**File No.: VIS (2024-25)-PL758-682-930 Dated: 24.02.2025**

**TECHNO-ECONOMIC VIABILITY**

**STUDY REPORT**

**OF**

**12,000 M3/DAY BIO GAS PRODUCING PLANT 5,000 KG PER DAY BIO CBG CAPACITY**

**SETUP BY**

**M/S W2JWALA BIOENERGY PVT LTD**

**REPORT PREPARED FOR**

**M/S W2JWALA BIOENERGY PVT LTD, THE SUMMIT, SCO NO. 205, SECOND FLOOR, VILL. SIGHPURA, CHANDIGARH AMBALA HIGHWAY, ZIRAKPUR, DHARAMGARH, RUPNAGAR, S.A.S. NAGAR (MOHALI), PUNJAB-140306.**

**REPORT SUBMITTED TO**

**STATE BANK OF INDIA, SME BRANCH, VATIKA FIRST INDIA PLACE, MEHRAULI-GURGAON ROAD, SECTOR-28, GURUGRAM, HARYANA-122002**

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| **PART A** | **REPORT SUMMARY** |

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| S. No. | PARTICULAR | DESCRIPTION |
|  | **Name of the Company:** | M/s W2Jwala Bioenergy Private Limited |
|  | **Registered Address:** | The Summit, SCO No. 205, Second Floor, Vill. Sighpura, Chandigarh Ambala Highway, Zirakpur, Dharamgarh, Rupnagar, S.A.S. Nagar (Mohali), Punjab, India-140306. |
|  | **Project Name** | 5,000 Kg per day Bio CNG generating plant. |
|  | **Project Location:** | Khasra no. 200/349 to 350, Village Jaula Kalan (Hadbast No. 180), Tehsil Dera Bassi, District S.A.S. Nagar, Punjab-140501. |
|  | **Project Type:** | Bio CNG generating plant along with Fermented Organic Manure (FOM). |
|  | **Project Industry:** | Renewable Energy |
|  | **Product Type / Deliverables:** | Bio CNG, FOM and Carbon Credits |
|  | **Report Prepared for Organization:** | M/s W2Jwala Bioenergy Private Limited |
|  | **Report Submitted to:** | State Bank of India, SME Branch, Vatika First India Place, Mehrauli-Gurgaon Road, Sector-28, Gurugram, Haryana-122002 |
|  | **TEV Consultant Firm:** | M/s. R.K Associates Valuers & Techno Engineering Consultants (P) Ltd. |
|  | **Report type:** | Techno-EconomicViability Report |
|  | **Purpose of the Report:** | To assess Technical & Economic Viability for the purpose of seeking external financial assistance to start a green field Project. |
|  | **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. |
|  | **Date of Report:** | 24th February, 2025 |
|  | **Documents referred for the Project:** | 1. **PROJECT INITIATION DOCUMENTS:** 2. Project Report 3. Financial Projections of the Project 4. Project Proposed Schedule 5. Statutory Approval Details 6. Layout and Master Plan 7. **PROCUREMENT DOCUMENTS:** 8. List of Plant & Machinery along with acquisition costs for the same 9. Process Flow Chart 10. Sanction/proposed map of the sites 11. Lease/Sale deeds of the Land 12. GAS Purchase Agreement with GAIL 13. **STATUTORY APPROVALS, LICENCES & NOCs** 14. MSME UDYAM Registration Certificate 15. Commercial Agreement with GAIL 16. CTE from PPCB 17. Gobardhan Certificate 18. GST Certificate |
|  | **Means of Finance:** | Equity & Debt (D/E Ratio 1.00 TPC) |
|  | **Key Financial Indicators:** | |  |  | | --- | --- | | **Key Indicators** | **Value** | | **Average DSCR** | 1.75 | | **Average EBITDA Margin** | 57.70% | | **Avg. PAT Margin** | 32.19% | | **NPV & IRR** | INR 56.38 Cr. & 20.39% | | **Payback Period** | 7.86 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.*

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| **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. 200/349 to 350, Village Jaula Kalan (Hadbast No. 180), Tehsil Dera Bassi, District S.A.S. Nagar, Punjab-140501, setup by M/sW2Jwala Bioenergy Private Limited.

1. **EXECUTIVE SUMMARY:**

M/s Jwala Bioenergy ApS intends to set up a 12,000 m3 /day (raw biogas), 6800 Nm3 /day (upgraded) biomethane (CBG) plant. 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.

The plant will be based on a multi-feedstock mix of paddy straw, cow dung, and chicken litter. The plant is located at Jaula Kalaan Village, Dera Bassi Tehsil, SAS Nagar District, Punjab. Jwala Bioenergy is developing this project through its SPV project company, M/s W2Jwala Bioenergy Private Limited. The 50% of the volume of the CBG produced is committed on a Take-Or-Pay basis as per the information shared with us and rest of the volume on Reasonable Endeavour Basis (RE Basis) at the designated delivery point, which will be supplied to CNG (Transport) and PNG (Domestic) segments in Chandigarh Geographical Area (GA) (GA-2.01) of Indian Oil-Adani Gas Private Limited (CGD Entity).

The project is backed by a robust assurance framework with multiple guarantees designed to protect both the developer and the lender. These include:

1. A **Take-Or-Pay Guarantee** covering 50% of the committed volumes, ensuring revenue stability.
2. A **raw biogas production volume guarantee** provided by the technology supplier, Sauter Biogas, mitigating production risks.
3. An **uptime guarantee of 96%**, ensuring fault-free operation for at least 96% of the hours in a 12-month period, as guaranteed by the EPC contractor, ISGEC.

W2Jwala Bioenergy Pvt Ltd, the SPV project company formed by the parent, Jwala Bioenergy ApS in May 2023. Jwala Bioenergy was allocated Dera Bassi tehsil on 4th Sep 2023. Jwala Bioenergy’s project report was reviewed by the empowered committee of PEDA and accorded approval on 16th April 2024.

Ministry of Petroleum & Natural Gas, Government of India (MoP&NG), in furtherance of guidelines dated 03.02.2014 and 20.08.2014 (as amended), has vide letters No. L-16022/05/2020-GP-I (E-35118) dated 09.04.2021, 26.10.2021 and 26.10.2023 issued policy guidelines for synchronisation of CBG produced by plants under SATAT scheme in the CGD network wherein GAIL has been mandated to operationalise the CBG-CGD Synchronisation Scheme and supply Biogas/CBG co-mingled with domestic gas at Uniform Base Price (UBP) to CGD entities for use in CNG (T) &and PNG (D) segments of CGD network. Moreover, the government has a set a target of 5% FY28-29, following a carrot-and-stick approach to incentivize CGD Company to offtake biogas.

On 18th February 2025, the company has signed a Purchase/LOI/Tripartite Agreement (W2Jwala Bioenergy Private Limited, Indian Oil-Adani Gas Private Limited (IOAGPL) and GAIL) for Purchase and Sale of Biogas/CBG under CBG-CGD Synchronisation Scheme under SATAT initiative to promote Compressed Bio-Gas as an alternative, green transport fuel, with the contract set to run until 2034. ***(Ref No.: WBPL-IOAGPL (GA-2.01)-GAIL dated 18.02.2025)***

Under this agreement, GAIL will purchase the CBG from W2Jwala (Seller/Producer) and onward sale of Biogas/CBG by GAIL to the CGD Entity after pooling with APM/NAPM domestic gas, meeting the required specifications, for use in Geographical Area of Chandigarh [GA-2.01] in the State of Chandigarh, Haryana, Punjab & Himachal Pradesh.

As per the data/information shared by the client, W2Jwala will lay a tie-in pipeline from CBG/Biogas plant upto a distance of 10 KMs for connecting with CGD (IOAGPL) Entity’s pipeline network and shall do necessary compression arrangement to inject/deliver Biogas to CGD entity through pipeline.

The plant will process 38,000 tons of agro and animal waste annually, including up to 14,000 tons of paddy straw, addressing stubble burning and reducing India’s reliance on energy imports. This initiative will generate wealth for the local community, directly benefiting around 2,500 households and increasing household incomes by 10-20% for approximately 12,500 individuals. Additionally, the project will create indirect employment for 100 local workers, including agricultural laborers and logistics personnel, and directly employ 9 technical and non-technical staff at the facility. The project will also contribute to reducing greenhouse gas emissions by replacing fossil-based energy sources.

As per the lease deed shared by the client/company, the promoters have leased 11.73 Kille (~39351.23 sq. meter.) of land at Khasra no. 200/349 to 350, Village Jaula Kalan (Hadbast No. 180), Tehsil Dera Bassi, District S.A.S. Nagar, Punjab-140501. This land has been leased out in the name of the company for 16 years with an option of with an option of renewal of 10 years at the end of lease as per the shared lease deed executed on 27th September 2024, for setting up the proposed Bio-CNG plant.

Once completed, the plant will be able to produce up to 2.4 million Sm3, and will generate other revenue streams through its by-products, such as Fermented Organic Manure (FOM) and carbon credits. The project is consented, holding the allocation of tehsil, with the project’s Detailed Project Report receiving approval from the empowered committee for renewable projects in Punjab state, and has a signed offtake agreement with GAIL (India) Limited.

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| **Proposed Biogas Plant Capacity** | | | |
| **Sr. No.** | **Particular** | **Capacity** | **Unit** |
| 1 | Raw Biogas Plant Generation | 12,000 | M3/Day |
| 2 | Compressed Biogas Generation | 6,800 | M3/Day |
| 3 | Bio-CNG Plant Capacity | 5,000 | kg/Day |
| 4 | Fermented Organic Manure (FOM) | 107 | Ton/Day |

*Source: DPR/data/information provided by the company*

As per the data shared with us, the project will utilize a design provided by PlanEnergi and a biogas solution from the German firm Sauter, known for handling straw and solid feedstocks effectively, making it ideal for a feedstock mix heavy in paddy straw. Sauter’s technology has been successfully implemented in multiple plants in Germany and Denmark, including the largest plant in Northern Jutland, which processes significant amounts of straw and produces 30 tonnes of methane daily.

The biogas upgrading process uses a membrane system, a preferred solution in Europe since 2017, due to its high reliability, performance, and low energy consumption. The project is positioned to benefit from India’s new Compressed Biogas Blending Obligation (CBO), which mandates that 5% of compressed natural gas (CNG) in City Gas Distribution (CGD) networks be blended with Compressed Biogas (CBG). The government is also aiming to increase the quantity of natural gas in its energy mix up to 15% by 2030, and the natural gas price is regulated by a gap and collar, with CBG sold at a premium above the natural gas price.

W2Jwala has provisionally approved placing a turnkey order for the design, engineering, manufacturing, procurement, transport, erection, and commissioning of machinery, equipment, and civil structures for a 5 TPD CBG plant in Dera Bassi with ISGEC (Ref: DERABASSI/19/05/LOI/ISGEC dated 17th February 2025). As per the information provided by the company, the contract proposal being negotiated with ISGEC (EPC) has an uptime guarantee of 96% hours of fault-free operation for equipment supplied and installed by the EPC.

The EPC scope will cover engineering, procurement, installation, and commissioning, excluding the Process-Provider (Sauter Biogas) equipment, which will be directly procured by the Developer. The Developer holds primary responsibility for securing permits, though they may request assistance from the EPC or delegate certain responsibilities.

ISGEC will follow a plug-and-play approach with Sauter, with all core process equipment would be packed by Sauter into a containerized solution. Integration with the rest of the plant will be supervised by Sauter’s German engineers on-site. The plant will inject CBG into the City Gas Distribution (CGD) grid, managed by Indian Oil-Adani Gas Private Limited under the CBG-CDG Synchronization scheme. The layout plan, prepared by ISGEC, is pending approval from the relevant authorities.

At Financial Close, the project company will sign a comprehensive O&M contract with an experienced local operator, such as Veolia’s local subsidiary, Ecofinity Solutions, or ISGEC’s O&M division. They will be able to evidence of an average target availability of 96% (under negotiation) on their current operation of similar plants. It will cover full-service O&M, including scheduled and unscheduled maintenance, feedstock services, daily plant operation (including labor), and provision of a technical team and site manager (a qualified marine engineer). The contract will also include capital replacement.

The Jwala plant has been welcomed in the local community and Jwala have built on this goodwill and intensively cultivated close co-operation with local farmers through close contact and forming a relationship with the NGO, Reviving Green Revolution Cell (RGR). One of the goals of the engagement with RGR Cell is to mobilize community organizes such as cooperatives to prevent stubble burning and collect the straws. Jwala aims to make these organisations co-owners in the plant for long-term bundling of community interest.

