENT:

a) EFFLUENT TREATMENT APPROACH:

The philosophy underlying the effluent treatment system is predicated on the sustainability principles of renew, reuse, recycle and recover. The thrust is to use renewable resources, reuse "wastes" recycle valuable inputs such as water, energy and nutrients and recover through energy efficiency initiatives energy otherwise lost.

b) PRODUCTION PROCESS:

The biogas plant generates about 12,700 m3/ day of biogas, which consists of 55-60 % methane, 36-40% CO2 and 2-5% water vapour, and contains about 1% of contaminants such as hydrogen sulphide (H2S) Ammonia (NH3) and N2 which are removed in the gas cleaning train. The cleaned gases, which contain ppb levels of the contaminants, are injected by the biogas pump into the biogas burners, which are specially designed to operate with biogas and used as cooking fuel, replacing the LPG.

c) DISPOSAL OF THE BY-PRODUCTS:

Fertilizer by-products: The plant generates about 30,000 Kg/ day of solid organic fertilizer from the sludge separator and about 90,000 Litre/ day of liquid organic fertilizer. This is sold as fertilizer in the market.

R.K. Associates Valuers & Techno Engineering Consultants Pvt. Ltd.

Recycled Slurry/Water: The digested slurry after process from solid liquid separator 2, 28,000 Litre/ day will be reused in mixing tank as live feedstock. This is mixed with the incoming fed in the hydrolysis holding tanks.

8. TESTING STANDARDS FOR PRODUCTION:

As per communicated by client, company will be having a quality control Laboratory, wherein, they check the entire range on defined parameters like design, quality and finish. The unit is proposed to be equipped with all the essential tools, machine, and technology in order to ensure the production quality as per the standard benchmark.

Proposed Lab Equipment For Testing Slurry And Gas Chemical Parameter
Hot air oven (up to 200 Degree C), Digital Ph. meter, Desiccator, Soil testing kit, Weight Balance, Muffle Furnace up to 1100 Degree C, Analyzer calibration kit, Ch4 and co2 cylinder, Biogas sample collection kit

9. MANPOWER:

As per information shared by the client/.company, an estimate of manpower requirement allowing for leave, absentecism, sickness and holidays for smooth and for efficient operation of different sections of the plant including its administrative and commercial departments, has been prepared based on technical and management ground primarly to indicate the order of manpower requirement.

In estimating the manpower requirement, a proper ratio between the administrative, managerial, supervisory and shop foor staff has been maintained with a view to affording proper industrial and professional management at various levels. The basic structure of the manpower will require the following kind of resources to opearte the plant 24*7 for 350 days a year:

Proposed manpower details along with Cost (INR)		
Workers on Wages		
Category	**Number**	**Average Monthly Salary**
Skilled Workers	10	25,000
Semi-Skilled Workers	4	20,000
Un-Skilled Worker	17	12,000
Sub Total	**31**	

Factory Supervision		
Category	**Number**	**Average Monthly Salary**
Shift Supervisor	4	45,000
Field Officer	2	35,000
Store In-Charge	2	22,000
Store Assistant	2	20,000
Chemist	1	18,500
Sub Total	**11**	
Office Staff		
Category	**Number**	**Average Monthly Salary**
General Manager	1	80,000
Accounts Manager	1	50,000
Accounts Assistant	2	35,000
Office Assistant -Marketing	2	25,000
Office boy	2	10,000
Sub Total	**8**	
Grand Total	**50**	

Source: *Data/information provided by the client.*

Company has proposed to deploy 50 human resources initially, which comes out with 10 workers per ton for the proposed Bio-CNG generating plant which is in permissible range as per the standard benchmark of the industry.

(*Ref:* *https://pib.gov.in/PressReleasePage.aspx?PRID=1868887*) The Sangrur CBG Plant shall provide direct employment to 390 and indirect employment to 585 people. This is a 33TPD capcity plant, thus it comes out with ~12 workers per ton.

PART F — PRODUCT PROFILE

1. INTRODUCTION:

BG has calorific value and other properties similar to CNG and hence can be utilized as green renewable automotive fuel. Thus it can replace CNG in automotive, industrial and commercial areas. Ministry of Road Transport and Highways, Government of India had permitted usage of bio-compressed natural gas (bio- CNG) for motor vehicles as an alternate composition of the compressed natural gas (CNG).

The compressed biogas, or Bio-CNG, is likely to play a crucial role in promoting India's transition to a sustainable energy ecosystem. Bio-CNG is a green renewable automobile fuel with calorific value and other qualities similar to compressed natural gas (CNG).

2. PRODUCT CATEGORY:

a) BIO CNG:

The proposed plant will be generating 5,000 Kg/ day of Bio-CNG which has a gross calorific value of 12,500 Kcal/Kg. Methane is the most valuable component under the aspect of using biogas as a fuel; the other components do not contribute to the calorific value and thus are "washed out" in the purification plants in order to obtain a gas with almost 95- 96% CH4. Methane is the flammable compound in biogas. Composition of the purified Bio-CNG has been shown in the below table:

Composition of Purified Bio-CNG		
Ingredient	**Value**	**Test Method**
CH4(Percentage)	95-96 %	IS-5130 (Part3)
CO2+ N2 + O2(Percentage)	4-5 %	IS-15130 (Part3)
Only CO2	< 4 %	IS-15130 (Part3)
H2S (Mg/M^3)	5 (Mg/M^3)	ISO- 6326-3
Moisture (Mg/M^3)	5 (Mg/M^3)	IS-15641 (Part2)

Source: *Data/information provided by the client.*

Bio-CNG, a clean and renewable fuel, has vast potential in India. It can be a supplement to petroleum products, if used in compressed form in the cylinders. Biogas originates from bacteria in the process of biodegradation of organic material under anaerobic conditions.

Bio CNG is having the applicability in various Industries and used as Automobiles Fuel. It is capable to be used in Canteens, Restaurant, Hotels, Sweet shop, Dhabas etc.

Equivalent Quantity Of Fuel For 1 Cu M Of Biogas	
Equivalent	**Value**
Biogas	1.00 M^3
Kerosene	0.620 Liter
Fire wood	3.474 Kg
Charcoal	1.458 Kg
Butane	0.433 Kg
LPG	0.456 Kg
Electricity	1.5 Kwh

b) ORGANIC FERTILIZER:

The plant has a capacity to produce 30,000 Kg/ day of solid organic fertilizers and 90,000 Litre/ day of liquid organic fertilizers. The material drawn from the digester is called sludge, or effluent., which is rich in nutrients (ammonia, phosphorus, potassium, and more than a dozen trace elements) and is an excellent soil conditioner.

Quality of Fermented Organic Manure: The C:N ratio of organic manure is between 12:1 to 16:1. It is a good source of nitrogen, phosphorous, potassium and iron. The typical elemental composition of the organic manure and biogas obtained at two of the operating plants based on BARC technology is given below:

Elemental Composition Of Organic Manure	
Calcium	0.39-0.65 %
Iron	0.18-0.32 %
Magnesium	0.032-0.01 %
Manganese	0.0059-0.008 %
Nitrogen	2.6-3.5 %
Phosphorous	0.8-0.9 %
Zinc	0.007-0.009 %
Potassium	0.8-0.95 %

In other words, one ton of slurry provides 44 kg of nutrients as compared to 19 Kg through farmyard manure and 27 Kg by compost. Micro nutrients such as zinc (Zn), copper (Cu) and manganese present in the original material are also recovered in biogas slurry and can proved useful to crops when used as organic manure. The nutrient composition of slurry manure is shown in the below table:

Nutrient Composition Of Slurry Manure		
Sr. No.	**Ingredient**	**Value**
1	Total Nitrogen (%)	1.40 – 1.84
2	Total Phosphorous (%)	1.10 – 1.72
3	Total Potash (%)	0.84 – 1.34
4	Organic Carbon (%)	35.0 – 38.4
5	Zinc (mg/kg)	103 – 116
6	Copper (mg/kg)	51 – 68
7	Manganese (mg/kg)	231 – 295
8	Iron (mg/kg)	3200 – 3600
9	Carbon / Nitrogen ratio	10 – 15
10	Organic Matter	65%

The organic manure is recommended for Short term crops such as vegetables and fodder, Mid-term crops such as wheat, cotton, rice, potato, sugarcane and maize and Long term crops such as kinnow, guava, grapes, mango, lemon and apple as per the shown inbelow table:

Application of organic manure		
Crop	**Doses**	**Time of application**
Wheat, Rice, Maize and Cotton	200-400 Kg/Acre	During preparation of Land for Sowing
Sugarcane, Potato	400-800 Kg/Acre	Half Dose of Manure during preparation of Land and remaining half after two-three months of sowing
Vegetable	200-400 Kg/Acre	20-30 Days after plantation
Kinnow, Guava, grapes,Mango, Lemon and Apple.	5-10 Kg/tree	Two times in a year

To derive maximum benefits from the stored digested slurry, it is essential to prevent its exposure to the sun as any such exposure would result in loss of ammoniacal nitrogen content of the slurry. It is advisable to dig, two or three manure pits near the biogas

plant. The slurry is then carried and stored in these pits which are covered with solid waste from the farm. The fresh biogas slurry when used by mixing with irrigation water to growing crops gives better yields as compared to other modes of its applications.

3. PRICING STRATEGY:

As per the data/information provided by the client, the company has already secured a purchase agreement/LOI with Indian Oil Corporation Ltd on 2nd January 2024. (***Ref No. - Indian Oil/SATAT/01/3646***). The current selling rate of CNG at OMC outlets in Haridwar, Uttarakhand is around INR 96.5/kg. (*https://hngpl.in/2023/07/14/cng-retail-price-w-e-f-01-07-2023-00-00hrs-retailselling- price-%e2%82%b984-20-kg/*), however the procurement price of Bio-CNG from Indian Oil as per the SATAT Scheme is around @INR 74.29 per kg without GST. "CBG Pricing Circular- SATAT Scheme" is attached below for reference:

स्वच्छ भारत
एक कदम स्वच्छता की ओर

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 including tax Rs./kg	Higher Retail Selling Price of CBG in Slab including tax Rs./kg	Procurement price of CBG Without GST Rs./kg	Procurement price of CBG With GST 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

As per the current market scenario, the fermented organic solid manure/fertilizer is sold to farmers or outlets at around INR 6.00 to 7.00 per kg including with packing and bagging facilities. Whereas the bulk-selling rate of solid fermented organic manure/fertilizer is around 4.00 to 5.00 per kg. The other by-product of digestate is called fermented organic liquid manure/fertilizer, which is being sold in the current market at INR 1.00 per litre.

Additionally, in a significant move towards promoting sustainable agriculture, the central government announced comprehensive guidelines to offer market development assistance (MDA) at INR 1500/MT (1.5 RS / Kg) for fermented organic manure (FOM) or bio-digestate derived from compressed biogas generating facilities. (Ref: https://pib.gov.in/PressReleasePage.aspx?PRID=1935893).

The government aims to bolster the production and use of organic fertilizers like FOM; liquid fermented organic manure (LFOM), and enriched phosphate rich organic manure (PROM). These fertilizers emerge as by-products from biogas (BG) and compressed biogas (CBG) plants.

The selling price of Bio-CNG is considered on conservative side as INR 72.00/kg. The selling rate of fermented organic solid and liquid fertilizers is assumed as INR 3.00 per kg and INR 0.10 per litre respectively on conservative side.

4. MARKETING, SELLING & DISTRIBUTION PLAN:

a) BIO CNG:

The Bio-CNG produced has to be sold to Indian Oil Corporation Ltd stations situated within 25-75 km, for which the company have already secured a purchase agreement/LOI ***(Ref No. - Indian Oil/SATAT/01/3646, Date: 2nd Jan 2024).***

b) ORGANIC FERTILIZER:

The by-product of the biogas generation process is enriched fermented organic digestate, which is a perfect supplement to, or substitute for, chemical fertilizers. As per informed by the client, the fermented organic solid and liquid bio-fertilizers are in demand as a premium replacement for chemical fertilizers and are to be directly marketed using appropriate channels to the farming communities and sold @ INR 3.00/Kg and INR 0.10/L respectively.