As per the details shared by the company, the cost of the proposed project from scratch to trial run is being estimated as INR 59.84 crores, which is proposed to be funded through promoter’s margin of INR 29.92 crores and bank loan of INR 29.92 crores. Project cost breakup is shown in later section of the report.

As per data/information provided to us, all permissions would be applied through a Single-Window online portal called 'Invest Punjab Business First'. The company has obtained NOC for Consent to Establish from Punjab Pollution Control Board. The company is yet to apply for the rest of the NOCs required such as 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).*

As per the data/information provided by the client, the plant will consume about 5048 kWh of power per day and ~20 KL/ 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 May 2026.

At present, the company is in discussion with multiple financial institutions to fund the project through a term loan of INR 29.92 crores. In this regard M/s W2Jwala Bioenergy Private Limited has appointed R.K. associates to assess the Techno-Economic Viability of the proposed Bio-CNG production plant at Village Jaulan Kalan, Tehsil Dera Bassi, District S.A.S. Nagar, Punjab-140501.

As requested by the company, the TEV report of the project is submitted to State Bank of India, SME Branch, Vatika First India Place, Mehrauli-Gurgaon Road, Sector 28, Gurugram Haryana-122002. The company plans to achieve loan approval by March 2025 and the financial closure by April, 2025 (expected).

1. **PURPOSE OF THE REPORT:**

To assess Project’s Technical and Financial Feasibility for lender’s requirement.

1. **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 W2Jwala Bioenergy Private Limited 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.*
* *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.*
* *Any review of the existing business of the promoters is out of scope of this report.*

1. **METHODOLOGY/ MODEL ADOPTED:**
2. Data/ Information collection.
3. Review of Data/ Information collected related to TEV study.
4. Independent review & assessment of technology used and financial projections provided by the company.
5. 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
6. Calculation of key financial indicators and ratio analysis including DSCR, NPV & IRR and payback period of the project.
7. Report compilation and Final conclusion.
8. **DATA/ INFORMATION RECEIVED FROM:**

All the data/Information has been received from Mr. Bikramjeet Singh Guram and the required details about him shown in the below table:

| **Particulars** | **Details** |
| --- | --- |
| Designation | Managing Partner |
| Company | Saba Capital |
| Email Address | bikramjeet.guram@sabacapitalindia.com |
| Contact No. | +91-9871119734 |

1. **DOCUMENTS / DATA REFFERED:**
2. Detailed Project Report and Promoters Profile.
3. Financial Projections of the proposed Bio CNG generating project.
4. Production flow chart.
5. Product profile along with Pricing Strategy etc.
6. List of expected Raw Material Suppliers.
7. Selling, Marketing & Distribution Plan, Commercial Agreement with GAIL.
8. Approved Site/Layout Plan.
9. Sale/Lease deed of the land.
10. Technical Offer Bid from EPC contractor (ISPEC) along with details of Plant & Machinery and Civil Works.
11. Technical Offer Bid from Technology consultant (Sauter Biogas GmbH) along with details of Plant & Machinery.
12. Survey Report conducted at the site.

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| **PART C** | **COMPANY PROFILE** |

1. **COMPANY OVERVIEW:**

As per certificate of incorporation shared by the client/company, M/s W2Jwala Bioenergy Private Limited was incorporated on May 19, 2023 as per the Companies Act, 2013 as an unlisted company limited by shares. As per information shared by the client, 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, and cattle & chicken manure as well as dealing its by-products like organic fertilizers. Below table shows the incorporation details of the company:

|  |  |
| --- | --- |
| **Incorporation Details of the Company** | |
| **Particular** | **Description** |
| **Company Name** | M/s W2Jwala Bioenergy Ltd |
| **Date of Incorporation** | 19th May 2023 |
| **CIN** | U35103PB2023FTC058577 |
| **Company Category** | Unlisted Company limited by Shares |
| **Company Subcategory** | Subsidiary of company incorporated outside India |
| **ROC** | Chandigarh |
| **Registered Address** | The Summit, SCO No 205, Second Floor, Vill. Sighpura, Chandigarh Ambala Highway, Zirakpur, Dharamgarh, Rupnagar, S.A.S. Nagar (Mohali), Punjab, India-140306 |
| **Authorized Capital** | INR 5,00,00,000/- |
| **Paid up Capital** | INR 90,00,000/- |

***Source:*** *As per the data shared by the client and available on the MCA website*

The company is categorised as micro enterprise with Udyam Registration Number UDYAM-PB-20-0074502. In this company, the promoters have proposed to setup 5,000 Kg/ day of Bio-CNG (compressed biogas) along with 107 Kg/ day of Fermented Organic Manure.

1. **SHAREHOLDING DETAILS:**

As per the data available on MCA website, the company is having authorised capital is INR 5,00,00,000 and the paid-up capital is INR 90,00,000 on the date of last balance sheet dated 31.03.2024. The shareholding details of the company is mentioned below:

|  |  |  |  |
| --- | --- | --- | --- |
| **S. No.** | **Nature of Shareholders** | **No. of Shares** | **% Holding** |
| 1 | Jwala Bioenergy APS Denmark | 8,99,996 | 99.99% |
| 2 | Ashok Benjamin Basil Attumaly | 1 | 0.00% |
| 3 | Vikram Garg | 2 | 0.00% |
| 4 | Devesh Gautam | 1 | 0.00% |
|  | **TOTAL** | **9,00,000** | **100.00%** |

Source: Data/Information provided by the client.

1. **KEY PROMOTER’S/DIRECTORS PROFILE:**

Mr. Ashok Benjamin Basil Attumaly, Mr. Devesh Gautam and Mr. Prakash Chand Singla are the directors of M/s W2Jwala Bioenergy Private Limited as per information available on MCA and also promoters of the company. As per data/information provided by the client about the promoters & directors, below table illustrate the educational & professional experience of the promoters along with the Address, DIN and contact details:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 1. **Directors/Promoters Details** | | | | | |
| **S. No.** | **Name** | | **DIN** | **Age** | **Designation** |
| **1.** | **Mr. Ashok Benjamin Basil Attumaly** | | 08130582 | 36 | Director & CEO |
| **2.** | **Mr. Devesh Gautam** | | 10170164 | - | Director |
| **3.** | **Mr. Parkash Chand Singla** | | 00586817 | - | Director |
| 1. **Education & Experience** | | | | | |
| **Mr. Ashok Benjamin Basil Attumaly** | | * Appointed as Director on 19th June 2024. * As per data/information shared by the client, Mr.Benjamin Attumaly is a 36-year-old energy professional based in Denmark, with over 13 years of experience in the energy and shipping sectors across India, Denmark, and the USA. * A graduate of IIT Delhi (2010) and the University of New Orleans (2013), Benjamin combines technical expertise with global industry insights. Fluent in four languages, including Danish, he has lived in Denmark since 2015. * His professional journey includes technical and commercial roles at leading global organizations like Siemens Wind Power, Bharat Petroleum, Maersk, and MAN Energy Solutions. At MAN, the world’s leading ship-engine maker, as the Sales Manager for LNG retrofit projects, he sold more than €130 million worth of projects. * He is the key promoter who has conceptualized and raised funds for Jwala Bioenergy. | | | |
| **Mr. Devesh Gautam** | | * Appointed as Director on 19th May 2023. * As per data/information shared by the client, Mr. Devesh Gautam is a director (one level below Partner) at Ernst & Young, where he is part of the Economic Development Advisory team for Government and Public Sector clients. He is a member of the Board of Directors of Jwala Bioenergy’s SPV – W2Jwala Bioenergy Pvt Ltd. * He is an IIT Delhi alumnus who worked in GATI’s infrastructure projects in the North East states prior to joining EY, he brings his experience of managing policy stakeholders and navigating the regulatory environment. | | | |
| **Mr. Parkash Chand Singla** | | * Appointed as Director on 10th July 2024. * As per data shared by the client, Mr. Parkash Chand Singla is the father of Mr. Samar Singla, whois an IIT Delhi alumnus, and the founder of mobility start-up *Jugnoo*. Mr. Samar Singla is an investor in Jwala Bieoenergy ApS and sits on the board of the company. | | | |

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

Below tables shows the information of the companies/LLPs with which each Director is associated with to give a basic background detail of the promoters as found on public domain in general/ tertiary category research.

**(MR. ASHOK BENJAMIN BASIL ATTUMALY DIN: 08130582)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S. No** | **Company Name**  **(CIN/FCRN)** | **Designation** | **Original Date of Appointment** | **Date Of Appointment at Current Designation** | **Date of Cessation** |
| 1 | W2Jwala Bioenergy Private Limited (U35103PB2023FTC058577) | CEO | 06/06/2023 | - | - |
| 2 | W2Jwala Bioenergy Private Limited (U35103PB2023FTC058577) | Director | 19/06/2024 | 19/06/2024 | - |
| 3 | 10Lane Seaways Private Limited (U40106UP2020PTC138480) | Director | - | 10/05/2018 | 02/03/2021 |

***Source****: Information extracted from MCA website & public domain*

**(MR. DEVESH GAUTAM DIN: 10170164)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S. No** | **Company Name**  **(CIN/FCRN)** | **Designation** | **Original Date of Appointment** | **Date Of Appointment at Current Designation** | **Date of Cessation** |
| 1 | W2Jwala Bioenergy Private Limited (U35103PB2023FTC058577) | Director | 19/05/2023 | 19/05/2023 | - |

***Source****: Information extracted from MCA website & public domain*

**(MR. PARKASH CHAND SINGLA DIN: 00586817)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S. No** | **Company Name**  **(CIN/FCRN)** | **Designation** | **Original Date of Appointment** | **Date Of Appointment at Current Designation** | **Date of Cessation** |
| 1 | G3 Worldwide Private Limited (U78300PB2023PTC059066) | Additional Director | 07/12/2024 | 07/12/2024 | - |
| 2 | Appvirality Technologies Private Limited (U72200TG2014PTC096860) | Additional Director | 19/11/2024 | 19/11/2024 | - |
| 3 | W2Jwala Bioenergy Private Limited (U35103PB2023FTC058577) | Director | 10/07/2024 | 10/07/2024 | - |
| 4 | Gourmet Chefs India Private Limited (U10790HR2024FTC124064) | Director | 08/08/2024 | 08/08/2024 | - |
| 5 | Jungleworks Software Private Limited (U72900CH2021PTC043984) | Director | 23/08/2023 | 23/08/2023 | - |
| 6 | Bistro Technologies Private Limited (U72900CH2015PTC035504) | Director | 08/12/2022 | 08/12/2022 | - |
| 7 | Click Labs Private Limited (U74900CH2011PTC035785) | Director | 18/12/2018 | 30/09/2019 | - |
| 8 | Radha Krishan Solvex Private Limited (U15143PB2003PTC025977) | Director | - | 01/05/2003 | 22/07/2007 |
| 9 | Click Labs Private Limited (U74900CH2011PTC035785) | Additional Director | - | 15/01/2013 | 28/08/2015 |
| 10 | Click Labs Private Limited (U74900CH2011PTC035785) | Director | - | 28/08/2015 | 21/11/2017 |

***Source****: Information extracted from MCA website & public domain*

|  |  |
| --- | --- |
| **PART D** | **PROPOSED INFRASTRUCTURE DETAILS** |

1. **PROPOSED PLANT LOCATION:**

The proposed Bio-CNG generating plant will be set up by M/s W2Jwala Bioenergy Private Limited at Village Jaulan Kalan, Tehsil Dera Bassi, District S.A.S. Nagar, Punjab-140501, which is spread over an area of 11.73 Kille (~39,351.23 Square meters) as per the lease deed provided to us by the company.

The location of the plant is in the well-known agricultural area of Punjab, where accessibility of agricultural land for cultivating the paddy straw is sufficient. Availability of the required raw material is the advantage of the proposed location as many agricultural farms are situated near by the proposed site location.