इंडियन ऑयल कॉर्पोरेशन लिमिटेड
कॉर्पोरेट कार्यालय :
दसवां तल, एन बी सी सी कमर्शियल कॉम्प्लेक्स
ब्लॉक नंबर 2, पूर्वी किदवई नगर, नई दिल्ली - 110023

Indian Oil Corporation Limited
Corporate Office :
10th Floor, NBCC Commercial Complex
Block No. 2, East Kidwai Nagar, New Delhi - 110023
Tel.: 011-24347500 Website : www.iocl.com

IndianOil

कॉर्पोरेट कार्यालय
Corporate Office

Ref: IndianOil/SATAT/01/3646
Date: 02.01.2024

To,
Naruma Industries Private Limited
Khasra Number 917, First Floor, Ahmedpur Kadach, Railway Road, Jwalapur, Haridwar Uttarakhand - 249407

Sub: Letter of Intent for supply of CBG to IndianOil under SATAT

Madam/ Sir,

This has reference to the following:

Notice Inviting Expression of Interest (NIEOI) ref.:	**CBG64**
NIEOI released on:	**01.11.2023**
NIEOI application dated:	**29.11.2023**
NIEOI file reference number:	**987510**
Status of CBG Plant as on date of application:	**Proposed**
CBG plant location as per NIEOI application:	**Khasra No.740, Village Tughalpur, Paragna Goverdhanpur, Tehsil Laksar, Haridwar, Uttarakhand**
CBG Quantity as per NIEOI application:	**5.0 Tonnes Per Day**

We also refer to documents submitted in the EOI and/or correspondences exchanged with IndianOil and your willingness to provide Compressed Bio Gas (CBG) to IndianOil from the above mentioned CBG plant for marketing through IndianOil's Retail Outlet(s).

Based on the evaluation of the EOI submitted by you, we hereby issue this Letter of Intent (LOI) for retailing of CBG produced from your above mentioned CBG Plant on following broad terms and conditions:-

1. In accordance with the NIEOI, you shall be responsible for, inter alia, the following obligations:
   a. You shall be responsible for planning, preparation, engineering and execution of the CBG Plant, including storage of raw material, operation and maintenance of the CBG Plant, maintaining final product output quantity and quality, managing the by-products and wastes from the CBG Plant as per existing central / state government norms and providing performance guarantee for the CBG Plant at your cost.

(contd..)

Indian Oil Corporation Ltd. A & SD

पंजीकृत कार्यालय : जी-9, अली यावर जंग मार्ग, बान्द्रा (पूर्व), मुम्बई - 400051, महाराष्ट्र (भारत)
Regd. Office : G-9, Ali Yavar Jung Marg, Bandra (East), Mumbai - 400 051, Maharashtra (India)
CIN : L 23201 MH1959 GOI 011388

R.K.Associates Valuers & Techno Engineering Consultants Pvt. Ltd.

PART G FEEDSTOCK ANALYSIS

1. INTRODUCTION:

Bio-Methane from Anaerobic Digesters (AD): Anaerobic processes could either occur naturally or in a controlled environment such as a biogas plant. Organic waste such as livestock manure and various types of bacteria are put in an airtight container called digester so the process could occur. Depending on the waste feedstock and the system design, biogas is typically 55 to 60 percent pure methane. The state-of- the-art systems report producing biogas that is more than 95 percent pure methane.

The primary component of an AD system is the anaerobic digester, a waste vessel containing bacteria that digest the organic matter in waste streams under controlled conditions to produce Bio-methane. As an effluent, AD yields nearly all of the liquid that is fed to the digester. This remaining fluid consists of mostly water and is recycled to flush manure from the swine building to the digester.

Approximate Quantity Required For Generation Of One M3 Biogas		
Sr. No.	**Substance**	**Quantity (Kg)**
1	Cattle Dung	20
2	Paddy Straw	4
3	Napier grass	8
4	Poultry Waste	8
5	Horse/ Mule/ Elephant Dung	12-15
6	Food waste: Pre and post cooked leftover food from households, hotels and canteens.	10-12
7	Green waste (vegetable market waste): Vegetable Refuses from Vegetable Markets or kitchens.	10-12
8	Paddy straw/ wheat straw/ mushroom spent waste: Lawn cuttings, leafy biomass, dried flowers, finely chopped and ground straw or bagasse.	5-8
9	De-oiled rice bran	3-4
10	De-oiled seed cake (Pongamia/ Jatropha)	3-4
11	Segregated municipal solid waste (biodegradable)	12-15
12	Slaughter house waste	5-10

Approximate Required Quantities of the Substances (Alone)		
Sr. No.	**Item**	**Daily RequiredQuantity (Ton)**
1	Cow Dung	250
2	Poultry Droppings	98-100
3	Food Waste	175-180
4	Sugarcane Press mud	125

Combination of any of these mentioned above can also work in proportionate quantity. However, as per feed stock analysis the proposed bio-CNG plant will be using the following Combination of Raw Materials, while it should be noted that the feed stock quantity may very base on dry matter and volatile matter available in the below mention combination of feed stock:

Proposed Combination of Raw material		
S. No.	**Item**	**Daily Input Quantity (Ton)**
1	Cow Dung Required	10-15
2	Sugarcane Press mud	115-120

2. SUGARCANE PRESS MUD:

Press mud is a solid residue, obtained from sugarcane juice before crystallization of sugar. It generally contains 60-85% moisture (w/w); the chemical composition depends on cane variety, soil condition, nutrients applied in the field, process of clarification adopted and other environmental factors.

Press mud from sugar factory typically contains 71% moisture, 9% ash and 20% volatile solids, with 74-75% organic matter on solids. Sugar molasses has methane potential (i.e. CH4 per ton of raw material) of 230 m3. The typical composition of press- mud is given below in the table:

Composition Of Press Mud	
Components	**Percentage**
Cellulose	11.4%
Hemi cellulose	10.0%
Lignin	9.3%
Protein	15.5%
Wax	8.4%
Sugar	5.7%
Na	0.22%

As it contains appreciable proportion of biodegradable organic matter, it has very good potential for the production of biogas. Methane is the most valuable component under the aspect of using biogas as a fuel; the other components do not contribute to the calorific value and thus are "washed out" in the purification plants in order to obtain a gas with almost 97-100% CH4. Methane is the flammable compound in biogas.

3. COW DUNG:

About one cubic foot of gas may be generated from one pound of cow manure at around 28°C. This is enough gas to cook a day's meals for 4-6 people in India. About 1.7 cubic meters of biogas equals one Litre of gasoline. The manure produced by one cow in one year can be converted to methane, which is the equivalent of over 200 Litres of gasoline. In the state of Uttarakhand, million tons of animal dung is produced every year which can be utilized for better purposes. Hence, anaerobic digestion becomes a promising technology.

Percentage Proximate Composition And PH Values Of The Dung	
Parameters	**Cow Dung**
Moisture %	18.55 ± 0.28
Ash %	10.10 ± 0.02
Crude Fiber %	40.20 ± 0.12
Crude Protein %	6.80 ± 0.06
Crude Fat %	4.00 ± 0.42
Carbohydrate %	20.35 ± 0.34
pH	7.10 ± 0.01

Gas produced from cow dung is 55-65% methane, 30-35% carbon dioxide, with some hydrogen, nitrogen and other traces. Its heating value is around 600 B.T.U. per cubic foot. The cow dung slurry is composed of 1.8-2.4% nitrogen (N2), 1.0-1.2% phosphorus (P2O5), 0.6-0.8% potassium (K2O) and 50-75% organic humus.

4. AVAILABILITY OF RAW MATERIAL:

As per the feedstock analysis and the data/information provided by the client, the plant will require cow dung around ~10-15 tons per day and sugarcane press around ~115-120 ton per day to produce the 5 ton Bio-CNG per day. Laksar in Haridwar district is well known for sugar processing industries.

The required raw material availability is the advantage of the proposed location as many sugar mills are situated near by the location. For reference, few sugar mills operating near by the proposed plant are shown in the below table:

S. No.	Name of the Sugar Mill	Distance from location
1.	R. B. N. S. Sugar Mill Laksar, P2WH+WHW, Shekhpuri, Laksar, Uttarakhand 247663	~18 km away from the plant
2.	Rohana Sugar Mill, Shop No- 12, Amrit Inter College G.T Road, Rohana Mill Meerut, Uttar Pradesh 251202	~40 km away from the plant
3.	Uttam Sugar Mill Manglore, Lahboli - Mandawli Road, Lahvauli, Mundyaki, Uttarakhand 247656	~28 km away from the plant

Source: *Google Map*

Approx. 800-1000 tons per day of sugarcane press mud is being disposed, which has very good potential for production of biogas as it contains appreciable proportion of biodegradable organic matter. As per data shared by the client, the company has contacted few raw material suppliers such as M.D Enterprises (dealer & contractor), Laksar, Uttarakhand, who ensured that they are able to supply 200-250 ton press mud per day.

In the state of Uttarakhand, million tons of animal dung is produced every year which can be utilized for better purposes. As per the data/information provided by the client, fresh cow dung is collected from nearby villages and cow farms.

5. PRICING:

As sugar mill owners have now recognised its potential for revenue generation. This realisation has resulted in a substantial increase in press mud prices over the last two years, rising from INR 100 per tonne to INR 500-600 per tonne including transportation. Thus, the sugarcane press mud is generated by the sugar mill and made available to the project @ INR 600/ Ton. The cattle dung is collected from various dairy farms/ nearby villages @ INR 750/MT and used as inoculants.

Ref:(https://www.downtoearth.org.in/news/renewable-energy/sugarcane-byproduct-pressmud-can-be-a-sweet-spot-for-india-s-compressed-biogas-sector-93022#:~:text=This%20realisation%20has%20resulted%20in,as%20fuel%20in%20brick%20kilns).

PART H — INDUSTRY OVERVIEW

1. INTRODUCTION:

Bio-CNG is considered a renewable fuel and has also been proven to reduce the emission of greenhouse gasses when used as a transport fuel. Bio-CNG, derived from the filtration of biogas, is also referred to as Compressed Biogas (CBG) and bio-methane. It is derived from biogas after removing impurities like carbon dioxide and hydrogen sulphide. As per the details available on Gobardhan Portal (https://gobardhan.co.in/), approx. 81 CBG/Bio CNG plants are completed and functional in 153 districts and 163 CBG/ Bio CNG plants are under construction at present.

Bio-CNG plants get financial and other incentives from the Union government under the Sustainable Alternative towards Affordable Transport (SATAT) Scheme. The scheme, launched in 2018, supports the establishment and expansion of bio-CNG plants that use waste to produce biofuel. Under the scheme, the Union government plans to establish a total of 5,000 bio-CNG plants in India by the end of FY 2025.

2. POTENTIAL AND EXPANSION:

In India, around 70 percent of the sugarcane is produced by three major states – Uttar Pradesh, Maharashtra, and Karnataka. India produces, on an average, over 300 million metric tonnes of sugarcane per year. Around 3.5 percent of this, can be the amount of press mud produced. At this rate, India has the potential to produce around 10 million metric tonnes of press mud/filter cake per year that could be diverted for producing bio-CNG.

Indian sugar industry while crushing around 300 million tonnes of sugarcane and producing about 10 million tonnes of press mud annually can offer compressed bio-methane/bio-CNG to the extent of 0.4 million metric tonnes .

Feedstock	Pan India accessible amount (TPD)	Biogas potential per ton (kg)	Bio-CNG potential per ton (kg)	pan India CBG potential (TPD)
Urban food waste, fruit and vegetable	50,000	75	40	2000
Poultry litter	100,000	100	60	6000
Press mud	100,000	150	80	8000
Total				**16000**

The Bio-CNG potential in India is estimated at 62 million metric tonnes (MMT) per annum, out of which the Sustainable Alternative towards Affordable Transportation (SATAT) scheme aims to tap 15 MMT. India biogas market is expected to grow from $1.47 billion in 2022 to $2.25 Billion in 2029 at a CAGR of 6.3% during the forecasted period.

The sector is about to attract over USD 2 Billion investment in the next 5-7 years under its SATAT scheme, the govt. announced an ambitious plan of touching 15 million metric ton per annum, which is roughly 40,000 ton per Day.

Demand for alternative fuel vehicles in India is on the upswing and clearly seen in the increasing sales of CNG-powered vehicles. Given the favourable price arbitrage of CNG versus petrol and diesel, retail sales of CNG vehicles, across four sub-segments, crossed the 650,000-unit mark for the first time in a fiscal in FY2023. Cumulative sales of 660,153 units (see data table below) translate into strong double-digit YoY growth of 46% (FY2022: 451,552 units). (Ref.: *https://www.autocarpro.in/analysis-sales/cng-vehicle-sales-surge-by-46-to-over-650000-units-in-fy2023-114656*).

CNG passenger vehicles (PVs), with 318,752 units, account for 48% of the total retail sales in FY2023 and surged by 40.71% year on year (FY2022: 226,547 units) and took an 8.80% share of overall retail sales of 36,20,039 PVs in India.

3. CHALLENGES:

The GOI has formulated various policies and schemes to promote and mitigate challenges associated with the Bio-CNG sector. There are still some operational and technological challenges such as sensitivity towards biomass quality, biogas upgradation process among others which are impeding the uptake of Bio-CNG projects. Below table shows the challenges:

Feedstock Availability	Quality of Feedstock (including multiple feedstocks)	Technology Challenges	Bio-CNG and by-products' Market Challenges	Financing, and Implementation Challenges
• No formal market for trading of feedstock • Uncertainty of long-term regular supply of feedstock	• Variation in quality of feedstock throughout the year • Some projects are designed to take multiple	• Technologies are sensitive to the quality of feedstock – slight change in	• Year-on-year variation in feedstock price – established feedstock pricing mechanism is	• There are schemes by public sector banks to finance Bio-CNG project, but less private sector banks are financing Bio-

• Demand supply mismatch - requirement of large storage facility • Unorganized biomass value chain – lack of sufficient collection, processing and transportation facility	feedstock – optimal operation is a challenge and may also affect the quantity and quality of Bio-CNG • Source segregation is important – receiving non-segregated waste is an operational challenge	feedstock quality will significantly impact the Bio-CNG production rate • Capital intensive technologies high upfront project cost	required. • Base price of Bio-CNG should be linked with feedstock cost variation mitigates the economic viability risks • Create market demand for by- products such as Bio manure etc.	CNG project that too at high cost of debt. • Lack of access to infrastructure i.e. road network and CGD network near project sites. • Large set of approvals are required from PESO, pollution control board, MNRE - subsidy disbursement etc.

4. GOVERNMENT INITIATIVES:

- Government has announced the phased mandatory blending of compressed biogas (CBG) in compressed natural gas (CNG) for transportation and piped natural gas (PNG) for domestic purposes in the latest interim budget for FY 2024-25.

- The government has increasingly focused on the production of compressed biogas in India. It is currently aiming to set up 5,000 CBG plants by FY25 under SATAT.

- Under Waste To Energy Programme, MNRE is providing the subsidy of INR 4.0 Cr per 4800 kg/day for Bio CNG generation from new biogas plant and INR 3.0 Cr per 4800 kg/day for Bio CNG generation from existing Biogas plant, while the maximum CFA of INR 10.0 Cr/project for both cases.

- GOBARDHAN: Ministry of Drinking Water and Sanitation, Financial assistance of INR 50 lakh per district is available for setting up model GOBARDHAN projects. SATAT Scheme OF MoPNG for encouraging OMCS's to issuance of LOI to the producers.

- Eight Biogas Development and Training Centres (BDTCs) have been established at India's premier Institutions to provide Technical Assistance, R & D, Testing and Validation of New Biogas Models / Designs, field inspections of biogas plants, and training and skill development.

- Ministry of Road Transport and Highways amended the Central Motor Vehicles Rules, 1989 in June 2015 and included the provisions for usage in motor vehicles Bio-CNG produced from waste (including MSW)

- Carbon Credits, Priority Sector Lending, and CSR Funds, Agri Infrastructure Fund (AIF).

5. CONCLUSION:

The business of bio CNG gases is in high demand because it is a clean and renewable source of energy. Additionally, it is more cost-effective than traditional sources of energy, and it can be used to power a variety of vehicles. Bio CNG gas is also a versatile fuel that can be used in a variety of applications.

Though there are a few reasons for this increase in demand, the primary one seems to be that environmentalism is becoming more and more popular. As people become more aware of the damaging effects that traditional forms of energy have on the environment, they are searching for alternatives that are cleaner and renewable.

India biogas market is expected to grow from $1.47 billion in 2022 to $2.25 Billion in 2029 at a CAGR of 6.3% in forecast period, 2022-2029. Bio CNG gas is one such alternative, and its popularity is only increasing as time goes on. Bio CNG can be produced from a variety of organic materials, making it a sustainable choice for energy production. Additionally, bio CNG produces fewer emissions than traditional fossil fuels, making it a more environmentally-friendly option. Finally, bio CNG is becoming increasingly cost-competitive as technology advances and production methods improve.

PART I	SWOT ANALYSIS

SWOT ANALYSIS	
STRENGTHS	• **Strategic Location:** The project is situated in Laksar, Haridwar, many sugar mills are situated near by the location of the proposed Bio CNG plant ensures the availability of raw material (press mud). • **Growing Demand:** Due to renewable source of energy, demand for Bio-CNG is expected to grow at a CAGR of ~6 % in the upcoming years. • **LOI:** The produced Bio CNG will be supplied to IOCL as per the LOI issued by OMC under SATAT scheme, which is an effortless avenue for the project to generate the revenue. ***(Ref No. - Indian Oil/SATAT/01/3646, Date: 2nd Jan 2024).*** • **Government Support:** The project will be entitled to avail incentives of INR 4.0 Cr per 4800 kg/day for Bio CNG generation from new biogas plant, Under Waste to Energy Programme of Ministry of New and Renewable Energy. • **Technology:** The proposed plant (Semi-Automatic) will be commissioned with CSTR Mesophilic bio-methanation technology, which is a proven technology empirically.
WEAKNESSES	• **CAPEX:** The proposed Bio CNG plant would be set up by a high initial investment, in which 70% capital would be required for plant & machinery. • **Infrastructure Requirements:** The project's power load and water consumption are significant, and ensuring uninterrupted power supply and adequate water resources may pose challenges. • **Raw Material Market:** There is no any formal market for raw material, leading to establish a feedstock pricing mechanism.
OPPORTUNITIES	• **Increasing Alternate fuel's Demand:** As the transportation industry is expanding, there will be an organic demand for Bio CNG/CBG as an alternate fuel due to mandatory blending of compressed biogas (CBG) in compressed natural gas (CNG) for transportation. • **Expansion Potential:** The Company is having the plan to expand its

	business in future for manufacturing Bio Coal and Bio Pellets. • **Government Support:** The project can benefit from government initiatives and policies aimed at promoting the Bio CNG production to achieve Net Zero target by 2070.
THREATS	• **Fluctuating Raw Material Prices:** With the increasing demand of sugarcane press mud, the prices are shooting up rapidly. • **Economic Factors:** Profitability of the project may hamper due to any blockage of feed stock. • **Dependency on LOI:** Any breach of the LOI agreement with OMC, the company may require to search the new approach to sell its production in the market. • **Manufacturing Experience:** Promoters are having experience of other family businesses, however entering into Bio CNG generating business may explore new multidimensional challenges.

PART J — PROJECT COST AND MEANS OF FINANCE

As per data/information shared by the client, the proposed Bio CNG generating project is proposed to be commissioned by making an investment of INR 3,200.00 lakhs as shown in the below table along with Means of finance:

Total Project Cost		
S. No.	**Capital Cost Head**	**Amount (INR)**
1	Electricity Connection	₹ 50,00,000
2	Civil Work	₹ 8,12,94,080
3	Plant & Machinery	₹ 21,57,80,320
4	Miscellaneous Assets	₹ 6,00,000
5	Preliminary Expense	₹ 15,80,000
6	Working Capital Margin (WCM)	₹ 16,67,000
7	Interest During Construction (IDC)	₹ 1,26,27,083
8	Contingencies Expenses	₹ 14,51,517
	TOTAL	**₹ 32,00,00,000**
Means of Finance		
S. No.	**Particular**	**Amount (INR)**
1	Promoters' Margin	₹ 10,00,00,000
2	Loan from Banks	₹ 22,00,00,000
	TOTAL	**₹ 32,00,00,000**
	CC Loan	₹ 50,00,000
	Total Loan	**₹ 22,50,00,000**

Source: *Data/Information provided by the company.*

Notes:

1. As per the shared sale/lease deed, a 2.2540 hectare (22,540 Sq. Mt.) land has been purchased by the promoters at Laksar, Haridwar, Uttarakhand 247663 and leased out in the name of M/s Naruma Industries Private Limited for a period of 29 years on an annual lease rental of INR 12,000/annum (excluding all other charges) through an executed lease deed on 23rd August 2022

2. As per the data/information provided by the client, Company has submitted an application to the Electricity Distribution Division (EDD), Laksar, Haridwar for sanctioning a required power connection of 800 Kwh, the cost of electricity infrastructure will be borne by the company for which a tentative estimated cost would be ~INR 50.00 lakhs including connection & fix charges, excavation, pipeline laying with cable and installation.

3. The estimated cost of the Building & Civil works is ~INR 812.00 lakhs including applicable 12% GST. As per the Cost vetting report shared by the client, the estimated cost has been verified by AR. Amit Kumar Chauhan *(Ref: Regd. Valuer F-20584, Panel Valuer (L.I.C) – DDV0017 Regd. No. -4/2023-14)*. However, as a TEV consultant, the estimated Building & Civil works cost has been verified independently by us, which we found in the permissible range.

4. The cost of Plant & Machinery has been considered as per the contract agreement between Company & the appointed EPC consultant. The estimated cost for plant & machinery will be ~INR 2,158.00 lakhs including the applicable GST of 12%. However, as a TEV consultant the cost of major plant & machinery has been verified by us independently, which we found reasonable & in the permissible range also the cost may change as per specifications & brand.

5. Estimated cost of miscellaneous assets would be ~INR 6.00 lakhs. Preliminary & Pre-Operative Expenses has been taken as lump sum basis, based on the time period of construction and estimate of company's resources involvement during this time in supervision & monitoring of the construction as INR 15.80 lakhs.

6. Contingency cost of INR 14.51 lakhs (~0.45% of TPC) has been considered based on general assumption and professional experience. Interest during Construction will be paid from March 2024 by the company @ 9.50%.

7. Company is eligible for a subsidy of INR 400.00 lakhs Under Waste to Energy Programme of Ministry of New and Renewable Energy, which is not adjusted in loan account as requested by bank to check the viability of the project without any financial assistance by government.

8. The project is proposed to be funded through a term loan of INR 22.00 crores and promoter's margin of INR 10.00 crores. Further, as per the working capital assessment, the working capital will require ~ INR 66.64 lakhs, which will be funded through WC loan of INR 50.00 lakhs and promoters margin of INR 16.67 lakhs (~25% of required WC in the first full operational year).

PART K PROJECT IMPLEMENTETION SCHEDULE

The proposed Bio CNG generating unit is expected to achieve its C.O.D till 1st January 2025, as per the proposed implementation schedule shown in the table below:

S. No.	Particulars	Activity	Expected completion date	Status
1.	Land	Land Procurement	23rd Aug 2022	CLU is approved by Sub Divisional Magistrate, Laksar on 22nd August 2022
		Land Development	April 2024	Pending
2.	Sanction of Rupee Term Loan	Sanction of Rupee Term Loan	April 2024	Pending
3.	Building & Civil Works	Appointment of Architect	23rd Dec 2023	Completed
		Building Plan Preparation	13th Dec 2023	Completed
		Building Plan Sanction	Dec 2023	Completed
		Appointment of Civil contractor/ developer	23rd Dec 2023	Completed
		Building & Civil Works completion	August 2024	Pending
4.	Plant & Machinery	Finalization of P&M suppliers	23rd Dec 2023	Completed
		Orders to P&M suppliers	23rd Dec 2023	Completed
		Arrival of P&M	September, 2024	Pending
		Installation of P&M	December 2024	Pending

		Utility Installation	January, 2024	
5.	Statutory Approvals, registrations & NOCs	From the respective authorities	Feb, 2024	Pending
6.	Finishing & Trail Run	Informed by client	March, 2024	Pending (Post C.O.D approval)
7.	Commercial Operation Date	Informed by client	1st April 2025	Pending

Notes:

1. Schedule has been made as per feasibility to achieve different milestones.
2. Achievement of Milestone will depend on sanction of term loan as per proposed timeline.
3. For current status of statutory approvals, kindly refer the "Section L" of this report.
4. As per this timeline, the expected C.O.D will be 1st April 2025.

PART L — STATUTORY APPROVALS | LICENCES | NOC

As shown in the below table along with current status, following major approvals are required. However the list is not exhaustive and State/District Authorities may be approached for further clearances required (if any):

S. No.	REQUIRED APPROVALS	DATE REFERENCE NO.	STATUS (Approved/ Applied For/ Pending)
1.	Certificate of Incorporation *Ministry of Corporate Affairs, Government of India*	1st June 2022 CIN: U24299UR2022PTC014131	Approved
2.	Land conversion to Industrial/Non agriculture *Sub Divisional Magistrate, Laksar, Haridwar*	23rd August 2022	Approved
3.	NOC from Gram Panchayat *Gram Panchayat Tughalpur, Haridwar, Uttarakhand*	Application No. - 76 26th Dec 2023	Approved
4.	Labour Licence Registration & grant of license under The Factories Act, 1948 *Department of Labour, Uttarakhand*	7th Feb 2024 Certificate No:02-7-CAFIP-6921183087298	Approved
5.	Building and civil works Plan Sanction Approval *Concerned local development authority*	December 2023	Approved
6.	Pre-establishment fire NOC *Uttarakhand Fire and Emergency Services*	5th Feb 2024 Certificate No:02-7-CAFIP-6921183087298	Approved
7.	Fire NOC (on completion) *Fire Services Department*	-	Will be Applied post C.O.D.