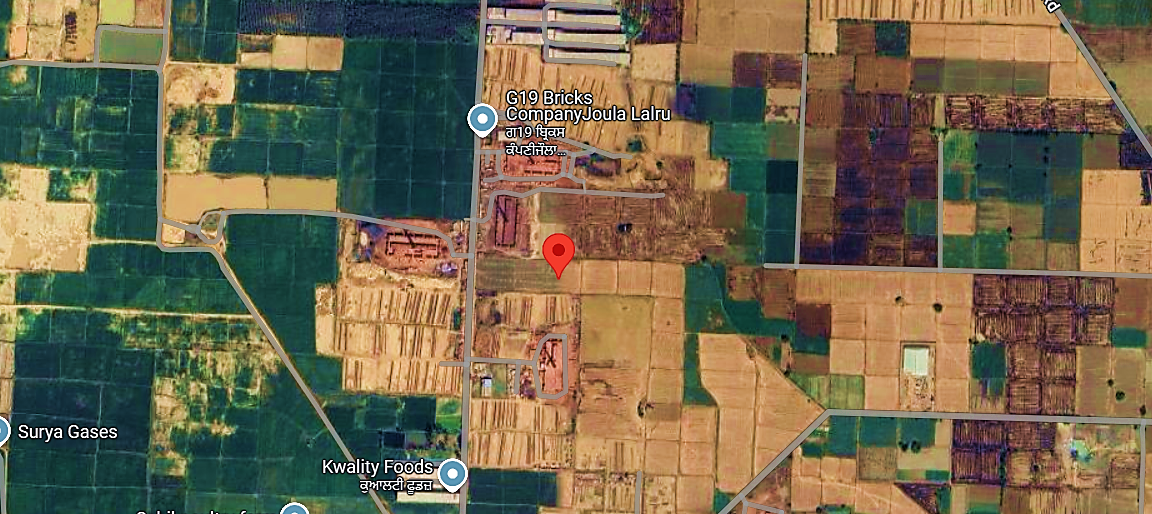
During the site visit we found that the property is merged with adjacent plots and not demarcated till the date of survey done by us. The property is having the proximity to the civic amenities such as hospital is situated ~9 km away and market is situated ~3 km away from the proposed plant location.

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 | Agricultural Land |
| West | Road (Entry Point) |
| North | G19 Brick Company |
| South | Agricultural Land |

| **Table: 2 Connectivity Details of the Proposed Location** | |
| --- | --- |
| **Connectivity** | **Details** |
| Road | Jaula Kalan Link Road - ~800 meters away |
| Rail | Dappar Railway Station - ~7.8 km away |
| Airport | Chandigarh Airport - ~29 km away |

1. **LOCATION MAP:**
2. **Google Map Location**: The Bio-CNG plant is proposed to be commissioned at Village Jaulan Kalan, Tehsil Dera Bassi, District S.A.S. Nagar, Punjab-140501 with GPS coordinates 30°30’03.3” North and 76°51'44.8" East as per the Google map attached below:

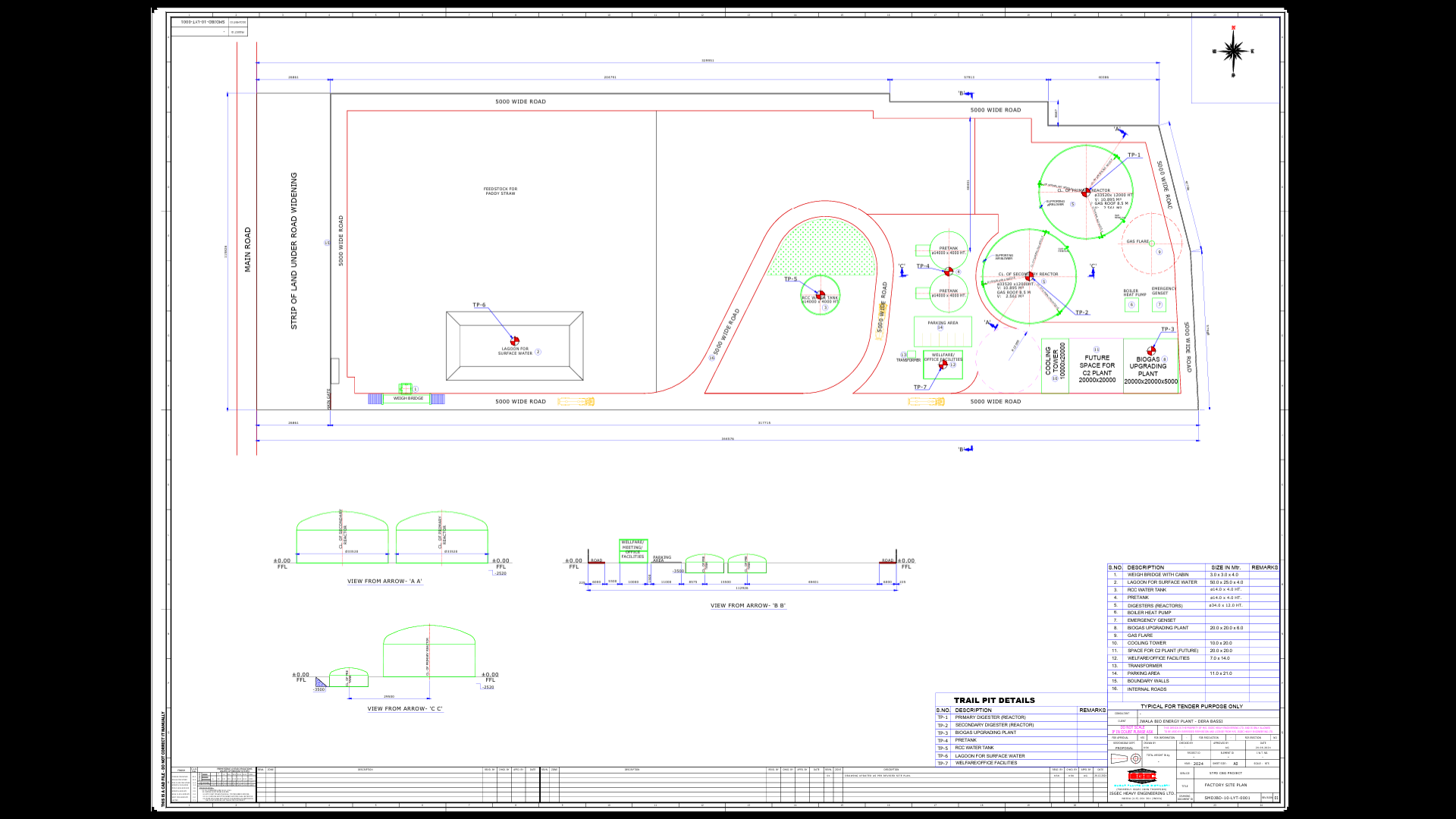
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1. **Google Map Layout:** Demarcation of the land with approximate measurement on the Google map is attached in the below picture:



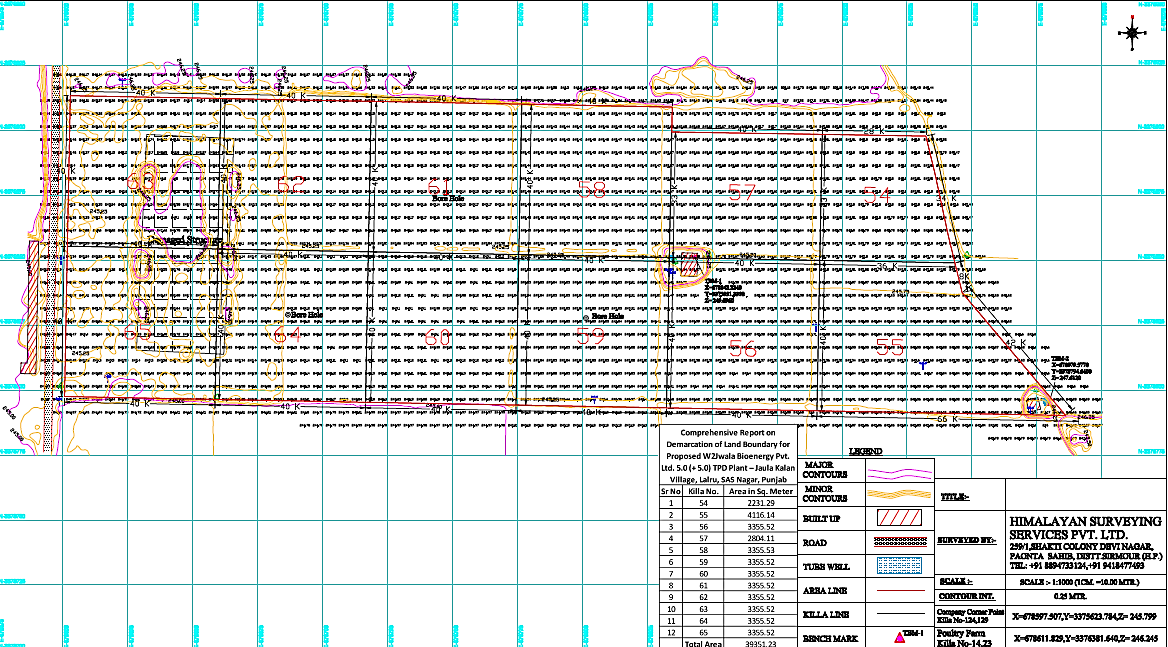
1. **LAYOUT PLAN:**

As per the data/information provided by the client/Company, the proposed layout plan has been prepared by the EPC, ISGEC which is yet to be approved by the concerned authorities. The site layout has been prepared by architect Empanelled Architect with Greater Mohali Area Development Authority (GMADA). For reference, proposed layout plan has been attached below:



1. **LAND DETAILS:**

As per the lease deed shared by the client/company, the promoters have leased 11.73 Kille of land at Village Jaulan Kalan, Tehsil Dera Bassi, District S.A.S. Nagar, Punjab-140501. However, this is the "short kille" - which is used in districts of Patiala etc. which converts to 39,351.23 m2. This land has been leased out in the name of M/s W2Jwala Bioenergy Private Limited for 16 years with an option of with an option of renewal of 10 years at the end of lease as per the shared lease deed executed on 27th September 2024, for setting up the proposed Bio-CNG plant. The Shazra map is shown in the image below:



During the site visit on 15th February 2025, 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 road of ~20 ft. wide. At the time of site visit, we found that the proposed land is not demarcated and work on the Project has not been started yet. As per informed by client, land development work will start soon.

1. **SITE PICTURES:**

Site pictures were captured during the site survey on 15th February 2025, for reference few of the pictures are attached below:

|  |  |
| --- | --- |
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1. **BUILDING & CIVIL WORKS:**

The Bio-CNG generating facility is proposed to be commissioned through appointment of the EPC. Company has executed a provisional contract agreement on 17th February 2025 and appointed M/s ISGEC Heavy Engineering Ltd as EPC contractor for implementation of the proposed plant. As per the scope of the agreement, EPC contractor will be supplying all civil & structural engineering required for the proposed plant.

Detailed bifurcation of the scope of work for the proposed Building & Civil works has been shown in the below table:

|  |  |  |
| --- | --- | --- |
| **S. No.** | **Description** | **Qty./Area/Unit** |
| 1. | Digester (33.52 m dia., Height-12.0m) foundation | 2 Nos. |
| 2. | Pretank (Dia. 14.0m, Ht. 4.0m) - 2 Nos. complete in RCC  Pre tanks shall have Epoxy lining inside | 2 Nos. |
| 3. | Water tank (Dia. 14.0m, Ht. 4.0m) - 1 No. complete in RCC | 1No. |
| 4. | Gas Flare Stack foundation | 1No. |
| 5. | Weigh Bridge (1 No.) foundation | 1No. |
| 6. | Weigh Bridge Room (1 No.) (3 x 3 m) | 1No. |
| 7. | Welfare / Office /MCC facilities (7mX14.0m) G + 1 floors | 196 sqm |
| 8. | Biogas upgradation shed (20mX20mx6.0m Ht.) | 400 sqm |
| 9. | Parking (21.0m X 11.0m) RCC considered | 231 sqm |
| 10. | Cooling tower (10.0mX20.0m) basin | 200 sqm |
| 11. | Lagoon (5000cum)  Providing and laying dry brick soiling as per required camber and slopes, joints filled with sand  Providing and laying HDPE film 500 microns thick with a minimum overlap of 150 mm thermowelded at joints to make a water proof membrane complete. | 5000 cum |
| 12. | Precast panels boundary wall having 1.8 m height | 970 m |
| 13. | Bitumen Road (2500sqm) and boundary roads (WBM) considered 2600 sqm & Drains (1000m) | Lot |
| 14. | Miscellaneous foundations | 1 Lot |

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

According to the provisional contract with the EPC, the estimated cost for Building & Civil works is approximately **INR 8.65 crores**, inclusive of applicable GST. However, a detailed cost breakdown for civil and building works has not yet been provided, as the EPC is performing the construction on lump sum basis.