8.	New HT line - non domestic /industrial Power Connection *Uttarakhand Power Corporation Limited*	5th Feb 2024 Certificate No:02-7-CAFIP-6921183087298	Approved
9.	Consent to Establish under Air (Prevention and Control of Pollution) Act, 1981 & Water (Prevention and Control of Pollution) Act, 1974 *Uttarakhand Pollution Control Board*	2nd Feb 2024 Certificate No:02-7-CAFIP-6921183087298	Approved
10.	No Objection Certificate (NOC) for ground water abstraction *Central Ground Water Authority, Department of Water Resources, River Development And Ganga Rejuvenation Ministry Of Jal Shakti, Govt. Of India*	19th March 2024 NOC No. CGWA/NOC/IND/ORIG/2024/20044	Approved
11.	Udyam Registration Certificate (MSME)	27th Nov 2023 UDYAM-UK-06-0035781	Approved
12.	Petroleum & Explosives Safety Organisation (PESO) *Filling of Compressed Bio Gas (CBG) and Storage of Compressed Bio Gas (CBG) under Gas Cylinders Rules , 2016 Ministry of Commerce & Industry, GoI*	4th March 2024 Prior Approval No : A/G/HO/UC/05/89 & A/G/HO/UC/06/89 (G128692)	Approved

Observation Note:

1. Company has taken the In-Principle Project Approval from State/District Nodal Agency, Single Window Clearance System, Government of Uttarakhand on 8th Feb 2024 *(Ref: Certificate No:02-7-CAFIP-6921183087298).*

2. Above is the only illustration of the major approvals sought or to be sought by the company. It should not be construed as the exhaustive list and in case any approval is missed to be mentioned then it is the sole responsibility of the company to keep the unit compliant with the necessary statutory approvals/ NOCs.

PART M — COMPANY'S FINANCIAL FEASIBILITY

1. PROJECTIONS OF THE FIRM:

The financial projections of the project are prepared from FY 2024-25 to FY 2035-36 based on the expected COD and loan tenor as per the best practice in industry to assess the financial feasibility of the project are elaborated below:

A. PROJECTED PROFIT & LOSS ACCOUNT:

(INR Lakhs)

Financial Year	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030	FY 2031
Months	**12**	**12**	**12**	**12**	**12**	**12**
% Production	100%	100%	100%	100%	100%	100%
Escalation Factor (5%)	1.00	1.05	1.10	1.16	1.22	1.28
Sale of Bio-CNG	1260.00	1323.00	1389.15	1458.61	1531.54	1608.11
Sale of Solid & Liquid Fertilizer	346.50	363.83	382.02	401.12	421.17	442.23
Gross Annual Sale	**1606.50**	**1686.83**	**1771.17**	**1859.72**	**1952.71**	**2050.35**
1. Raw Material	276.50	290.33	304.84	320.08	336.09	352.89
2. Power	170.24	178.75	187.69	197.07	206.93	217.27
3. Factory Overheads	14.60	15.33	16.10	16.90	17.75	18.63
Total Variable Cost	**461.34**	**484.41**	**508.63**	**534.06**	**560.76**	**588.80**
1. Office and other Overheads	206.51	216.84	227.68	239.06	251.02	263.57
2 Lease Rental	0.50	0.50	0.50	0.50	0.55	0.55
3. Bio CNG Transportation Cost	35.00	36.75	38.59	40.52	42.54	44.67
4. Preliminary Expenses Written off	3.16	3.16	3.16	3.16	3.16	0.00
Total Fixed Cost	245.17	257.25	269.93	283.24	297.27	308.79
Total Production Cost	**706.51**	**741.65**	**778.55**	**817.30**	**858.03**	**897.59**
EBIDTA	899.99	945.17	992.61	1042.43	1094.68	1152.76
Interest on Term Loan	207.43	196.46	183.92	167.20	146.30	125.40
Interest on Working Capital Loan	4.75	4.75	4.75	4.75	4.75	4.75
Depreciation	176.40	176.40	176.40	176.40	176.40	176.40

PBT	511.40	567.56	627.54	694.07	767.23	846.21
Less : Taxation	201.35	223.76	247.10	272.35	299.57	328.50
PAT	**310.05**	**343.80**	**380.44**	**421.72**	**467.66**	**517.70**

(Continued)

Financial Year	FY 2032	FY 2033	FY 2034	FY 2035	FY 2036
Months	**12**	**12**	**12**	**12**	**12**
% Production	100%	100%	100%	100%	100%
Escalation Factor (5%)	1.34	1.41	1.48	1.55	1.63
Sale of Bio-CNG	1688.52	1772.95	1861.59	1954.67	2052.41
Sale of Solid & Liquid Fertilizer	464.34	487.56	511.94	537.54	564.41
Gross Annual Sale	**2152.86**	**2260.51**	**2373.53**	**2492.21**	**2616.82**
1. Raw Material	370.54	389.06	408.52	428.94	450.39
2. Power	228.14	239.54	251.52	264.10	277.30
3. Factory Overheads	19.57	20.54	21.57	22.65	23.78
Total Variable Cost	**618.24**	**649.15**	**681.61**	**715.69**	**751.47**
1. Office and other Overheads	276.75	290.58	305.11	320.37	336.39
2 Lease Rental	0.55	0.55	0.55	0.61	0.67
3. Bio CNG Transportation Cost	46.90	49.25	51.71	54.30	57.01
4. Preliminary Expenses Written off	0.00	0.00	0.00	0.00	0.00
Total Fixed Cost	324.20	340.38	357.37	375.27	394.06
Total Production Cost	**942.44**	**989.53**	**1038.98**	**1090.96**	**1145.54**
EBIDTA	1210.42	1270.97	1334.55	1401.25	1471.28
Interest on Term Loan	104.50	81.51	56.43	29.26	3.66
Interest on Working Capital Loan	4.75	4.75	4.75	4.75	4.75
Depreciation	176.40	176.40	176.40	176.40	176.40
PBT	924.77	1008.31	1096.97	1190.84	1286.47
Less : Taxation	357.08	387.13	418.75	451.97	485.64
PAT	**567.70**	**621.18**	**678.22**	**738.87**	**800.83**

B. PROJECTED BALANCE SHEET:

Below table shows the Projected Balance Sheet of the proposed Bio CNG generating project from the period FY 2024-25 to FY 2035-36. FY 2025 would be the implementation period of the project:

(INR Lakhs)

Financial Year	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030
Months	**Constr.**	**Constr.**	**12 M**	**12 M**	**12 M**	**12 M**	**12 M**
Liabilities							
Equity	58.91	500.00	500.00	500.00	500.00	500.00	500.00
Reserve & Surplus	0.00	0.00	310.05	653.85	1034.29	1456.00	1923.66
Secured Loan	0.00	2134.00	2002.00	1870.00	1650.00	1430.00	1210.00
Unsecured loan	0.00	500.00	500.00	500.00	500.00	500.00	500.00
Current Liabilities							
Trade Payables	0.00	0.00	13.07	13.72	14.40	15.12	15.88
Term liabilities payable within one year	0.00	66.00	132.00	132.00	220.00	220.00	220.00
CC Limit	0.00	0.00	50.00	50.00	50.00	50.00	50.00
Total Equity & Liabilities	**58.91**	**3200.00**	**3507.12**	**3719.57**	**3968.69**	**4171.13**	**4419.54**
Gross Assets							
Civil Work	0.00	855.23	855.23	855.23	855.23	855.23	855.23
Plant & Machinery	0.00	2270.06	2270.06	2270.06	2270.06	2270.06	2270.06
Other Fixed Assets	6.31	6.31	6.31	6.31	6.31	6.31	6.31
Electricity Connection	52.60	52.60	52.60	52.60	52.60	52.60	52.60
Total Gross Block	**58.91**	**3184.20**	**3184.20**	**3184.20**	**3184.20**	**3184.20**	**3184.20**
Depreciation	0.00	0.00	176.40	352.80	529.21	705.61	882.01
Net Block	**58.91**	**3184.20**	**3007.80**	**2831.40**	**2654.99**	**2478.59**	**2302.19**
Trade Receivables	0.00	0.00	96.39	101.21	106.27	111.58	117.16
Inventories	0.00	0.00	5.53	5.81	6.10	6.40	6.72
CASH & BANK	0.00	15.80	384.76	771.68	1195.01	1571.39	1993.47
Current Assets	**0.00**	**15.80**	**486.68**	**878.69**	**1307.38**	**1689.38**	**2117.35**

Preliminary Expenses W/off	0.00	0.00	12.64	9.48	6.32	3.16	0.00
Total Assets	**58.91**	**3200.00**	**3507.12**	**3719.57**	**3968.69**	**4171.13**	**4419.54**

(Continued)

Financial Year	FY 2031	FY 2032	FY 2033	FY 2034	FY 2035	FY 2036
Particulars	**12 M**	**12 M**	**12 M**	**12 M**	**12 M**	**12 M**
Liabilities						
Equity	500.00	500.00	500.00	500.00	500.00	500.00
Reserve & Surplus	2441.37	3009.06	3630.24	4308.47	5047.34	5848.16
Secured Loan	990.00	726.00	462.00	154.00	0.00	0.00
Unsecured loan	500.00	500.00	500.00	500.00	500.00	500.00
Current Liabilities						
Trade Payables	16.67	17.51	18.38	19.30	20.27	21.28
Term liabilities payable within one year	220.00	264.00	264.00	308.00	154.00	
CC Limit	50.00	50.00	50.00	50.00	50.00	50.00
Total Equity & Liabilities	**4718.04**	**5066.57**	**5424.63**	**5839.77**	**6271.60**	**6919.44**
Gross Assets						
Civil Work	855.23	855.23	855.23	855.23	855.23	855.23
Plant & Machinery	2270.06	2270.06	2270.06	2270.06	2270.06	2270.06
Other Fixed Assets	6.31	6.31	6.31	6.31	6.31	6.31
Electricity Connection	52.60	52.60	52.60	52.60	52.60	52.60
Total Gross Block	**3184.20**	**3184.20**	**3184.20**	**3184.20**	**3184.20**	**3184.20**
Depreciation	1058.41	1234.81	1411.22	1587.62	1764.02	1940.42
Net Block	**2125.79**	**1949.39**	**1772.98**	**1596.58**	**1420.18**	**1243.78**
Trade Receivables	123.02	129.17	135.63	142.41	149.53	157.01
Inventories	7.06	7.41	7.78	8.17	8.58	9.01
CASH & BANK	2462.17	2980.60	3508.23	4092.60	4693.31	5509.65
Current Assets	**2592.25**	**3117.19**	**3651.64**	**4243.19**	**4851.42**	**5675.67**
Preliminary Expenses W/off	0.00	0.00	0.00	0.00	0.00	0.00

Total Assets	4718.04	5066.57	5424.63	5839.77	6271.60	6919.44

C. PROJECTED CASH FLOW STATEMENT:

(INR Lakhs)

Financial Year	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030
Particulars	**Constr.**	**Constr.**	**12 M**	**12 M**	**12 M**	**12 M**	**12 M**
A. Source Of Fund							
Net Profit	0.00	0.00	310.05	343.80	380.44	421.72	467.66
Increase in Equity / Share Capital	58.91	941.09	0.00	0.00	0.00	0.00	0.00
Increase in TL	0.00	2200.00	0.00	0.00	0.00	0.00	0.00
Increase in CC Limit	0.00	0.00	50.00				
Depreciation	0.00	0.00	176.40	176.40	176.40	176.40	176.40
Preliminary Expenses w/off	0.00	0.00	3.16	3.16	3.16	3.16	3.16
Trade payables	0.00	0.00	13.07	0.65	0.69	0.72	0.76
Subsidy Inflow		0.00	0.00	0.00	0.00		
TOTAL	**58.91**	**3141.09**	**552.68**	**524.02**	**560.68**	**602.00**	**647.98**
B. Application Of Funds							
Capital Expenses	58.91	3125.29	0.00	0.00	0.00	0.00	0.00
Decrease in Term Loan	0.00	0.00	66.00	132.00	132.00	220.00	220.00
Trade Receivable	0.00	0.00	96.39	4.82	5.06	5.31	5.58
Inventory	0.00	0.00	5.53	0.28	0.29	0.30	0.32
Preliminary Expense	0.00	0.00	15.80				
TOTAL	**58.91**	**3125.29**	**183.72**	**137.10**	**137.35**	**225.62**	**225.90**
Opening Balance	0.00	0.00	15.80	384.76	771.68	1195.01	1571.39
Net Surplus/ Deficit	0.00	15.80	368.96	386.92	423.33	376.38	422.08
Cumulative Balance	**0.00**	**15.80**	**384.76**	**771.68**	**1195.01**	**1571.39**	**1993.47**

(Continued)

Financial Year	FY 2031	FY 2032	FY 2033	FY 2034	FY 2035	FY 2036
Particulars	**12 M**	**12 M**	**12 M**	**12 M**	**12 M**	**12 M**
A. Source Of Fund						
Net Profit	517.70	567.70	621.18	678.22	738.87	800.83
Increase in Equity / Share Capital	0.00	0.00	0.00	0.00	0.00	0.00
Increase in TL	0.00	0.00	0.00	0.00	0.00	0.00
Increase in CC Limit						
Depreciation	176.40	176.40	176.40	176.40	176.40	176.40
Preliminary Expenses w/off	0.00	0.00	0.00	0.00	0.00	0.00
Trade payables	0.79	0.83	0.88	0.92	0.97	1.01
Subsidy Inflow						
TOTAL	**694.90**	**744.93**	**798.46**	**855.54**	**916.24**	**978.24**
B. Application Of Funds						
Capital Expenses	0.00	0.00	0.00	0.00	0.00	0.00
Decrease in Term Loan	220.00	220.00	264.00	264.00	308.00	154.00
Trade Receivable	5.86	6.15	6.46	6.78	7.12	7.48
Inventory	0.34	0.35	0.37	0.39	0.41	0.43
Preliminary Expense						
TOTAL	**226.19**	**226.50**	**270.83**	**271.17**	**315.53**	**161.91**
Opening Balance	1993.47	2462.17	2980.60	3508.23	4092.60	4693.31
Net Surplus/ Deficit	468.70	518.43	527.63	584.37	600.71	816.34
Cumulative Balance	**2462.17**	**2980.60**	**3508.23**	**4092.60**	**4693.31**	**5509.65**

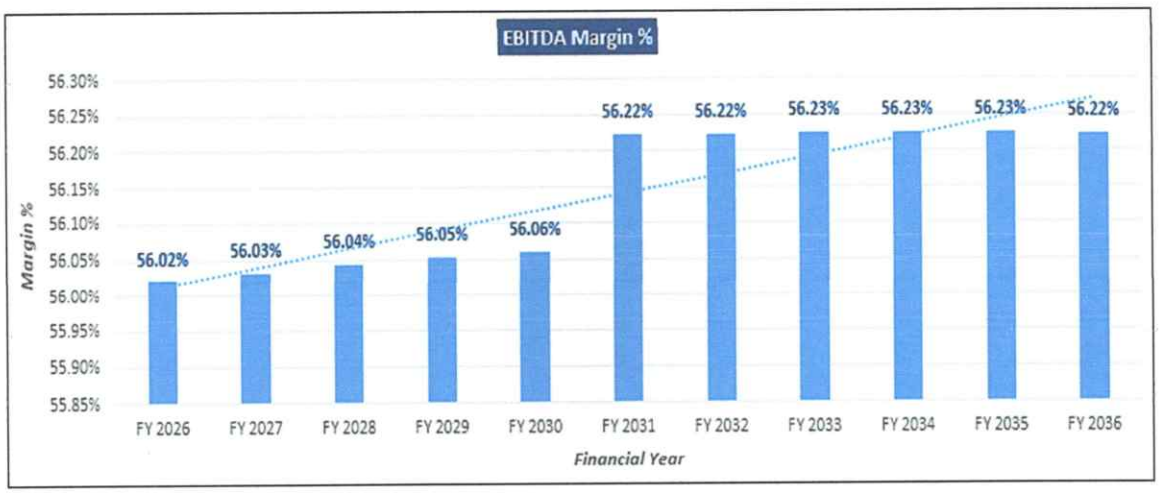
D. KEY FINANCIAL RATIO:

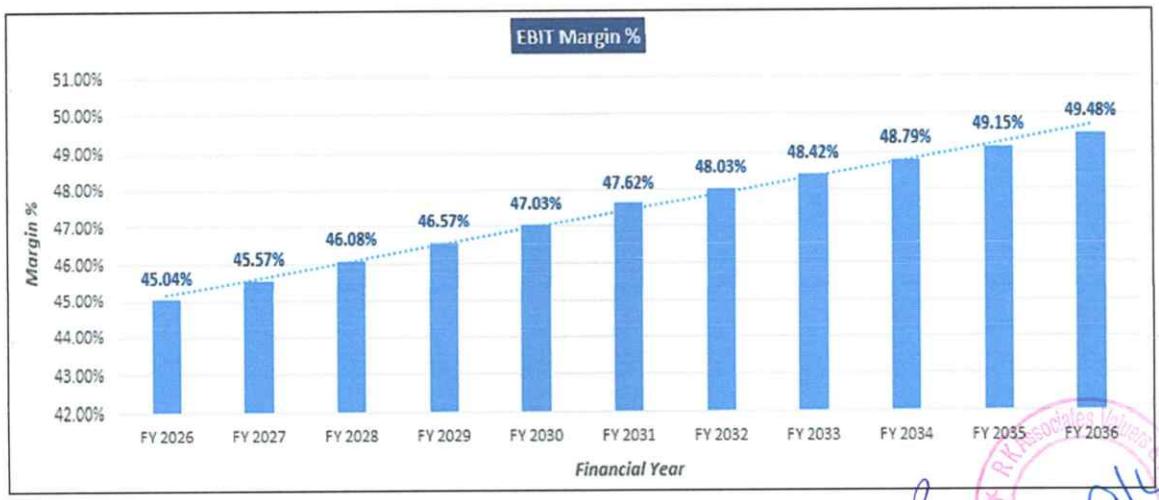
YEAR	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030	FY 2031	FY 2032	FY 2033	FY 2034	FY 2035	FY 2036
EBITDA Margin %	*56.02 %*	*56.03 %*	*56.04 %*	*56.05 %*	*56.06 %*	*56.22 %*	*56.22 %*	*56.23 %*	*56.23 %*	*56.23 %*	*56.22 %*

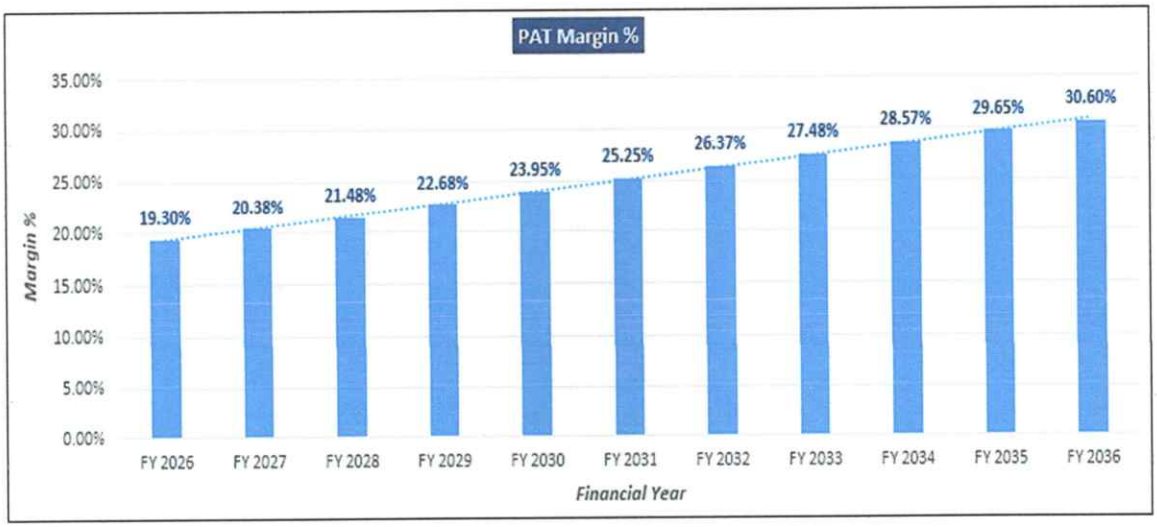
Average	56.14%										
EBIT Margin %	45.04 %	45.57 %	46.08 %	46.57 %	47.03 %	47.62 %	48.03 %	48.42 %	48.79 %	49.15 %	49.48 %
Average	47.44%										
PAT Margin %	19.30 %	20.38 %	21.48 %	22.68 %	23.95 %	25.25 %	26.37 %	27.48 %	28.57 %	29.65 %	30.60 %
Average	25.06%										
Revenue Growth %		5.00 %	5.00 %	5.00 %	5.00 %	5.00 %	5.00 %	5.00 %	5.00 %	5.00 %	5.00 %
Average	5.00%										

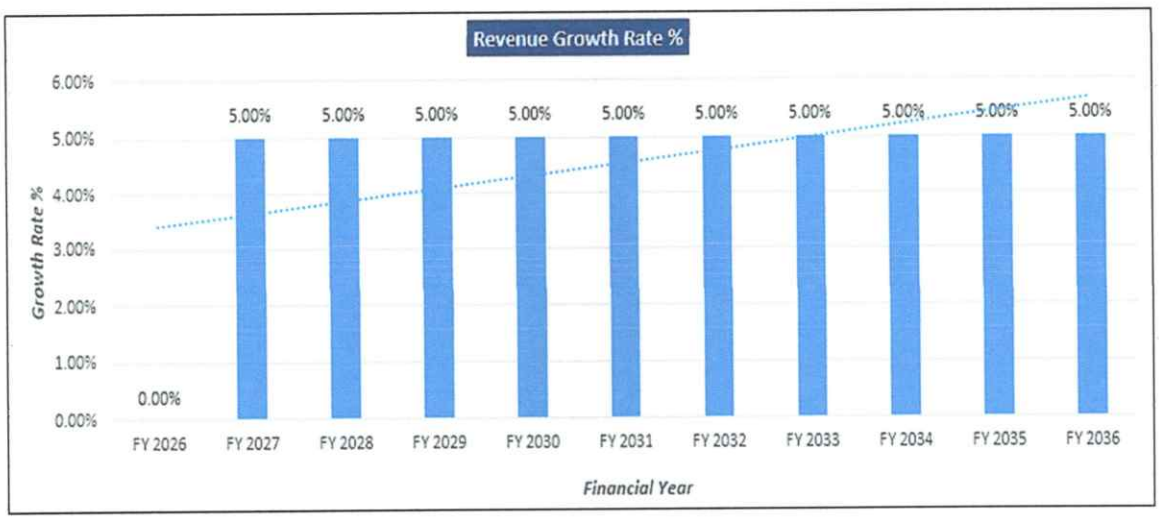
Note: Revenue growth rate is constant as 5% during the forecasted period since the proposed plant will be operating @100% capacity to produce 5 TPD CBG as per the LOI with OMC, however the growth of 5% here is due to the escalation in selling price assumed during the forecasted period. PAT margin is growing from 19.30% in FY 2026 to 30.60% in FY 2036 due to the lower interest cost in the later projected years.

E. GRAPHICAL REPRESENTATION OF KEY RATIOS:









F. ESTIMATED KEY FINANCIAL METRICS:

DEBT SERVICE COVERAGE RATIO (DSCR)

Particular	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030	FY 2031
PAT (Profit After Tax)	310.05	343.80	380.44	421.72	467.66	517.70
Depreciation+ Preliminary Exp. Written off	179.56	179.56	179.56	179.56	179.56	176.40
Interest on term loan	207.43	196.46	183.92	167.20	146.30	125.40
Interest on CC	4.75	4.75	4.75	4.75	4.75	4.75
Subtotal	**701.80**	**724.57**	**748.67**	**773.23**	**798.27**	**824.25**
Interest on term loan	207.43	196.46	183.92	167.20	146.30	125.40
Interest on CC	4.75	4.75	4.75	4.75	4.75	4.75

Loan Repayment	66.00	132.00	132.00	220.00	220.00	220.00
Subtotal	**278.18**	**333.21**	**320.67**	**391.95**	**371.05**	**350.15**
DSCR	**2.52**	**2.17**	**2.33**	**1.97**	**2.15**	**2.35**

(Continued)

Particular	FY 2032	FY 2033	FY 2034	FY 2035	FY 2036
PAT (Profit After Tax)	567.70	621.18	678.22	738.87	800.83
Depreciation+ Preliminary Exp. Written off	176.40	176.40	176.40	176.40	176.40
Interest on term loan	104.50	81.51	56.43	29.26	3.66
Interest on CC	4.75	4.75	4.75	4.75	4.75
Subtotal	**853.35**	**883.84**	**915.80**	**949.28**	**985.64**
Interest on term loan	104.50	81.51	56.43	29.26	3.66
Interest on CC	4.75	4.75	4.75	4.75	4.75
Loan Repayment	220.00	264.00	264.00	308.00	154.00
Subtotal	**329.25**	**350.26**	**325.18**	**342.01**	**162.41**
DSCR	**2.59**	**2.52**	**2.82**	**2.78**	**6.07**
Average D.S.C.R	2.58				
Max. D.S.C.R	6.07				