1. **PLANT & MACHINERY/ EQUIPMENTS DETAILS:**

As per the contract agreement executed on 17th February 2025 with EPC contractor, M/s ISGEC Heavy Engineering Ltd is expected to execute the rest of the plant (engineering, procurement, installation & commissioning) except Process-Provider (Sauter Biogas) scope items which would be directly procured by the Developer. Detailed bifurcation of the proposed Plant & Machinery as shared by the client/company has been shown in the below table along with the estimated cost:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Proposed Plant & Machinery** | | | | | | |
| **S. No.** | **Equipment Name** | **Quantity** | **Manufacturer Name** | **Specification/ Capacity** | **Expected Landed Price (excluding GST) (INR Cr)** | **Current Status of Order** |
| 1 | 30T Weigh Bridge | 1 | Local | Capacity - 30T | 0.1 | Yet to be Ordered |
| 2 | Pre-Mix (Universal 4-in-1 solid feeder) | 1 | Vogelsang India Pvt Ltd | For feeding 80T of feedstock per day | 1 |
| 3 | Bio Mixer Feed Mixer | 1 | Vogelsang India Pvt Ltd | Kombi-Mix 80-8 m³ / 4t Kombi-Mix 120-12 m³ / 6t | 1 |
| 4 | GFS Digester Tanks | 2 | Rostfrie Steel Pvt Ltd | Material - Glass Fused Steel Ø inside 33.52 m - Clear wall height 12.05m - Capacity 10633m³ gross - Capacity 9442m³ net | 5.2 |
| 5 | Thermal Insulation for Tanks | in kgs | Rockwool | - Polystyrene foam or glass wool (Thermal resistance-RD [(m²·K)/W] 2,35) | 0.5 |
| 6 | Double Membrane Gas Holder Balloons | 2 | Baur Folien India Pvt Ltd | Roof shape / dome 1/5 - Diameter 33.52m - Variable gas storage volume appx 2561m³ - Roof height 8.5m | 1.8 |
| 7 | Sauter Core Process technology | 1 | Sauter Biogas GmBH | Steel container, screw pumps, heatexchanger, biomass piping, sprinkler system, valves, O2 generator, Solid-liquid seperators | 10.4 |
| 8 | Mixer for Pre-Tank | 2 | WAM India | Power 15kWb drive and Gearbox | 0.25 |
| 9 | Gas Flare | 1 | SCT | throughput capacity: 600m³/h | 0.3 |
| 10 | Staircase around Digester Tank | 2 | Local | Spiral ladder (external) (MS -HDG, steps width 700 mm) with intermediate resting platforms | 1.2 |
| 11 | Boiler/ Water Heater | 1 | ISGEC | Briquette based water heater considered. 90kg/Hr as Crushed briquette required | 0.6 |
| 12 | Emergency DG Set | 1 | Kirloskar | 500 KVA | 0.5 |
| 13 | Biogas Upgrading System (Pumps, chiller, pipes, valves, filters) | 1 | GPS Renewables Pvt Ltd | 500NM3/hr | 6 |
| 14 | Cooling Tower with Pumps & accessories | 1 | ISGEC | 200m3/hr FRP Based | 0.2 |
| 15 | Air Conditioners for Office Space | 6 | ISGEC | Split Acs of 1.5 Tons each | 0.05 |
| 16 | Gas Piping System | in sqm | ISGEC | Combination of SS310 and HDPE piping | 2 |
| 17 | Electrical System (Transformers, Cabling) | in sqm | ISGEC | 11KV/.433 KV Substation MV/LV power and control cable for substation Illumination system for proposed plant along with one no. of 415V/400V, 100kVA, Dyn11, indoor mounted lighting transformer Complete earthing system (GI) for Compressed bio gas plant | 1.9 |
| 18 | Fire Fighting Systems | in Kgs | ISGEC | fire pumps, portable fire extinguishers, fire hoses, Alarms, Hooters. TAC standard for critical sections | 1 |
| 19 | Biomethane Regulator (BMR) | 1 | Sopan India | Decompressor - Offline Gas Chromatography Unit - Flare functionality in case of off-spec gas, Odourizer | 0.5 |
| 20 | Air Compressor for LP Air | 2 | ISGEC | 2 x 100 CFM screw type lubricated air compressors with air drier. | 0.2 |

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

As informed by the client, the plant & machinery are to be ordered after Financial Closure. The cost of Plant & Machinery has been considered as per the technical offer bid received from EPC Contractor (ISGEC) and technology provider (Sauter). The estimated cost for plant & machinery will be ~INR 42.66 crores including GST.

1. **REASONING FOR COMPARITIVELY HIGHER PROJECT COST:**

The 5TPD CBG project at Dera Bassi represents a strategic investment in advanced technology and infrastructure to ensure long-term efficiency, reliability, and sustainability. The key factors contributing to the higher capital expenditure include:

1. **Adoption of Advanced German Technology** – The project incorporates high-performance equipment from Sauter Biogas GmbH, a globally recognized leader in biogas solutions. This includes specialized screw pumps, a patented sprinkling system, solid-liquid separators, a technical pumping container with integrated SCADA control, and a biological desulfurization unit. These components ensure high uptime, superior process control, and reduced operational risks.
2. **First-of-Its-Kind Patented Sprinkling System in India**- As informed by client, unlike conventional CBG plants relying on agitators and mixers, the Sauter system eliminates common mechanical failures, enhancing reliability and minimizing maintenance costs.
3. **Higher Initial Cost for Long-Term Gains** – While the ₹10.50-11.00 crore investment in Sauter technology is higher than industry norms, it guarantees 96% operational availability, significantly reducing efficiency losses faced by many Indian CBG plants operating at 50-60% of design capacity.
4. **Advanced Pre-Treatment System for Paddy Straw** – Integrating high-performance Vogelsang Biomixer and Universal 4-in-1 Pre-Mix System optimizes feedstock preparation, improving biogas yield and overall plant efficiency.
5. **Oversized Anaerobic Digester Tanks** – With tanks 1.5-2 times larger than conventional designs, the project enhances anaerobic digestion, ensuring higher and more stable gas production.
6. **State-of-the-Art Gas Processing & Grid Injection** – The facility features an advanced Bio-Methane Regulator, two-stage membrane purification for 95-98% methane purity, and a biological desulfurization unit to meet stringent CGD grid standards—surpassing the lower quality requirements of cascade delivery projects.
7. **Direct Gas-Grid Injection** – Unlike most Indian CBG projects that rely on cascade delivery, this project is among the first to integrate direct grid injection, requiring superior gas quality and additional infrastructure investment.
8. As part of its long-term risk mitigation strategy, the company has acquired or leased a larger land parcel of 39,351.23 sqm to accommodate on-site feedstock (straw) storage within the plant premises. The associated civil infrastructure costs—including the construction of internal roads, stormwater drains, boundary walls, firefighting systems for the feedstock storage area, and a 5,000-cubic-meter lagoon—constitute a significant component of the project's capital expenditure (CAPEX). However, this investment is expected to reduce operational expenditure (OPEX) over time by eliminating the need for external feedstock storage.

The higher capital expenditure of the Dera Bassi CBG project is a calculated investment in long-term efficiency, reliability, and sustainability. By prioritizing superior technology, advanced pre-treatment, optimized digestion, and direct gas-grid injection, the project ensures maximum uptime, consistent gas yield, and lower lifecycle costs—positioning it as a benchmark for future CBG plants in India.

1. **UTILITIES:** Details of Water, Electricity and other utilities are described as below:
2. **WATER:**

During the site inspection, we have found that the underground water is available at the project site. Company has yet to take the "No Objection Certificate" for groundwater extraction from the concerned authorities. As informed by client, the water supply of local Jal Board is also available. The total requirement of the plant will be ~20 KL per day.

1. **ELECTRICITY:**

As per the data/information provided to us by the client, Company is yet to apply for sanction of power load. The estimated power requirement would be ~5048 Kwh per day to run the plant. The consumption of different components of the unit as described in the below table:

|  |  |
| --- | --- |
| **Parasitic Consumption Of Power** | |
| **Particular** | **Required Power** |
| Load of Sauter Components | 1,448 KWh/day |
| Load of Biogas Up-gradation Section & Recovery | 3,360 KWh/day |
| Load of auxiliaries at Bio-CNG Unit | 240.4 KWh/day |
| **Total** | **5,048.40 KWh/day** |

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

|  |  |
| --- | --- |
| **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 raw biogas generation capacity of 12,000 M3/Day to generate the 5,000 kg/day Bio-CNG along with 8723 TPA of solid organic fertilizer as illustrated in the below table:

|  |  |
| --- | --- |
| **Capacity of the proposed Bio-CNG plant** | |
| **Particular** | **Capacity** |
| Raw Biogas Plant Generation | 12,000 M3/Day |
| Bio-CNG Plant Capacity | 5,000 kg/Day |
| Fermented Organic Manure Capacity | 107 Ton/Day |

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

1. **PRODUCTION PROCESS OF BIO CNG (CBG):**

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 Mesophilic 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:

1. **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.

1. **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.

1. **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.

1. **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.

1. **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 |

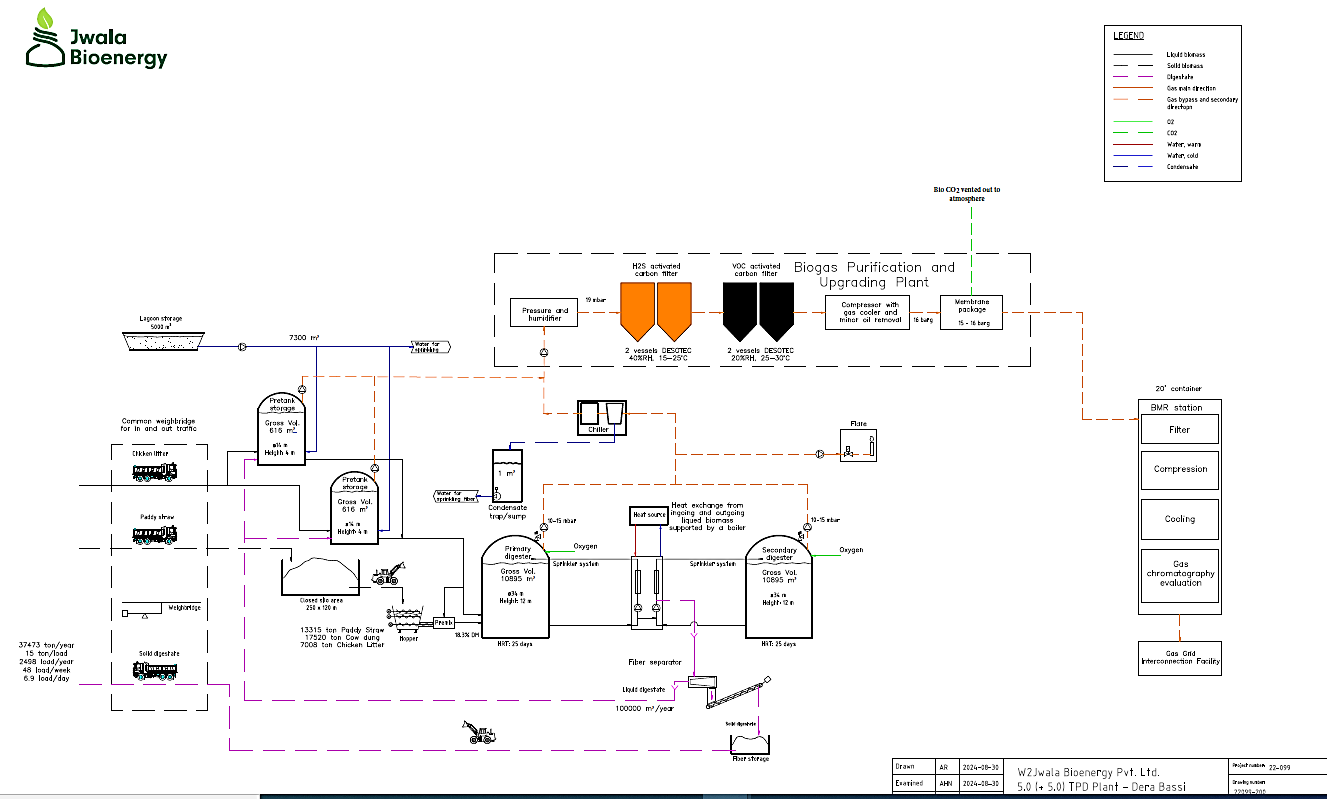
1. **BIOGAS UPGRADATION:**

Biogas upgradation using membrane separation technology involves a multi-stage purification process to remove hydrogen sulfide (H₂S), moisture, and carbon dioxide (CO₂), producing high-purity Compressed Biogas (CBG). The process begins with H₂S removal through a catalytic reaction, where sulfur compounds are oxidized or filtered out to prevent corrosion and ensure compliance with gas quality standards. Next, moisture is removed in two stages—first by chilling, which condenses excess water, and then by desiccant adsorption, ensuring the gas is dry before further processing.