G. SENSITIVITY ANALYSIS OF D.S.C.R:

The proposed project is found comparatively more sensitive with respect to the revenue, than the cost of raw material and any surge in the interest rate. Sensitivity analysis of the project with respect to 10% decrease in the revenue, 10% increase in the cost of raw material and 2% increment in the proposed interest rate has been shown in the below table:

Sensitivity Analysis of D.S.CR			
S. No.	**Particular**	**Average D.S.C.R**	**Max. D.S.C.R**
1.	If the projected revenue decreased by 10%	2.15	5.00
2.	If the projected Cost of raw material decreased by 10%	2.50	5.89
3.	If interest rate is increased by 2%	2.42	6.04

H. NPV,IRR AND PAYBACK PERIOD OF THE PROJECT:

(INR Lakhs)

Free Cash Flow for the project							
Particulars	**FY 2024**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**	**FY 2030**
Period (Months)	0	0	12	12	12	12	12
EBIT	0.0	0.0	723.6	768.8	816.2	866.0	918.3
Less: Taxes	0.0	0.0	201.4	223.8	247.1	272.4	299.6
Add: Depreciation & Amortisation	0.0	0.0	176.4	176.4	176.4	176.4	176.4
NOPAT	**0.0**	**0.0**	**698.6**	**721.4**	**745.5**	**770.1**	**795.1**
+/- WCC	0.0	0.0	88.9	4.4	4.7	4.9	5.1
Capex	**59**	**3125**	**0**	**0**	**0**	**0**	**0**
Free Cash Flow to Firm (FCFF)	**(59)**	**(3,125)**	**610**	**717**	**741**	**765**	**790**
Discount Period	0.00	0.00	1.00	2.00	3.00	4.00	5.00
Discount Factor	1.00	1.00	0.87	0.76	0.67	0.58	0.51
PV Of FCFF	(58.91)	(3125.2)	533.26	548.31	495.47	447.52	404.04
TV	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PV Of TV	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PV(FCFF+TV)	(58.91)	(3125.2)	533.26	548.31	495.47	447.52	404.04

(Countinue)

Particulars	FY 2031	FY 2032	FY 2033	FY 2034	FY 2035	FY 2036
Period (Months)	12	12	12	12	12	12
EBIT	976.4	1034.0	1094.6	1158.1	1224.8	1294.9
Less: Taxes	328.5	357.1	387.1	418.7	452.0	485.6
Add: Depreciation & Amortisation	176.4	176.4	176.4	176.4	176.4	176.4
NOPAT	**824.3**	**853.3**	**883.8**	**915.8**	**949.3**	**985.6**
+/- WCC	5.4	5.7	6.0	6.3	6.6	6.9
Capex	**0**	**0**	**0**	**0**	**0**	**0**
Free Cash Flow to Firm (FCFF)	**819**	**848**	**878**	**910**	**943**	**979**
Discount Period	6.00	7.00	8.00	9.00	10.00	11.00
Discount Factor	0.45	0.39	0.34	0.30	0.26	0.23
PV Of FCFF	366.26	331.57	300.30	272.08	246.62	223.91

TV	0.00	0.00	0.00	0.00	0.00	7102.09
PV Of TV	0.00	0.00	0.00	0.00	0.00	1624.76
PV(FCFF+TV)	366.26	331.57	300.30	272.08	246.62	1848.66

Key Input for NPV & IRR		
S. No.	**Key Input**	**Description**
1.	Nifty 50 Returns (CAGR) in the Last 20 Years	13.35% (https://kunaldesai.blog/nifty-50-cagr-last-20-years/)
2.	Company Risk Premium	1%
3.	Discount Rate	14.35%
4.	Perpetual Growth Rate	0.50%
NPV		**INR 2609.90 Lakhs**
IRR		**10.33%**

Payback Period of the Project		
Financial Year	**Cash Accrual**	**Accumulated Cash Accrual**
2026	489.61	489.61
2027	523.36	1012.97
2028	560.00	1572.97
2029	601.28	2174.25
2030	647.22	2821.47
2031	694.10	3515.58
2032	744.10	4259.68
2033	797.58	5057.26
2034	854.62	5911.88
2035	915.27	6827.16
2036	977.23	7804.39
Total	**7804.39**	
TPC	**INR 3200.00 lakhs**	
Payback Period	**5.55 Years**	

Thus, the project will be having a payback period of **5.55 years** and NPV & IRR of the project as on COD will **INR 2609.90 Lakhs** & **10.33%** respectively, which indicates worthiness of the project.

I. OTHER FINANCIAL RATIOS:

Financial Year	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Return On Sale (%)			*19%*	*20%*	*21%*	*23%*	*24%*	*25%*	*26%*	*27%*	*29%*	*30%*	*31%*

Return On Capital (%)		0%	26%	25%	25%	25%	25%	25%	24%	24%	23%	22%	20%
Return On Investment		0%	62%	69%	76%	84%	94%	104 %	114 %	124 %	136 %	148 %	160 %
Return On Net Worth		0%	38%	30%	25%	22%	19%	18%	16%	15%	14%	13%	13%
Fixed Assets Coverage		1.49	1.50	1.51	1.61	1.73	1.90	2.15	2.69	3.84	10.3		
Interest Coverage Ratio			4.2	4.7	5.3	6.1	7.2	8.9	11.1	14.7	21.8	41.2	175
Current Ratio		0.24	3.35	6.03	5.58	7.19	8.98	10.9	11.0	12.9	12.9	27.8	266
TOL / TNW	0.00	4.40	2.76	1.81	1.27	0.88	0.62	0.43	0.30	0.19	0.11	0.04	0.01
Debt - Equity Ratio	0.00	4.40	4.27	4.00	3.74	3.30	2.86	2.42	1.98	1.45	0.92	0.31	0.00

J. BREAK-EVEN ANALYSIS:

(INR lakhs)

Financial Year	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Sales	1607	1687	1771	1860	1953	2050	2153	2261	2374	2492	2617
Variable Expenses	461	484	509	534	561	589	618	649	682	716	751
Contribution	1145	1202	1263	1326	1392	1462	1535	1611	1692	1777	1865
Fixed Expenses	245	257	270	283	297	309	324	340	357	375	394
Profit / PBT	900	945	993	1042	1095	1153	1210	1271	1335	1401	1471
PV RATIO	**71%**	**71%**	**71%**	**71%**	**71%**	**71%**	**71%**	**71%**	**71%**	**71%**	**71%**
BEP Sales	344	361	379	397	417	433	455	478	501	526	553
BEP%	**21%**	**21%**	**21%**	**21%**	**21%**	**21%**	**21%**	**21%**	**21%**	**21%**	**21%**

K. TERM LOAN INPUTS:

Term Loan Repayment Inputs	
Total loan amount	**INR 2200.00 lakhs**
Rate of Interest	**9.50%**
1st Disbursement	**April-24**
IDC Start & End Month	**April-24 to March-25**

IDC Period (construction period)	**12 Month**
Commencement /Operation Start	**April-25**
Moratorium Start & End Month (only interest to pay)	**April 2025 to Sept. 2025**
Moratorium Period after COD	**6 Month**
Repayment Start	**Oct-25**
Repayment End	**Sep-35**
Repayment Period	**10**

Financial Year (FY)	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Op. Bal	0	2200	2134	2002	1870	1650	1430	1210	990	726	462	154
Disbursement	2200	0	0	0	0							
Rep.	0	66	132	132	220	220	220	220	264	264	308	154
Closing balance	2200	2134	2002	1870	1650	1430	1210	990	726	462	154.00	0.00
Interest	126	207	196	183	167	146	125	104	81	56	29	3.66
IDC	126											
TL Interest	**0.00**	**207**	**196**	**183**	**167**	**146**	**125**	**104**	**81**	**56**	**29**	**3.66**

L. DEPRECIATION SCHEDULE (STRAIGHT LINE METHOD):

Depreciation Schedule												
Financial Year (FY)	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**
Building	855	855	855	855	855	855	855	855	855	855	855	855
Depreciation - Build	0.0	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1
Plant & Machinery	2,270.1	2,270.1	2,270.1	2,270.1	2,270.1	2,270.1	2,270.1	2,270.1	2,270.1	2,270.1	2,270.1	2,270.1
Depreciation - P&M	0.0	143	143	143	143	143	143	143	143	143	143	143
Other Fix Assets	58.9	58.9	58.9	58.9	58.9	58.9	58.9	58.9	58.9	58.9	58.9	58.9
Depreciation - Other Fix Asst.	0.0	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6
Total SLM Depreciation	**0.0**	**176**	**176**	**176**	**176**	**176**	**176**	**176**	**176**	**176**	**176**	**176**

M. WORKING CAPITAL REQUIREMENT:

(lakhs)

Financial Year (FY)	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Net Working Capital	88.85	93.30	97.96	102.8	108.0	113.4	119.0	125.0	131.2	137.8	144.7
Working Capital Margin	22.21	23.32	24.49	25.72	27.00	28.35	29.77	31.26	32.82	34.46	36.18
Working Capital Required	66.64	69.97	73.47	77.15	81.00	85.05	89.31	93.77	98.46	103.3	108.5
CC loan	***50.00***	***50.00***	***50.00***	***50.00***	***50.00***	***50.00***	***50.00***	***50.00***	***50.00***	***50.00***	***50.00***

2. KEY ASSUMPTIONS & BASIS:

S. No.	Item	Assumptions and Basis
1.	General	a. The projections of the firm are done for the period from FY 2026 to FY 2036, 10 years, to cover the term loan period as per the industry best practices. It is assumed that the plant will be achieving COD on 1st April 2025. b. We have considered both Revenue & cost based model (top to bottom approach) while making the future financial projections. c. Revenue modelling has been done based on required production as per the LOI with the IOCL. Expense modelling has been done based on the capacity utilization during the respective year except for the raw material which is considered based on raw material ratio and its price in the market.
2.	Revenue Build up	a. The plant is assumed to be operational for 350 days for 24 hours annually. b. Company will be generating the revenue by selling 5TPD Bio-CNG to IOCL as per LOI issued by the OMC on 2nd Jan 2024 and by-products (fermented Solid & liquid organic fertilizers). Below table

shows the Revenue of the company @100% capacity utilization:

Revenue @100% capacity			
Products	**Unit Price**	**Annual Quantity**	**Amount (INR)**
Sale of Bio-CNG	72.00 INR/Kg	17,50,000	12,60,00,000
Sale of Compost/ Solid Manure	3.00 INR/Kg	1,05,00,000	3,15,00,000
Sale of Liquid Fertilizer	0.10 INR/Litre.	3,15,00,000	31,50,000
Total Revenue (INR)			**16,06,50,000**

c. Thus the company is expected to generate INR 1606.50 Lakhs (@ 100% Capacity Utilization) in the initial year. Further it is expected to increase up to INR 2616.82 Lakhs till FY 2035-36.

d. Based on the forecasting, the company is achieving an average revenue growth rate of 5% Y-o-Y basis from FY 2026-27 due to a 5% escalation assumed in the selling price during the forecasted period.

3. Pricing (Average Price Per Unit)

a. Proposed selling price per unit of CBG and by products are shown in the below table:

Selling price per unit	
Products	**Unit prices**
Selling price of Bio-CNG @ 80% of Commercial LPG	INR 72.00 per kg
Selling price of solid organic fertilizer	INR 3.00 per kg
Selling price of liquid fertilizer concentrate	INR 0.10 per kg

b. The Bio-CNG produced has to be sold to Indian Oil Corporation Ltd stations situated within 25-75 km, for which the company have already secured a purchase agreement/LOI (Ref No. - Indian Oil/SATAT/01/3646, Date: 2nd Jan 2024), the procurement price of Bio-CNG from Indian Oil as per the SATAT Scheme is around @INR 74.29 per kg without GST.

		c. As per the current market scenario, the fermented organic solid manure/fertilizer is sold to farmers or outlets at around INR 6.00 to 7.00 per kg including with packing and bagging facilities. Whereas the bulk-selling rate of solid fermented organic manure/fertilizer is around 4.00 to 5.00 per kg. d. The other by-product of digestate is called fermented organic liquid manure/fertilizer, which is being sold in the current market at INR 1.00 per litre. e. The selling price of Bio-CNG is considered on conservative side as INR 72.00/kg. The selling rate of fermented organic solid and liquid fertilizers is assumed as INR 3.00 per kg and INR 0.10 per litre respectively on conservative side. f. An escalation factor of 5% has been considered in the prices of the sellable products during the forecasted periods considering the micro and macro-economic factors.
4.	**Capacity Utilization**	a. The proposed CBG generating plant will be commissioned with a Design capacity of 14,100 M3/Day, which will be operating at 90% (12,700 M3/Day) of the designed capacity to generate 5000 Kg Bio-CNG per day as per letter of Intent (LOI) with Indian Oil under SATAT scheme. a. We have assumed 100% capacity utilisation of the plant from the throughout the projected period since 5,000 kg Bio CNG has to be supply by the company to OMC (IOCL).
5.	**Capital Expenditure**	a. As per the data/information provided by the client, Company is in the process for sanctioning a required power connection of 800 Kwh. For which a tentative estimated cost would be ~INR 50.00 lakhs including connection & fix charges, excavation, pipeline laying with cable and installation. As per informed by the client, company

		will submit actual cost to the bank once they received it from Electricity Distribution Division (EDD), Laksar, Haridwar b. The estimated cost of the Building & Civil works is ~INR 812.00 lakhs including applicable 12% GST. As per the Cost vetting report shared by the client, the estimated cost has been verified by AR. Amit Kumar Chauhan (Ref: Regd. Valuer F-20584, Panel Valuer (L.I.C) – DDV0017 Regd. No. -4/2023-14). However, as a TEV consultant, the estimated Building & Civil works cost has been verified independently by us and found in the permissible range. c. The cost of Plant & Machinery has been considered as per the contract agreement between Company & the appointed EPC consultant. The estimated cost for plant & machinery will be ~INR 2,158.00 lakhs including the applicable GST of 12%. However, as a TEV consultant the cost of major plant & machinery has been verified by us independently, which we found in the permissible range. d. Estimated cost of miscellaneous assets would be ~INR 6.00 lakhs. Preliminary & Pre-Operative Expenses has been taken as lump sum basis, based on the time period of construction and estimate of company's resources involvement during this time in supervision & monitoring of the construction as INR 15.80 lakhs. e. Contingency cost of INR 14.51 lakhs (~0.45% of TPC) has been considered based on general assumption. Interest during Construction will be paid from April 2024 by the company @ 9.50%. f. Hence, INR 6.40 Crore per ton including GST, transportation IDC, pre-operative and preliminary expenses etc. will be the capex for this proposed plant which we found in the line with industrial and sectoral benchmarks. (*Reference: As per Ministry of New and Renewable energy, the approx. CAPEX of installing a 5 TPD capacity*

<table>
<tr><td></td><td></td><td>CBG plant is estimated between INR 20-25 crore and ~75 80% of the CAPEX cost is for purchasing plant machinery).</td></tr>
<tr><td>6.</td><td>Expenses</td><td>
a. The sugarcane press mud will be costing @ INR 600 per ton including transportation. Cattle dung is collected from various dairy farms/ nearby villages @ INR 750 per MT including transportation and used as inoculants. The cost of the raw material @ 100% capacity has been shown in the below table:
<table>
<tr><th colspan="4">Raw material Cost @ 100% capacity</th></tr>
<tr><th>Raw Material</th><th>INR/Ton</th><th>Annual Quantity</th><th>Amount INR</th></tr>
<tr><td>Cattle Dung including Transportation</td><td>700</td><td>3,500</td><td>24,50,000</td></tr>
<tr><td>Sugarcane Press mud including transportation</td><td>600</td><td>42,000</td><td>2,52,00,000</td></tr>
<tr><td>Total</td><td colspan="3">INR 2,76,50,000</td></tr>
</table>
b. As per our tertiary research and data available in the public domain, we found the unit rate are in the permissible range. Escalation of 5% is considered during forecasted period.

c. As per information provided by the client, estimated annual consumption of the power will be 21,28,000 Kwh. As per information available on UK power corporation ltd website, the applicable per unit charges will INR 8 per Kwh. Thus the annual electricity expenses would be INR 1,70,24,000. An escalation rate of 5% is assumed on it.

d. A 5% escalation rate has been considered during the forecasted period, on the salary & wages of the proposed manpower.

e. Land has been procured for 29 years on an annual lease rental of INR 12,000/annum (excluding all other charges) through an executed lease deed on 23rd August 2022. INR 50,000 has been considered for annual lease rentals including taxes and other charges applicable as informed by the client.
</td></tr>
</table>

		f. Bio CNG transportation Cost has been considered as INR 2.00 per kg.
7.	**Partial Loan**	a. The project is proposed to be funded through a term loan of INR 22.00 crore and promoter's margin of INR 10.00 crores. b. The tenure of the loan will be 10 years from Oct 2025 to September 2035 post COD, i.e., 1st April 2025, the next 6 months will be considered as moratorium period. As per discussion with bank, Interest rate has been considered as 9.50%. c. Further, as per the working capital assessment, the working capital will required ~INR 66.64 lakhs, which will be funded through WC loan of INR 50.00 lakhs and promoters margin of INR ~16.67 lakhs (~25% of required WC in the first full operational year).

Key Findings:

1. Average DSCR, EBIDTA margin, EBIT margin is 2.58, 56.14%, and 47.44% respectively during the estimated period.

2. The company is having a positive NPV and IRR as on COD, of INR 2609.90 lakhs and 10.33% respectively at the base cases while it may vary with changes in the assumptions & micro and macro-economic trends considered as on date.

3. The proposed project is having a payback period of 5.55 years.

4. Based on the above key financial ratios of the proposed Project during the forecasted period shows that the project appears financially viable if the promoters of the project are able to maintain assumed capacity utilization, revenue and can contain cost as assumed above in the calculation.

PART N CONCLUSION

Based on the technological, economical and market analysis done above, various assumptions of sectoral trends taken, product pricing to be adopted by the company, the Project appears to be Techno-commercially viable subject to the risks, threats, weaknesses, limitations of the product as detailed previously.

As per financial projections for the estimated period, **Average DSCR, EBITDA Margin and EBIT Margin** of the project are **2.58, 56.14%** and **47.44%** respectively, where higher DSCR is the indicator of the project capability to pay out its outstanding debt and EBITDA margin shows the capability of the project to generate the operating profits over the forecasted period. Also the project is having the payback period of **5.55 Years** in the line with sectoral trends.

The proposed Bio-CNG generating facility is having a positive **NPV and IRR** as **INR 2609.90 Lakhs** and **10.33%** respectively at a 100% capacity utilization as the industry is expectedly growing at a CAGR of 6.34% during the forecasted period. While it is not avoidable that the future projections may change in the upcoming years due to various factors impacting the operation, managerial, financial efficiency and economies of scale of the project.

While it would be depending on the management's capability in future that how efficiently company adopts marketing and advertisement strategy, supply chain and carry out inventory & resource management to achieve higher profitability. After considering the foreseen demand of the Bio CNG and its by-products domestically and globally, various initiatives taken by the government, financial analysis of the project based on the assumptions taken over the projected period, it appears reasonable to comment that the proposed project is "**Technically and Economically**" Viable subject to current assumptions considered and occurring the same in the upcoming years same as the forecasted period which is dependent on the sincerity and efforts of the management and various micro and macroeconomic & industry situation.

We have tried our level best to analyse the Project techno-economic feasibility of the Project based on the Industry research, Project information and various futuristic assumption taken within the limitations and challenges came in front of us. However achieving the financial milestones depends on the ability, sincerity and efforts of the company, promoters and its key management to maintain the projected revenue level Y-o-Y basis keeping the fact in mind that the project is found sensitive with respect to the down side fluctuation in the revenue.

Declaration	i. The undersigned does not have any direct/indirect interest in the above property/project/Company. ii. The information furnished herein is true and correct to the best of our knowledge, logical and scientific assumptions. iii. This TEV Report is carried out by our Financial Analyst team on the request from PNB, CBB Branch, Dehradun, 248001. iv. Meeting of Financial projections will be subject to the market & economy stability factors, judicious business operations and proper & timely implementation of the project and putting proper plan for achieving high productivity, efficiency and achieving cost saving benefits to increase profitability. v. We have submitted TEV report to the PNB, CBB Branch.
Number of Pages in the Repost	97
Enclosed Documents	Disclaimer & Remarks 91-94
Place	Noida
Date	2nd April 2024

FOR ON BEHALF OF M/S. R.K. ASSOCIATES VALUER & TECHNO ENGINEERING CONSULTANTS PVT. LTD.		
SURVEYED BY	**PREPARED BY**	**REVIEWED BY**
Mr. Deepak Joshi	**Mr. Gaurav Kumar**	**Mr. Rachit Gupta**
		R.K. Associates Valuers & Techno Engineering Consultants Pvt. Ltd.

PART O | DISCLAIMER | REMARKS

1. No employee or member of R.K Associates has any direct/ indirect interest in the Project.

2. This report is prepared based on the copies of the documents/ information which the Bank/ Company has provided to us out of the standard checklist of documents sought from them and further based on our assumptions and limiting conditions. The client/owner and its management/representatives warranted to us that the information they supplied was complete, accurate and true and correct to the best of their knowledge. All such information provided to us has been relied upon in good faith and we have assumed that it is true and correct in all respect. I/We shall not be liable for any loss, damages, cost or expenses arising from fraudulent acts, misrepresentations, or wilful default on part of the owner, company, its directors, employee, representative or agents. Verification or cross checking of the documents provided to us from the originals or from any Govt. departments/ Record of Registrar has not been done at our end since this is beyond the scope of our work. If at any time in future, it is found or came to our knowledge that misrepresentation of facts or incomplete or distorted information has been provided to us then this report shall automatically become null & void.

3. Legal aspects for e.g. investigation of title, ownership rights, lien, charge, mortgage, lease, sanctioned maps, verification of documents, etc. have not been done at our end and same has to be taken care by legal expert/ Advocate. It is assumed that the concerned Lender/ Financial Institution has satisfied them with the authenticity of the documents, information given to us and for which the legal verification has been already taken and cleared by the competent Advocate before requesting for this report. I/ We assume no responsibility for the legal matters including, but not limited to, legal or title concerns.

4. This report is a general analysis of the project based on the scope mentioned in the report. This is not an Audit report, Design document, DPR or Techno feasibility study. All the information gathered is based on the facts seen on the site during survey, verbal discussion & documentary evidence provided by the client and is believed that information given by the company is true best of their knowledge.

5. This Techno Economic-Viability study is prepared based on certain futuristic assumption which are intra dependent on economic, market and sectorial growth condition in future and socio-economic, socio-political condition at macro and micro level.

6. Meeting of assumption and financial ratio will entirely depend on the sincerity and efforts of the company, promoters and its key managerial performance.

7. All observations mentioned in the report is only based on the visual observation and the documents/ data/ information provided by the client. No mechanical/ technical tests, measurements or any design review have been performed or carried out from our side during Project assessment.

8. This report has been diligently prepared by our techno-financial team to the best of their ability. However, it's important to note that the recommendations provided in this Total Economic Viability (TEV) assessment do not imply an endorsement, validation, or certification of the accuracy or completeness of the disclosed information by the involved stakeholders. Furthermore, we do not claim or endorse that the opinions presented herein are the sole best course of action for decision-makers to follow. There may exist additional approaches and inputs that have not been covered within this report or fall outside the scope of this report.

9. Bank/FII should **ONLY** take this report as an Advisory document from the Financial/ Chartered Engineering firm and its specifically advised to the creditor to cross verifies the original documents for the facts mentioned in the report which can be availed from the borrowing company directly.

10. In case of any default in loans or the credit facility extended to the borrowing company, R.K Associates shall not be held responsible for whatsoever reason may be and any request for seeking any explanation from the employee/s of R.K Associates will not be entertained at any instance or situation.

11. The documents, information, data provided to us during the course of this assessment by the client are reviewed only up to the extent required in relation to the scope of the work. No document has been reviewed beyond the scope of the work.

12. This report only contains general assessment & opinion as per the scope of work evaluated as per the information given in the copy of documents, information, data provided to us and/ and confirmed by the owner/ owner representative to us at site which has been relied upon in good faith. It doesn't contain any other recommendations of any sort including but not limited to express of any opinion on the suitability or otherwise of entering into any transaction with the borrower.

13. We have relied on data from third party, external sources & information available on public domain also to conclude this report. These sources are believed to be reliable and therefore, we assume no liability for the truth or accuracy of any data, opinions or estimates furnished by others that have been used in this analysis. Where we have relied on data, opinions or estimates from external sources, reasonable care has been taken to ensure that such data has been correctly extracted from those sources and /or reproduced in its proper form and context, however still we can't vouch its authenticity, correctness or accuracy.

14. This Report is prepared by our competent technical team which includes Engineers and financial experts & analysts.

15. This is just an opinion report and doesn't hold any binding on anyone. It is requested from the concerned Financial Institution which is using this report for taking financial decision on the project that they should consider all the different associated relevant & related factors also before taking any business decision based on the content of this report.

16. All Pages of the report including annexure are signed and stamped from our office. In case any paper in the report is without stamp & signature then this should not be considered a valid paper issued from this office.