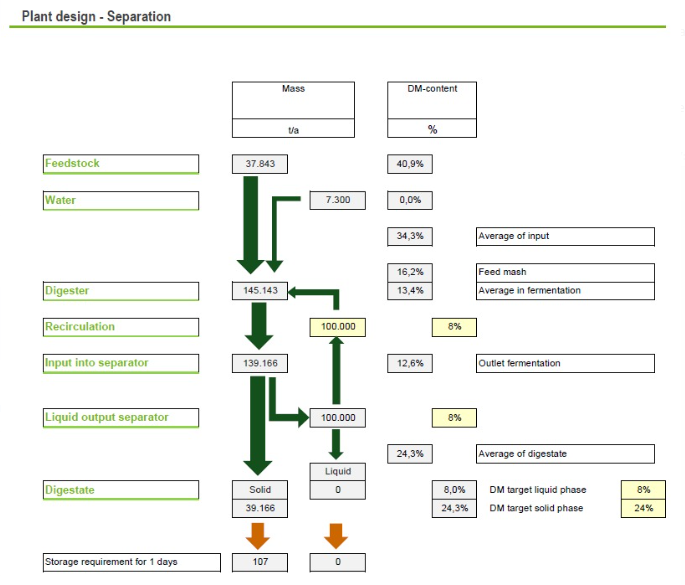
For CO₂ removal, the dried biogas is compressed using a Roots-type gas blower and passed through semi-permeable membranes that selectively allow CO₂, oxygen, and other smaller molecules to diffuse out while retaining methane. The system operates in multiple stages, maximizing methane purity (>95%) while minimizing losses. A recirculation mechanism further optimizes methane recovery, reducing methane loss to as low as 2-5%. Once upgraded, the CBG is pressurized and conditioned to meet City Gas Distribution (CGD) network specifications.

The entire process is fully automated using a Programmable Logic Controller (PLC), ensuring real-time monitoring, efficiency optimization, and seamless operation. Membrane separation technology is favoured for its low maintenance, energy efficiency, scalability, and minimal methane loss, making it an ideal choice for large and small-scale CBG production facilities. 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 a membrane separation system, a versatile and proven technology for gas separation. In this system, the company will be using a selective membrane process where CO₂ is separated based on differences in permeability. The process involves four key steps: gas conditioning, selective permeation, CO₂ separation, and product gas collection.

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

****

Source: Data shared by client



Source: Binding Offer Bid from Sauter Biogas GMBH dated 25.01.2025

1. **TECHNICAL SPECIFICATIONS OF THE PROPOSED BIO-CNG PLANT:**

The 5TPD CBG project at Dera Bassi integrates a well-established biogas technology solution designed by PlanEnergi and executed using advanced biogas processing technology from Sauter Biogas GmbH, a German industry leader.

The Sauter biogas concept has been successfully deployed in multiple projects across Germany and Denmark, demonstrating its effectiveness in handling straw and other solid feedstocks. This makes it particularly well-suited for the Dera Bassi project, which relies heavily on paddy straw as a primary feedstock. One of the largest Sauter-operated plants, located in Northern Jutland, Denmark, produces approximately 30 tonnes of methane per day, while also processing the highest percentage of straw-based feedstock in the country—validating the system’s capability in similar operational conditions.

For biogas upgrading, the project incorporates a membrane purification system to refine biogas into pipeline-grade biomethane. Over the past several years, membrane-based upgrading has become the preferred technology in Europe due to its high reliability, efficiency, and lower energy consumption. Since 2017, more than 50% of new biomethane plants in Europe have adopted membrane systems, reinforcing their proven advantages in commercial-scale biogas operations.

As per the data/information provided by the client, below table shows the technical specification of the proposed Bio CBG generating plant:

|  |  |
| --- | --- |
| **Digester Tanks & Storage Tanks** | * 2 primary digesters of approximately 10,895 m3 each. * At most, 13,500 tonnes of paddy straw will require storage. This will be stored in a storage area taking up 2.8 hectares of land. * Groundwater will be stored in a 600m3 Pretank. |
| **Feeding of Material** | * Feedstock processing system is simple and reliable. * Feedstocks are added using a side-mounted hopper attached to each primary digester. * Solids are mixed with liquids to make the solid feedstock pumpable. * Solid feedstock will be transported by its own wheel loader, while liquid material will be pumped directly. |
| **Digestion Technologies** | * Digestion temperature will be mesophilic in the range of 40-43 °C to aid in anaerobic digestion process of the feedstock. * Both digesters will be mounted with a double membrane gas holder. * Each gas holder is expected to store approximately 2,300m3 of biogas in variable gas storage and 3,000m3 in total. |
| **Gas Purification** | * Humidity is removed by the gas condensing in the pipes, leaving an ammonia rich condensate in the pipes. * A O2 micro-dosing system and Ferric compounds will also be used to reduce H2S levels in the digester. * VOC, the remaining H2S and siloxanes will then be removed by activated carbon filters |
| **Gas Upgrading** | * A membrane system will be used to upgrade the biogas to biomethane. * Membranes gave been used in over 50% of AD plants since 2017. * Afterwards, the biomethane will then be compressed and sent to the gas grid via pipeline. |

The present Bio-waste to Bio-CNG system operates on a two-phase mesophilic 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 СН4 | % | 55-60 |
| 6 | Calorific value | Cal | 4500-4708 |
| 7 | Number of digesters | Pcs. | 2 |
| 8 | Digester volume (overall) | M3 | 10895 |
| 9 | Number of gasholders | Pcs. | 2 |
| 10 | Temperature in the digester | 0С | 40-42 |
| 11 | Pressure in the digester | KPа | 0.5 |
| 12 | Overall dimensions of the digester (diameter / height) Approx. | Mt. | 34/12 |
| 13 | Solid fertilizers yield (70-80% wet) | Tons /Day | 107 |
| **Biogas to Bio-CNG plant characteristics** | | | |
| 14 | Biogas Upgrading Capacity | M3/hr. | 700 |
| 15 | Methane | % | >95-98 |
| 16 | Booster Compressor | M3/hr. | 350-400 |
| 17 | electrical power Connected Load | KW | 440 |
| 18 | Total Electrical power Running Load | kW | 345 |

1. **TECHNOLOGY USED:**
2. **TECHNOLOGY SUPPLIER, EPC CONTRACTOR:**

As per the contract agreement executed on 17th February 2025, M/s ISGEC Heavy Engineering Ltd has been appointed as the EPC contractor by the Company for commissioning the proposed Bio-CNG plant. As per the data/information provided by the client/company and available on public domain, ISGEC, a globally recognized engineering and construction firm, brings extensive experience in executing large-scale sugar plants, distilleries, refineries, and power projects. With a track record of delivering over 220 sugar plants, 900+ cane crushing mills, 800+ boilers, and 60+ power plants across 51 countries, ISGEC is well-equipped to handle complex EPC (Engineering, Procurement, and Construction) projects.

For the Dera Bassi CBG project, ISGEC has been appointed as the EPC contractor, responsible for the engineering, procurement, installation, and commissioning of all plant components, excluding the process technology and core equipment supplied directly by Sauter Biogas GmbH. The developer retains primary responsibility for securing permits, with ISGEC providing ad-hoc assistance or taking on delegated responsibilities as needed.

Given the specialized biogas technology involved, ISGEC will work in close collaboration with Sauter Biogas to ensure seamless integration, installation, and operational efficiency of the plant. The completed facility is designed to inject compressed biogas (CBG) directly into the City Gas Distribution (CGD) grid, facilitated by GAIL, in the Geographical Area of Chandigarh [GA-2.01] in the State of Chandigarh, Haryana, Punjab & Himachal Pradesh operated by Indian Oil-Adani Gas Private Limited under the terms of CBG-CDG Synchronization scheme.

The project uses PlanEnergi as Owner’s Engineer and will employ the biogas solution provided by German Biogas firm Sauter. The company has an LOI with Sauter, and will sign the commercial agreement upon achieving financial closure as per the information shared with us. The contract draft proposed by Sauter Biogas GmbH also includes an assured raw gas production volume of 550 m3/hr (ref. Sauter quotation and contract proposal). Sauter Biogas GmbH is a globally recognized biogas plant developer, founded by Stefan and Norbert Sauter, with a legacy of innovation dating back to 1992, when they built their first biogas plant on the family farm. Over the decades, the company has pioneered several advanced biogas plant designs, with a strong focus on processing diverse organic residues.

The company’s patented biogas system was first implemented in 2006, and since then, Sauter Biogas has developed over 50 plants across four continents, with capacities ranging from 75 kW to 6 MW. Their expertise spans the full spectrum of biogas project development, including:

* Consultation
* Planning and authorization
* Plant Construction
* Service

Sauter Biogas has successfully implemented high-efficiency plants across Europe and Asia, including:

* Vraa, Denmark (2017) – A 30 million Sm³/year biomethane facility with four digesters.
* Arnschwang, Germany (2011) – A 2.8 MW biogas plant.
* Ferrara, Italy (2019) – A 1.2 MW biogas plant.
* Malaysia (2018) – A 1 MW biogas plant.

**Technological Expertise:** Sauter Biogas specializes in handling a wide range of organic feedstocks, including slurry, manure, and paddy straw, making its technology particularly suitable for residue-based biogas projects like the Dera Bassi 5TPD CBG plant. Additionally, the company’s energy-efficient irrigation system significantly reduces plant energy consumption, further enhancing operational efficiency.

1. **PROPOSED TECHNOLOGY:**

Jwala Bioenergy has implemented cutting-edge biogas technology from Sauter Biogas GmbH, a globally recognized leader in biogas solutions. This advanced system is designed to enable stable and efficient biogas production from paddy straw, a challenging feedstock that requires specialized handling.

A key advantage of the Sauter technology is its innovative reactor design, which operates without internal mechanical components such as heating hoses or stirring systems. This eliminates common failure points, significantly reducing maintenance needs while enhancing long-term reliability and operational efficiency. By minimizing mechanical interventions, the system ensures higher uptime and consistent gas yields, making it an exceptionally robust solution for commercial-scale biogas production.

The biogas technology implemented by Jwala Bioenergy, in collaboration with Sauter Biogas GmbH, has a proven track record in the Danish and broader European biogas markets for processing straw-based feedstocks. With over 50 reference plants across Europe, Africa, and Asia, Sauter Biogas has demonstrated its expertise in delivering high-efficiency biomethane solutions.

A key innovation in this technology is the "Sprinkled, not stirred! ®" system, which ensures optimal mixing of straw inside the reactor without the need for mechanical agitators. This enhances digestion efficiency, leading to higher biogas yields while reducing maintenance requirements.

Following the digestion process, the biogas is purified using an advanced membrane system, resulting in biomethane (CH₄) with a concentration of 95-98%. This high-purity biomethane meets regulatory standards for direct grid injection, ensuring compliance with stringent quality requirements.

With a strong foundation in proven European biogas technology, Jwala Bioenergy’s partnership with Sauter Biogas ensures efficient, reliable, and high-yield biomethane production. The use of patented mixing technology and advanced gas purification systems positions this solution as a benchmark for straw-based biogas projects worldwide.

1. **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 W2Jwala Bioenergy Pvt Ltd is using the appropriate 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.**

**Jwala Bioenergy’s adoption of Sauter Biogas technology reinforces its commitment to high-performance, low-maintenance, and sustainable biogas production. This strategic approach ensures greater efficiency, reduced downtime, and long-term operational success, positioning the company as a leader in advanced CBG technology adoption.**

1. **EFFLUENT TREATMENT AND ABETMENT:**
2. **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.

1. **PRODUCTION PROCESS:**

The biogas plant generates about 12,000 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 ppm levels of the contaminants, are injected directly into the gas grid pipelines of CGD companies. This can be used as cooking fuel replacing PNG(D)/ LPG or a transport fuel in CNG pumps.

1. **DISPOSAL OF THE BY-PRODUCTS:**

**Fertilizer by-products:** The plant generates about 37,450 TPA of fermented organic manure from the sludge separator. This is sold as fertilizer in the market. These comply with the government's FOM standards in the FCO as amended in the Extraordinary Gazette dtb May 29, 2023.