17. Though adequate care has been taken while preparing this report as per its scope, but still we can't rule out typing, human errors, over sightedness of any information or any other mistakes. Therefore, the concerned organization is advised to satisfy themselves that the report is complete & satisfactory in all respect. Intimation regarding any discrepancy shall be brought into our notice immediately. If no intimation is received within **15 (Fifteen) days** in writing from the date of issuance of the report, to rectify these timely, then it shall be considered that the report is complete in all respect and has been accepted by the client up to their satisfaction & use and further to which R.K Associates shall not be held responsible in any manner.

18. Defect Liability Period is **15 DAYS**. We request the concerned authorized reader of this report to check the contents, data and calculations in the report within this period and intimate us in writing if any corrections are required or in case of any other concern with the contents or opinion mentioned in the report. Corrections only related to typographical, calculation, spelling mistakes, incorrect data/ figures/ statement will be entertained within the defect liability period. Any new changes for any additional information in already approved report will be regarded as additional work for which additional fees may be charged. No request for any illegitimate change in regard to any facts & figures will be entertained.

19. R.K Associates encourages its customers to give feedback or inform concerns over its services through proper channel at valuers@rkassociates.org in writing within **15 days** of report delivery. After this period no concern/ complaint/ proceedings in connection with the Techno- Economic Viability Study Services will be entertained due to possible change in situation and condition of the subject Project.

20. Our Data retention policy is of **ONE YEAR**. After this period, we remove all the concerned records related to the assignment from our repository. No clarification or query can be answered after this period due to unavailability of the data.

21. This Techno Economic Viability Study report is governed by our (1) Internal Policies, Processes & Standard Operating Procedures, (2) Information/ Data/ Inputs given to us by the client and (3) Information/ Data/ Facts given to us by our field/ office technical team. Management of R.K Associates never gives acceptance to any unethical or unprofessional practice which may affect fair, correct & impartial assessment and which is against any prevailing law. In case of any indication of any negligence, default, incorrect, misleading, misrepresentation or distortion of facts in the report then it is the responsibility of the user of this report to immediately or at least within the defect liability period bring all such act into notice of R.K Associates management so that corrective measures can be taken instantly.

22. R.K Associates never releases any report doing alterations or modifications from pen. In case any information/ figure of this report is found altered with pen then this report will automatically become **null & void**.

23. If this report is prepared for the matter under litigation in any Indian court, no official or employee of R.K Associates will be under any obligation to give in person appearance in the court as a testimony. For any explanation or clarification, only written reply can be submitted on payment of charges by the plaintiff or respondent which will be 10% of the original fees charged where minimum charges will be Rs. 15,000/.

R.K Associates Valuers & Techno Engineering Consultants Pvt. Ltd.

EXTRACTS OF IMPORTANT STATUTORY APPROVALS PROVIDED BY THE CLIENT

भारत सरकार
जल शक्ति मंत्रालय
जल संसाधन, नदी विकास
और गंगा संरक्षण विभाग
केन्द्रीय भूमि जल प्राधिकरण
Government of India
Ministry of Jal Shakti
Department of Water Resources,
River Development & Ganga Rejuvenation
Central Ground Water Authority

(भूजल निकासी हेतु अनापत्ति प्रमाण पत्र)

NO OBJECTION CERTIFICATE (NOC) FOR GROUND WATER ABSTRACTION

Project Name:	Naruma Industires Private Limited		
Project Address:	Khasra No. 740, Village Tughalpur Paragna Goverdhanpur		
Village:	Khanpur	Block:	Laksar
District:	Haridwar	State:	Uttarakhand
Pin Code:			
Communication Address:	Khasara Number 917, First Floor Ahmedpur Kadach Railway Road, Jwalapur, Laksar, Haridwar, Uttarakhand - 247663		
Address of CGWB Regional Office :	Central Ground Water Board Uttarakhand Region, 419-a, Kanwali Road, Balliwala, Near Urja Bhawan, Dehradun, Dehradun, Uttarakhand - 248001		

1.	**NOC No.:**	CGWA/NOC/IND/ORIG/2024/20044	2.	**Date of Issuence**	19/03/2024
3.	Application No.:	21-4/2151/UT/IND/2024	4.	Category: (GWRE 2023)	Safe
5.	Project Status:	New Project	6.	NOC Type:	New
7.	**Valid from:**	19/03/2024	8.	**Valid up to:**	18/03/2027

9. Ground Water Abstraction Permitted:

Fresh Water		Saline Water		Dewatering		Total	
m³/day	m³/year	m³/day	m³/year	m³/day	m³/year	m³/day	m³/year
80.00	28000.00						

10. Details of ground water abstraction /Dewatering structures

	Total Existing No.:0						Total Proposed No.:1					
	DW	DCB	BW	TW	MP	MPu	DW	DCB	BW	TW	MP	MPu
Abstraction Structure*	0	0	0	0	0	0	0	0	0	1	0	0

*DW- Dug Well; DCB-Dug-cum-Bore Well; BW-Bore Well; TW-Tube Well; MP-Mine Pit;MPu-Mine Pumps

11. Ground Water Abstraction/Restoration Charges paid (Rs.): 50000.00

ग्राम पंचायत तुगलपुर

वि०ख० खानपुर जिला हरिद्वार (उत्तराखण्ड)

प्रधान
श्री श्याम लाल
मो० : 9568948660

निवास/कार्यालय
ग्राम तुगलपुर
पो० खानपुर
जिला हरिद्वार (उत्तराखण्ड)
पिन कोड-247663

पत्रांक 76 | दिनांक 26/12/2023

प्रमाण पत्र

नरुमा इन्डस्ट्रीज प्रा० लि० जिसके डायरेक्टर वंशज गुप्ता एवं रिशभ गुप्ता है। जो ग्राम तुगलपुर में कंप्रेस्ट बायो गैस और फरटीलायजर के उत्पादन। का उद्योग लगाने जा रहे है। तुगलपुर ग्राम पंचायत के निवासीयो को इस उद्योग के लगाने पर किसी प्रकार की कोई आपत्ति नही है। हमारा इस उद्योग को लगाने मे पूर्ण सहयोग रहेगा

SINGLE WINDOW CLEARANCE SYSTEM
GOVERNMENT OF UTTARAKHAND

Status for CAF ID - 87298 is Approved As On 08-02-2024 12:21:00

Application Details	
CAF ID	87298
CAF Date	2023-12-07 17:55:33
CAF Status	Approved
CAF Updated On	2024-02-08 12:17:27
Enterprise Details	
IUID	69211830
Enterprise Name	NARUMA INDUSTRIES PRIVATE LIMITED
Registered Headquarter : Address	Khasra Number 917, First Floor Ahmedpur Kadach Railway Road, Jwalapur, Haridwar, Uttarakhand, 249407
Registered Headquarter : Pin Code	249407
Phone No. of Headquarter	9766543977
Land Line number (with STD Code) of Headquarter	
Email Address	industriesnaruma@gmail.com
Fax	
Organisation Details	
Nature of Organisation	Private Limited Company
MD/CEO/Lead Promoter : Gender	Male
CIN-Company Identification Number	U24299UR2022PTC014131
First Name of MD/CEO/Lead Promoter	Vanshaj
Middle Name of MD/CEO/Lead Promoter	
Last Name of MD/CEO/Lead Promoter	Gupta
MD/CEO/Lead Promoter Caste Category	General
MD/CEO/Lead Promoter Other Category	

केन्द्रीय प्रदूषण नियंत्रण बोर्ड
CENTRAL POLLUTION CONTROL BOARD
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय भारत सरकार
MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE, GOVT. OF INDIA

SPEED POST

CPCB/IPC-VI/ROGW6686-6730 Date: 22.09.2021

To
The Member Secretary
SPCB/PCC
(as per the list)

Sub: Harmonization of Classification of Industrial Sectors into Red, Orange, Green and White Categories-reg.

Sir,

This has reference to CPCB letter dated 30.04.2020 on the above-mentioned subject, wherein 'Compressed/refined bio-gas production from bio-degradable waste' was categorized under Orange Category of industries.

Subsequently, CPCB was in the receipt of representations from various stakeholders with a request to revisit the categorization of Compressed Bio-Gas (CBG) plants in light of the notifications issued by the Ministry of Agriculture and Farmers Welfare vide Gazette Notification No. 2051 dated 14.07.2020 and No. 1972 dated 01.06.2021 regarding inclusion of Fermented Organic Manure (FOM) and Liquid Fermented Organic Manure (LFOM) under Fertilizer (Inorganic, Organic or Mixed) (Control) Act, 1985.

In view of the above notifications and to promote the cleaner sources of energy, CPCB revisited the categorization of CBG plants. Accordingly, CBG plants producing FOM & LFOM as by products in conformity with requirements of Gazette Notification No. 2051 dated 14.07.2020 & No. 1972 dated 01.06.2021, respectively, and utilizing entire FOM & LFOM as a fertilizer or manure on land and also not discharging any waste-water, are to be considered under White category, subject to verification by SPCB on case-to-case basis. The aforesaid criteria may be re-assessed based on ground conditions after a period of two years. CBG plants which do not fall in the aforesaid category are to be categorized based on the type of feed-stocks being used. CBG plants based on animal waste and crop residue as feedstock are categorized under green category. CBG plants based on Municipal Solid Waste (MSW) and process waste as feedstock are categorized under Orange Category.

भारत सरकार /Government of India
वाणिज्य और उद्योग मंत्रालय /Ministry of Commerce & Industry
पेट्रोलियम तथा विस्फोटक सुरक्षा संगठन (पैसो) /Petroleum & Explosives Safety Organisation (PESO)
पांचवा तल, ए-व्लाक, सी.जी.ओ.कॉम्प्लेक्स,सेमिनरी हिल्स
नागपुर- 440006
5th Floor, A-Block, CGO Complex, Seminary Hills,
Nagpur - 440006

ईमेल/ E-mail : explosives@explosives.gov.in
दुरभाष//Phone/Fax No : 0712 -2510248, Fax-2510577

पुर्वानुमोदन सं/Prior Approval No : A/G/HO/UC/05/89 & A/G/HO/UC/06/89 (G128692) दि./ Dated : 04/03/2024

सेवा में To,

M/s. NARUMA INDUSTRIES PRIVATE LIMITED,
Khasra Number 917, First Floor Ahmedpur Kadach ,,
Railway Road,
Jwalapur,
Other,
Taluka: Other,
District: HARIDWAR
State: Uttarakhand
Pin : 249407

विषय/Sub : Khasra No, 740, Khata No. 193,, At-Tugalpur, Paragna Gordhanpur, Tugalpur, Laksar, Taluka: Laksar, District: HARIDWAR, State: Uttarakhand, Pin : 247663. में सिलण्डरों में Compressed Bio Gas (CBG) गैस का भरण-एवं भण्डारण गोडाउन- गैस सिलेण्डर्स नियम, 2016 के अंतर्गत अनुमोदन-जारी करने के बारे में/ Filling of Compressed Bio Gas (CBG) and Storage of Compressed Bio Gas (CBG) gas in cylinders at Khasra No, 740, Khata No. 193,, At-Tugalpur, Paragna Gordhanpur, Tugalpur, Laksar, Taluka: Laksar, District: HARIDWAR, State: Uttarakhand, Pin : 247663. under Gas Cylinders Rules , 2016 - Grant of approval

महोदय/Sir(s),

कृपया आपके दि. 01/03/2024 के पत्र सं. OIN1611789 का संदर्भ ग्रहण करे / Please refer to your application No.OIN1611789 dated 01/03/2024 .

प्रस्तावित भरण एवं भंडारण सुविधाओं का साईट ले-आउट एवं निर्माण योजना अनुमोदित की जाती है और प्रत्येक की एक/ दो हस्ताक्षरित प्रतियां अनुमोदन के टोकन के रूप में इसके साथ लौटाई जा रही है // The site layout and construction plan of the proposed Filling-cum-Storage facilities is approved and one/two copy each of the same is returned herewith duly signed in token of approval Conditions of the Approval:-

Prior approval may be granted with following conditions other than documents asked in prior approval letter, (1) Fire water calculation and the adequcy to be shown in layout drawing. (2) Online purity analyser and auto cut off devise shall be provided on CBG pipeline before inlet to CBG compressor and same shall be shown in layout drawing. (3) Following details to be mentioned in Notes of the layout drawing, A) Purity of CBG shall be as per IS 16087. B) Filling pressure in cylinders not exceed 150 kg/cm2. C) All flame- proof enclosures to be provided as per IS/IEC 60079. D) Details of safety systems, i.e. nos. of gas detectors, temperature sensors, flame detectors, ESD, Auto cut-off switch, fire hydrant/Monitors, water sprinkler arrangement with locations to be incorporated in layout/fire hydrant drawing with tabular form. (4) HAZOP study report with compliance of recommendations to be submitted. (5) An undertaking shall also be submitted stating that the land of proposed premises situated at- (complete site address) is within your legal physical possession and no case is pending in any court of law against this land. (6) Undertaking stating that approvals/permissions from district authority/local authority/fire service department etc. have