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

1. **TESTING STANDARDS FOR PRODUCTION:**

In India, the testing standards for Compressed Biogas (CBG) are primarily governed by the Bureau of Indian Standards (BIS), Ministry of New and Renewable Energy (MNRE), and other regulatory bodies. The key standard for CBG is IS 16087:2016, which specifies the quality requirements for biogas used as a fuel. Below are the main parameters and standards applicable to CBG in India:

1. **BIS Standards**

* **IS 16087:2016** – Specifications for Biogas (Methane Content, Moisture, and Impurities)
* **IS 15958:2020** – Guidelines for Bio-methanation
* **IS 17393:2020** – Purification and Bottling of Biogas

1. **Ministry of Petroleum & Natural Gas (MoPNG) – SATAT Initiative**

* "Sustainable Alternative Towards Affordable Transportation (SATAT)" program mandates quality standards similar to Compressed Natural Gas (CNG).
* Guidelines align with IS 16087:2016 and specifications for injection into city gas distribution (CGD) networks.

The following parameters will be tested for “PNGRB Gas Quality Specifications - Threshhold Limit for gas parameters on City or Local Gas Distribution Networks”:

|  |  |
| --- | --- |
| **Parameters** | **Limit** |
| Hydrocarbons dew pt (Degree Celsius, max.) \* | 0 |
| Water dew pt (Degree Celsius, max) \* | 0 |
| Hydrogen Sulphide (ppm by wt. max.) | 5 |
| Total Sulphur (ppm by wt. max.) | 10 |
| Carbon dioxide (mole % max.) | 6 |
| Total inerts (mole %) | 8 |
| Temperature (Degree Celsius, max.) | 55 |
| Oxygen (% mole vol. max.) | 0.2 |

The testing of compressed biogas involves:

1. **Gas Chromatography (GC)** – To analyze CH₄, CO₂, and O₂ content.
2. **Moisture Analyzer** – To determine the water content.
3. **H₂S Analyzer** – To check hydrogen sulfide levels.
4. **Gas Purity Testing** – Ensures the removal of contaminants.
5. **Calorific Value Measurement** – Determines the energy content.
6. **Compression and Storage Testing** – Ensures compliance with pressure and storage norms.

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.

1. **MANPOWER:**

As per information shared by the client/company,Jwala Bioenergy Private Limited is planning to outsource the Operations & Maintenance (O&M) of its biogas plant to a third-party service provider, which is yet to be finalized. As part of this arrangement, the selected service provider will be responsible for managing all aspects of plant operations, maintenance, and associated activities.

Additionally, all manpower requirements for the plant, including skilled and unskilled personnel, will be fulfilled by the outsourced service provider. Jwala Bioenergy Pvt. Ltd. will oversee the performance and compliance of the third party to ensure smooth and efficient operations while adhering to all regulatory and safety standards.

This strategic decision aims to enhance operational efficiency, optimize resource utilization, and ensure the long-term sustainability of the biogas plant. Further details regarding the service provider selection and contractual terms will be finalized in due course.

|  |  |
| --- | --- |
| **PART F** | **PRODUCT PROFILE** |

1. **INTRODUCTION:**

CBG 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).

1. **PRODUCT CATEGORY:**
2. **BIO CNG:**

The proposed plant will be generating 5,000 Kg/ day of Bio-CNG which has a gross calorific value of 8126.222 KCa1/SCM. 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 95-98% 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** | **Standard** |
| CH4(Percentage) | >90% | IS 16087:2016 |
| CO2+ N2 + O2(Percentage) | 10 % | IS 16087:2016 |
| Only CO2 | 4 % | IS 16087:2016 |
| O2(Percentage) | 0.5% | IS 16087:2016 |
| H2S (Mg/M3) | 20 (Mg/M3) | IS 16087:2016 |
| Moisture (Mg/M3) | 5 (Mg/M3) | IS 16087:2016 |

***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 M3 |
| 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 |

Biogas supplied at Delivery Point, for injection in the pipeline network of Buyer, shall meet following PNGRB specifications (as amended) for natural gas in CGD networks:

|  |  |
| --- | --- |
| **PNGRB gas Specifications for Pipeline supply** | |
| ***Schedule – VI*** | |
| ***(See Regulation 7(1))*** | |
| ***Threshold limit for gas parameters on City or Local Natural Gas Distribution Network*** | |
| **Parameters** | **Limit** |
| Hydrocarbon dew point (Degree Celsius, max.) | 0 |
| Water dew point (Degree Celsius, max.) | 0 |
| Hydrogen Sulphide (ppm by wt, max.) | 5 |
| Total Sulphur (ppm by wt, max.) | 10 |
| Carbon dioxide (mol%, max.) | 6 |
| Total inerts (mol%) | 8 |
| Temperature (Degree Celsius, max.) | 55 |
| Temperature (Degree Celsius, min.) | 10-20 |
| Oxygen (% mol. vol. max.) | 0.2 |
| Wobbe Index (for domestic consumers), MJ/SCM | 39-53 |

A critical aspect of pipeline specifications is the stringent control of gas composition, including ultra-low hydrogen sulphide (H₂S) levels (<5 ppm), oxygen content below 0.2% mol vol, and low moisture levels (dew point of 0°C or lower). Additionally, the Wobbe Index serves as a key indicator of methane content, with Indian City Gas Distribution (CGD) companies typically requiring a Wobbe Index of 46 or higher, corresponding to a methane content of 95% or more.

1. **ORGANIC FERTILIZER:**

One of the major by-products of a Compressed Biogas (CBG) plant is digestate, a nutrient-rich organic by-product. This falls under the classification of Fermented Organic Manure (FOM) as per order dt. May 29, 2023 Digestate is the material left after anaerobic digestion of organic waste, such as agricultural residues, food waste, and animal manure. It is used as an organic soil conditioner and fertilizer. The choice of input feedstocks - rice straw, cow dung and poultry waste were purposely chosen so as to ensure a higher nutrition in the residues than purely rice straw.

The plant has a capacity to produce 37,450 TPA of solid organic fertilizers. The material drawn from the digester is called Organic Carbon Enhancers as per GoI/ MoAFW notification SO.897(E) dated 17 Feb 2025, which is rich in nutrients (ammonia, phosphorus, potassium, and more than a dozen trace elements) and is an excellent soil conditioner.

**Quality of 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 composition of digestate varies depending on the feedstock used in the CBG plant, but it generally contains:

|  |  |
| --- | --- |
| **Elemental Composition of Organic Manure** | |
| Calcium (Ca) | 1-3 % |
| Carbon (C) | 35-50% |
| Magnesium (Mg) | 0.2-1.5% |
| Sulphur (S) | 0.2-1% |
| Nitrogen (N) | 1.5-4% |
| Phosphorous (P) | 0.5-2% |
| Potassium (K) | 1-5% |

In other words, one ton of organic manure 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.

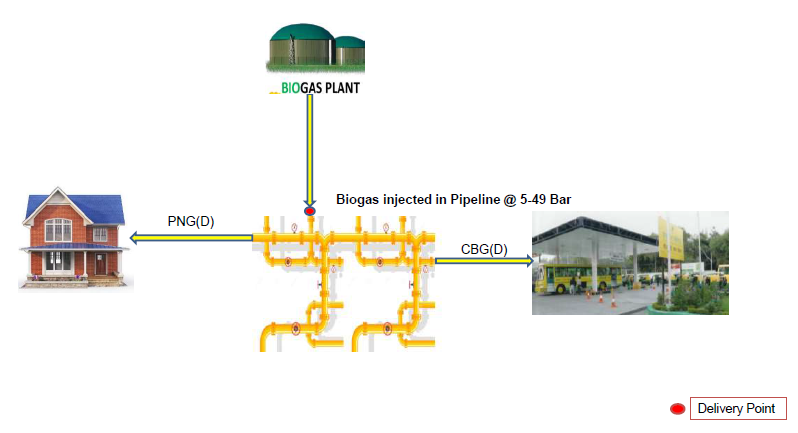
The organic manure is recommended for Short term crops such as vegetables and fodder, Mid-term crops such as wheat, cotton, rice, potato, sugarcane and maize and Long term crops such as kinnow, guava, grapes, mango, lemon and apple as per the shown inbelow table:

|  |  |  |
| --- | --- | --- |
| **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 |

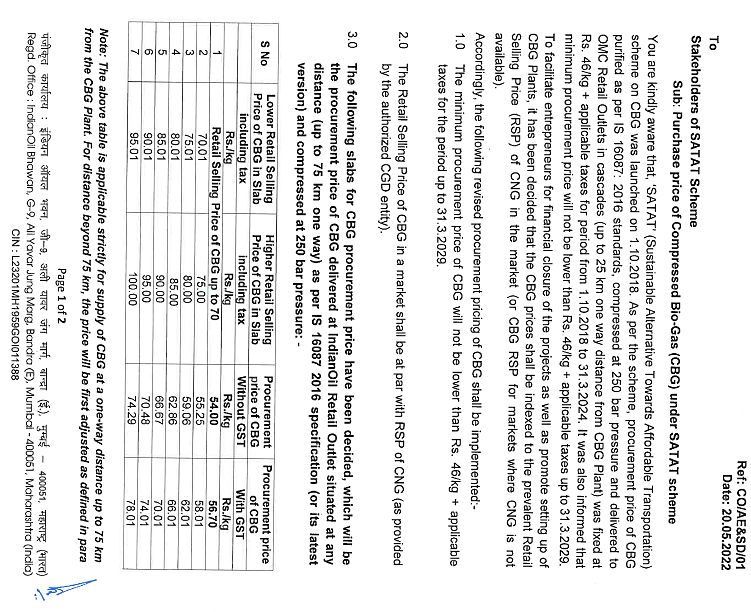
To derive maximum benefits from the stored digested slurry, it is essential to prevent its exposure to the sun as any such exposure would result in loss of ammoniacal nitrogen content of the slurry. It is advisable to dig, two or three manure pits near the biogas plant. The slurry is then carried and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

1. **PRICING STRATEGY:**

On 18th February 2025, the company has signed a Purchase/LOI/Tripartite Agreement (W2Jwala Bioenergy Private Limited, Indian Oil-Adani Gas Private Limited (IOAGPL) and GAIL). ***(Ref No.: WBPL-IOAGPL (GA-2.01)-GAIL dated 18.02.2025)***. GAIL purchases Biogas/CBG from producers and sells to CGD entities across India along with APM/NAPM gas at Uniform Base Price (UBP) for use in PNG (D) & CNG (T) segments.

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The current selling rate of CNG at OMC outlets in Punjab is around INR 87.58/kg. (https://www.goodreturns.in/cng-price-in-punjab-s27.html)*,* however the procurement price of Bio-CNG from Indian Oil as per the SATAT Scheme is around @INR 66.67 per kg without GST. “CBG Pricing Circular- SATAT Scheme” is attached below for reference:



As informed by client, the organic digestate produced from the plant could comply with Fermented Organic Manure (FOM) for which 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*](https://pib.gov.in/PressReleasePage.aspx?PRID=1935893)).

As the by-product produced from the plant would come under the definition of FOM as per the government guidelines, especially the FCO amended dated May 29, 2023, that allowed moisture of up to 70% for FOM. At present, the company does not have any formal agreement with Farmers/FPO but is working with an NGO namely RGR cell of TATA group to formalise the same. The company is building a supply chain for paddy straw from farmers to the plan in cooperation with the NGO. The company to build a reverse supply chain of supply FOM to the farmers tapping into the same channel via the NGO as the farmers sending paddy straw would also be recipients and beneficiaries of the FOM.

As per our tertiary research about 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.

Further, The Indian Biogas Association (IBA) has recommended a fair and remunerative price of Rs 5.5 per kg for fermented organic manure (FOM), excluding the government incentive of Rs 1.5 per kg, to support biogas plants in the country. The IBA has suggested that the Ministry of Chemical and Fertilizer administer a fair market price for FOM, with an additional allowance for logistics and transportation charges. *(*[*https://economictimes.indiatimes.com/industry/indl-goods/svs/chem-/-fertilisers/fix-fair-remunerative-price-of-rs-5-5/kg-for-fermented-organic-manure-indian-biogas-association/articleshow/103100564.cms?from=mdr*](https://economictimes.indiatimes.com/industry/indl-goods/svs/chem-/-fertilisers/fix-fair-remunerative-price-of-rs-5-5/kg-for-fermented-organic-manure-indian-biogas-association/articleshow/103100564.cms?from=mdr)*)*

The IBA suggested a 'floor market price' at par with the Urea Retail Prices (presently at Rs 242 per 45 Kg bag), i.e., approx. Rs 5.5 per kg (exclusive of taxes). The market development Assistance (MDA) of Rs 1.5 per kg shall be realized over and above the floor market price by the FOM producer.

As IBA suggested the floor market price should have additional leeway to accommodate for additional logistics and transportation charges, if incurred and suggested an additional rate of approx. Rs 50/ton/km. According to the IBA, FOM is being sold at a rate ranging from Rs 0.50 to 4.50 per kg in the country. The selling price of Bio-CNG is considered on conservative side as INR 64.20/kg (excluding compression charges of INR 2/kg). The selling rate of FOM has been built at a conservative assumption of Rs 1500/ton when the government's MDA gives pricing support of Rs 1500/ton.

1. **MARKETING, SELLING & DISTRIBUTION PLAN:**
2. **BIO CNG:**

As per data shared with us, the Bio-CNG produced has to be sold to GAIL by directly injecting it in the Pipeline Network of CGD thru tie-in pipeline of 9 km as per the information shared by the client/company, for which the company have already secured a Purchase Agreement/LOI/Tripartite Agreement ***(Ref No. - WBPL-IOAGPL (GA-2.01)-GAIL dated 18.02.2025).***

*As informed by client, the company have 50% Take-Or-Pay on the contract volume, although the contract is not yet signed regarding this. As per client, the contract is expected to be fully executed by Jwala Bioenergy, GAIL and IOAGPL by the time of the submission of this report to the bank. Hence, we recommend the bank to suggest the client to submit a signed agreement with 50% take-or-pay clause* *to ensure contractual certainty and risk mitigation.*

1. **ORGANIC FERTILIZER:**

The by-product of the biogas generation process is enriched organic digestate, which is a perfect supplement to, or substitute for, chemical fertilizers. As per informed by the client, the organic solid bio-fertilizers are in demand as a replacement for chemical fertilizers and are to be directly marketed using appropriate channels to the farming communities and sold @ INR 1.50/Kg.

One of the strategic goals of the tie-up with RGR Cell (TATA Trusts NGO) is intended to create a strong community demand for the digestate (FOM). The community would be educated on the benefits of using FOM vs. chemical fertilizers.

There is a daily traffic of 5 trolleys of cow dung (50T) and 2 trolleys of poultry droppings (20T). The FOM would be supplied back to the villages via resellers in these trolleys. It is to be noted that the above is a developer's own market development initiative, already underway even before plant construction.

This is over and above the efforts of the government, where Market Development Assistance (MDA) programs have been introduced, with minimum support prices (Rs 1500/MT) announced and PSU fertilizer companies roped in to market FOM.

Considering the own efforts of the developer and the government’s efforts via MDA programs, along with its conservative pricing (Rs 1500/MT), the organic fertilizer (FOM) from Jwala Bioenergy's plant is expected to be fully offtaken.

|  |  |
| --- | --- |
| **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** | | |
| **S. 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 Required Quantity (Ton)** |
| 1 | Cow Dung | 250 |
| 2 | Poultry Droppings | 98-100 |
| 3 | Food Waste | 175-180 |
| 4 | Paddy Straw | 130-150 |

Combination of any of these mentioned above can also work in proportionate quantity. However, as per feed stock analysis the CBG 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 | ~50 |
| 2 | Paddy Straw | ~38 |
| 3 | Poultry Droppings | ~20 |

1. **PADDY STRAW:**

Paddy straw is an abundant agricultural residue generated after rice harvesting. It typically has a moisture content of 10-15% and its chemical composition varies depending on rice variety, soil conditions, applied nutrients, and environmental factors. Due to its high lignocellulosic content, paddy straw presents a significant opportunity for biogas production through anaerobic digestion.

The methane potential of paddy straw is approximately 220–250 m³ per ton, making it a valuable raw material for biogas plants. The typical composition of paddy straw is provided below:

|  |  |
| --- | --- |
| **Composition Of Press Mud** | |
| **Components** | **Percentage** |
| Cellulose | 35-45% |
| Hemi cellulose | 20-25% |
| Lignin | 15-20% |
| Protein | 3-4% |
| Wax | 15-18% |
| Sugar | 12-16% |
| Na | 0.1-0.3% |

Given its high proportion of biodegradable organic matter, paddy straw serves as an excellent feedstock for biogas production. The primary energy-yielding component is methane (CH₄), which accounts for the calorific value of biogas. During purification, non-combustible gases are removed, resulting in a high-purity methane output of 97-100% CH₄, making it a sustainable and renewable fuel source.

By utilizing paddy straw for biogas production, significant environmental benefits can be achieved, including the reduction of stubble burning, mitigation of air pollution, and enhancement of sustainable energy generation

1. **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.

1. **CHICKEN LITTER:**

Chicken litter, a by-product of poultry farming, is a potent feedstock for anaerobic digestion, offering a high methane yield due to its rich organic content and nitrogen levels. Approximately 1.5 cubic feet of biogas can be generated from one pound of chicken litter at around 28°C, making it an efficient energy source for household cooking and other applications. Due to its high organic matter and nitrogen content, chicken litter is an excellent feedstock for biogas production through anaerobic digestion.

The methane potential of chicken litter is approximately 260–300 m³ per ton, making it a highly efficient raw material for biogas plants.

|  |  |
| --- | --- |
| **Percentage Proximate Composition and PH Values of The Chicken Litter** | |
| **Parameters** | **Chicken Litter** |
| Moisture % | 25.00 ± 0.30 |
| Ash % | 12.50 ± 0.05 |
| Crude Fiber % | 15.80 ± 0.10 |
| Crude Protein % | 30.00 ± 0.20 |
| Crude Fat % | 5.00 ± 0.35 |
| Carbohydrate % | 10.70 ± 0.28 |
| pH | 7.50 ± 0.02 |

Chicken litter biogas contains 60-70% methane (CH₄), 20-30% carbon dioxide (CO₂), and trace amounts of hydrogen (H₂), nitrogen (N₂), and ammonia (NH₃). Approximately 650-700 B.T.U. per cubic foot, making it a high-energy biofuel. The slurry left after digestion is a rich organic fertilizer containing 2.5–3.5% Nitrogen (N₂), 1.5–2.0% Phosphorus (P₂O₅), 0.8–1.2% Potassium (K₂O), 40-60% organic humus, improving soil fertility.

1. **AVAILABILITY OF RAW MATERIAL:**

As per the feedstock analysis and the data/information provided by the client, the plant will require cow dung around ~50 tons per day, Paddy Straw around ~38 tons per day and chicken litter around ~20 ton per day to produce the 5-ton Bio-CNG per day.

Since, May 2024, The Jwala biogas plant has fostered strong community support and partnerships with local farmers, working closely with the Reviving Green Revolution (RGR) Cell, an NGO under Tata Trusts that promotes sustainable farming.

**REVIVING GREEN REVOLUTION (RGR) CELL AND ITS ROLE**

Founded in 2008 under the Tata Trusts umbrella, RGR is committed to advancing sustainable farming techniques across Punjab. Headquartered at Punjab Agricultural University, RGR operates with a team of 500 professionals, including office and field staff. The organization has played a pivotal role in:

* **Encouraging in-site crop residue management** to mitigate environmental damage from stubble burning.
* **Promoting the cultivation and marketing of new summer crops** to diversify agricultural output.
* **Enhancing vegetable consumption** as part of broader efforts to improve nutritional security in Punjab.

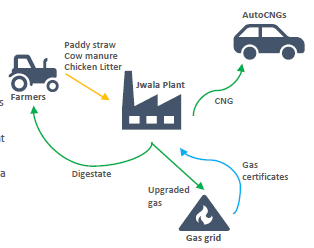
**Key Initiatives and Impact**

* **Community Engagement:** Jwala collaborates with farmer cooperatives to prevent stubble burning and repurpose paddy straw as feedstock.
* **Waste-to-Value Model:** Farmers sell manure to Jwala for biogas production and receive nutrient-rich digestate as organic fertilizer. Some may opt for an ownership stake in exchange for feedstock.
* **Sustainable** **Alternatives:** The plant provides an eco-friendly solution to Punjab’s 17–18 million MT of annual paddy straw, 85–90% of which is currently burned, and leverages the state’s 9.83 million MT of dairy waste for steady bioenergy production.

**Three key objectives of the tie-up of Jwala Bioenergy with RGR Cell are:**

* Build a symbiotic relationship with the farming community in the plant vicinity - defusing chances of protests, etc. against the plant.
* Ensure feedstock security by preventing stubble burning and sensitizing farmers about feedstock supply to the plant
* Ensure demand for the digestate (FOM) in the villages by promoting use of organic fertilizers

Punjab is also one of the most straw-dense regions on the planet as well, ensuring a long-term supply of dry matter for the digester. The straw itself is an unwanted by-product which requires removal for farming. The annual feedstock (excl. water) requirement of ~39k tonnes will be collected from within approximately 3km of the site, ensuring a local supply and providing demand for feedstock for around 10 villages.



Manure from farmers serves a dual function; as input to the biogas production process and as an output in the form of a digestate which is returned to the farmers as a valuable enhanced fertiliser. By integrating crop and dairy waste into energy production, Jwala’s biogas plant serves as a sustainable solution to two major environmental challenges: stubble burning and agricultural waste management. The project not only mitigates pollution but also enhances rural livelihoods, soil health, and sustainable agricultural productivity.

Since May 2024, RGR Cell has conducted more than 20 camps in the villages. In collaboration with RGR Cell, Jwala Bioenergy has set up 8 Village Level Information (VLI) Centers. These centers are infomration hubs used by aleast 5-6 farmers every day per village - where they are given information about use of sustainable fertilizers, good cropping practices, etc. During the harvest season, these VLIs would serve as the hub for feedstock collection.

1. **PRICING:**

As farmers and agro-industries have now recognized the potential of paddy straw for revenue generation, its market value has significantly increased over the last two years. The price of paddy straw has risen from INR 500 per tonne to INR 1,500-1,800 per tonne, including transportation. Thus, the paddy straw, which is primarily generated from rice harvesting, is assumed to be made available to the project at INR 1,800 per tonne. The cattle dung is collected from various dairy farms/ nearby villages @ INR 400-500/MT and used as inoculants. As per the plan shared by the company, the by-product, organic manure/fertiliser to the farmers directly in exchange of the cow dung, which will ensure the lower procurement cost of the cow dung/chicken manure to the company.

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| **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/*](https://gobardhan.co.in/)*),* approx. 118 CBG/Bio CNG plants are completed and functional in 187 districts and 201 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.

1. **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 | 2,000 |
| Poultry litter | 1,00,000 | 100 | 60 | 6,000 |
| Press mud | 1,00,000 | 150 | 80 | 8,000 |
| **Total** | | | | **16,000** |

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*](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.

1. **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 * Demand supply mismatch - requirement of large storage facility * Unorganized biomass value chain – lack of suﬃcient collection, processing and transportation facility | * Variation in quality of feedstock throughout the year * Some projects are designed to take multiple 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 | * Technologies are sensitive to the quality of feedstock – slight change in feedstock quality will signiﬁcantly impact the Bio-CNG production rate * Capital intensive technologies high upfront project cost | * Year-on-year variation in feedstock price – established feedstock pricing mechanism is 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. | * There are schemes by public sector banks to ﬁnance Bio-CNG project, but less private sector banks are ﬁnancing Bio-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. |

1. **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.
* Government of Uttar Pradesh is providing the subsidy of INR 75 lac / Ton under the provision of UP Bio Energy Policy 2022 and Benefit up to INR 2.0 Cr from Agriculture Infrastructure Fund (AIF) – Circular dated 27th Oct. 2020.
* Market Development Assistance (MDA) for Promotion of Organic Fertilizers @ Rs. 1500 / Ton to CBG Plants.

1. **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.

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| **PART I** | **SWOT ANALYSIS** |

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| **SWOT ANALYSIS** | |
| **STRENGTHS** | * **Strategic Location:** The project is situated in Dera Bassi, Punjab, several agricultural lands are situated near by the location of the proposed Bio CNG plant ensures the availability of agricultural residue (paddy straw), and at the same time strong urban demand centres with pipelines - Chandigarh as well as Patiala. * **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. * **Commercial Agreement with Take-or-Pay:** The produced Bio CNG will be supplied to CGD (Indian Oil-Adani Gas) under CBG-CGD synchronisation Scheme through GAIL as per the LOI/tripartite agreement under SATAT scheme, which is an effortless avenue for the project to generate the revenue. ***(Ref No. - WBPL-IOAGPL (GA-2.01)-GAIL dated 18.02.2025).*** * **Mode of Delivery:** Being one of the first direct pipeline injection plants in India, there is a high level of assurance for offtake from the plant, as opposed to the earlier SATAT plants which depended on cascade-based offtakes. * **Government Support:** The project will be entitled to avail incentives of INR 4.15 Cr (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 “Sprinkling and not stirred technology” Mesophilic bio-methanation technology from Sauter, which is a proven technology empirically. * **Backup Offtake Agreement:** The company has signed another LOI with IOCL dated 7th December 2023 ***(Reference: Indian Oil/SATAT/01/2283/A)*** |
| **WEAKNESSES** | * **CAPEX:** The proposed Bio CNG plant would be set up by a high initial investment, in which more than 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 LNG for exports in foreign countries with huge demand potential. * **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. * **Carbon Credits:** The Company has the opportunity to leverage the expanding carbon credit market, creating an additional revenue stream through its sustainable operations. By generating and monetizing carbon credits, the project can enhance its financial viability while contributing to global emissions reduction efforts. |
| **THREATS** | * **Fluctuating Raw Material Prices:** With the increasing demand of paddy straw, the prices are increasing. * **Economic Factors:** Profitability of the project may hamper due to any blockage of feed stock. However, the plant can also be run on cow dung and poultry litter also. * **Dependency on Commercial Agreement:** Any breach of the Offtake Purchase agreement with OMC, the company may require to search the new approach to sell its production in the market. However, considering the offtake into the pipeline and the pricing incentivization for the CGD company to take biogas deliveries, this probability seems low. |

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| **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 59.84 Crores as shown in the below table along with Means of finance:

|  |  |  |
| --- | --- | --- |
| **Total Project Cost** | | |
| **S. No.** | **Capital Cost Head** | **Amount (INR Crore)** |
| 1 | Civil Works-ISGEC, India | 8.65 |
| 2 | EPC - ISGEC, India | 31.27 |
| 3 | EPC - Sauter, Germany | 11.39 |
| 4 | Pipeline Cost | 1.80 |
| 5 | Pre-Operative Expenses | 3.33 |
| 6 | IDC | 2.14 |
| 7 | Contingencies (2.50% of Item 1-5) | 1.25 |
|  | **TOTAL** | **59.84** |
| **Means of Finance** | | |
| **S. No.** | **Particular** | **Amount (INR Crore)** |
| 1 | Promoters' Margin | 29.92 |
| 2 | Loan from Banks | 29.92 |
|  | **TOTAL** | **59.84** |

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

**Notes:**

1. As per the shared sale/lease deed, a land parcel located at Village Jaulan Kalan, Tehsil Dera Bassi, District S.A.S. Nagar, Punjab-140501 admeasuring ~11.73 Kille and leased out in the name of M/s W2Jwala Bioenergy Private Limited for a period of 15 years with an option of renewal of 10 years at the end of lease on an annual lease rental of INR 18,36,918/annum with an annual escalation rate of 8% through an executed lease deed on 27th September 2024.
2. As per the provisional contract with the EPC, the estimated cost of the Building & Civil works is ~INR 8.65 crores including applicable GST.
3. The cost of Plant & Machinery has been considered as per the technical offer bid received from EPC Contractor (ISGEC) and technology provider (Sauter). The estimated cost for plant & machinery will be ~INR 42.66 crores including GST.
4. According to the details provided by the company, W2Jwala has proposed a total cost of INR 1.80 crore (inclusive of GST) for the construction of a 9-kilometer MDPE pipeline connecting the project site to the CGD (IOC Adani) entity’s pipeline network for the distribution of Bio-CNG. This equates to a cost of INR 20 lakh per KM.
5. As per the information shared by the client/company, the estimated cost of other items described as Pre-operative Expenses would be ~INR 3.30 Cr. The details of Pre-Operative Expenses are shown in the table below:

|  |  |  |
| --- | --- | --- |
| **S. No.** | **Particulars** | **Cost (In Cr.)** |
| a | C.A.R. insurance | 0.23 |
| b | Freight DE to IN | 0.15 |
| c | Security | 0.30 |
| d | Construction Management | 0.40 |
| e | Salaries | 0.60 |
| f | RGR Cell | 0.40 |
| g | Permits | 0.50 |
| h | Temp transformer | 0.25 |
| i | Cabling | 0.10 |
| j | Fin. Brokerage | 0.40 |
|  | **Total** | **3.33** |

1. Contingency cost of INR 1.50 crores (~3% of TPC) has been considered based on general assumption and professional experience. Interest during Construction will be paid from April 2025 by the company @ 10%.
2. The Company’s Dera Bassi Project has been registered in the Gobardhan Portal of Ministry of Jal Shakti. (Reg No. PB02001146TEMP dated 30 Jul 2024). Company is eligible for a subsidy of INR 4.15 crores Under Waste to Energy Programme of Ministry of New and Renewable Energy. As per the information/shared by the company/client, the company is eligible for a subsidy of INR 1.10 Crores for the 9 KM pipeline to be established from the project site to the CGD (IOC Adani) entity’s pipeline network.
3. For the total project cost of INR 59.84 Crores, the project is proposed to be funded through a term loan of INR 29.92 crores and promoter’s margin of INR 29.92 crores.
4. Thus, ~INR 10.02 Crore per ton excluding GST, IDC & contingency expenses 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 with reference to the reasoning shared by the company which is mentioned above and 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*](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 Company** | **Plant Location** | **Remarks** |
|  | Verbio AG | Lehragaga, Sangrur, Punjab | * Production capacity – 33 TPD * Biogas purification method – Amines (Chemical Based) * Cost Rs. 230 Crore (Rs. 6.96 Crore per TPD) |
|  | EverEnviro | Indore, Madhya Pradesh | * Production capacity – 17 - 18 TPD * Biogas purification method – PSA * Cost Rs. 150 Crore (Rs. 8.82 – 8.33 Crore per TPD) |
|  | Badaun CBG Plant | Badaun, Uttar Pradesh | * Production capacity – 14 TPD * Biogas purification method – NA * Cost Rs. 133 Crore (Rs. 9.5 Crore per TPD) |
|  | Gobardhan Bio CNG Plant | Madhya Pradesh | * Production capacity – 15 - 20 TPD * Biogas purification method – NA * Cost Rs. 6.5 to 9 Crore per TPD |

|  |  |
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| **PART K** | **PROJECT IMPLEMENTETION SCHEDULE** |

The proposed Bio CNG generating unit is expected to achieve its C.O.D till 1st May 2026, as per the proposed implementation schedule shown in the table below:

|  |  |  |  |
| --- | --- | --- | --- |
| **S. No.** | **Major Milestones** | **Timeline** | |
| **Start Date** | **End Date** |
| 1 | Signing of EPC Contract | 01-May-25 | 01-May-25 |
| 2 | Signing of Sauter Contract | 15-May-25 | 15-May-25 |
| 3 | Detailed Design by EPC | 01-May-25 | 15-Jun-25 |
| 4 | Detailed Design by Sauter (Implementation Planning) | 15-May-25 | 29-Jun-25 |
| 5 | PO Placement of Digester tanks, Upgrading system and Pre-Treatment system | 01-May-25 | 10-May-25 |
| 6 | Provisional Fire NOC | 01-May-25 | 30-May-25 |
| 7 | Building Plan Approvals | 01-May-25 | 30-Jun-25 |
| 8 | Ground Water Extraction Approval | 01-May-25 | 31-May-25 |
| 9 | Approval for Temporary Electricity Consumption | 01-May-25 | 31-May-25 |
| 10 | Mobilization of EPC team for civil | 15-Jun-25 | 30-Jun-25 |
| 11 | On-site Civil work | 01-Jul-25 | 30-Oct-25 |
| 12 | On-site Electrical Work | 20-Jul-25 | 30-Aug-25 |
| 13 | On-site Piping Work | 20-Jul-25 | 30-Sep-25 |
| 14 | Digester tank Foundation | 01-Jul-25 | 31-Jul-25 |
| 15 | PO Placement of remaining items/ systems | 01-Aug-25 | 10-Aug-25 |
| 16 | On-site receipt of Digester Tanks (lead time) | 10-May-25 | 08-Aug-25 |
| 17 | On-site erection of Digester Tanks | 09-Aug-25 | 30-Sep-25 |
| 18 | On-site receipt of Upgrading System (lead time) | 10-May-25 | 07-Oct-25 |
| 19 | On-site receipt of Pre-Treatment system (lead time) | 10-May-25 | 07-Sep-25 |
| 20 | On-site receipt of other equipment (lead time) | 10-Aug-25 | 09-Oct-25 |
| 21 | Commence erection activity of other equipment | 10-Oct-25 | 30-Jan-26 |
| 22 | Installation of Fire Fighting equipment/system | 10-Oct-25 | 29-Nov-25 |
| 23 | Receipt of Sauter equipment on-site (lead time) | 15-May-25 | 01-Dec-25 |
| 24 | Erection activity of Sauter equipment | 02-Dec-25 | 15-Jan-26 |
| 25 | Integration & SCADA, Network connectivity | 16-Jan-26 | 31-Jan-26 |
| 26 | Consent to Operate | 01-Nov-25 | 30-Jan-26 |
| 27 | Other Mandatory Approvals (Fire NOC, Factory License, permanent Electricity) | 01-Nov-25 | 30-Jan-26 |
| 28 | Dry Commissioning of equipment | 15-Feb-26 | 28-Feb-26 |
| 29 | Inoculum, Feedstock availability & Troubleshooting | 01-Mar-26 | 15-Mar-26 |
| 30 | Full Commissioning & Performance Trials | 15-Mar-26 | 25-Mar-26 |
| 31 | Commercial Operational Date (COD) | 01-May-26 | 01-May-26 |

**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 May 2026.

|  |  |
| --- | --- |
| **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. | Name Of License/ Registration  Issuing Authority | Purpose | Licence No. With Date | Current Status |
| 1. | **Certificate of Incorporation** | RoC registration | U35103PB2023FTC058577 | Completed |
| *Ministry of Corporate Affairs, Government of India* | 19th May 2023 |
| 2. | **Approval of Building / Site Plans** | Grant of approval on building plans | - | Yet to Apply |
| HUD & Dept. of Labour |
| 3. | **Consent to Establish** | NOC for CTE | PBIP/PPCB/2025/2523 | Received |
| Punjab Pollution Control Board | 19th February 2025 |
| 4. | **Application Form for Sewerage Connection** | NOC for Sewage Connection | - | Yet to Apply |
| Punjab Housing and Urban Development |
| 5. | **NOC for fire-fighting** | NOC under firefighting scheme | - | Yet to Apply |
| Fire Service, Punjab |
| 6. | **Central Ground Water Permission** | NOC for Water Extraction | - | Yet to Apply |
| CGWA Punjab |
| 7. | **Power load sanction / Electric connection** | For Power load sanction | - | Yet to Apply |
| Punjab State Power Corporation Ltd |
| 8. | **NoC for Boiler Installation** | Boiler Installation / Erection Permission | - | Yet to Apply |
| Director Boilers |
| 9. | **Consent to Operate (CTO)** | NOC for CTO |  | Yet to Apply |
| Punjab Pollution Control Board |
| 10. | Udyam Registration Certificate (MSME) |  | UDYAM-PB-20-0074502 | Received |
| 8th June 2024 |
| 11. | GOBARdhan Registration Certificate |  | PB02001146TEMP | Received |
| 30th July 2024 |

***Observation Note:***

1. Company has received LOA for setting up of Compressed Biogas (CBG) Project of 12000m3 Raw Biogas per day (5 TPD CBG) from Punjab Energy Development Agency (A Punjab Govt. Undertaking) on 4th September 2023 *(Ref: 8186-98).*
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 2025-26 to FY 2040-41 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:

1. **PROJECTED PROFIT & LOSS ACCOUNT:**

***(INR Crores, unless mentioned otherwise)***

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Particulars** | **Units** | **FY 2027** | **FY 2028** | **FY 2029** | **FY 2030** | **FY 2031** | **FY 2032** | **FY 2033** |
| **Year** | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| **Technical Assumptions** |  |  |  |  |  |  |  |  |
| Sale Quantity - CBG | in TPA | 1,750 | 1,750 | 1,750 | 1,750 | 1,750 | 1,750 | 1,750 |
| Sale Quantity - Digestate (FOM) | in TPA | 37,450 | 37,450 | 37,450 | 37,450 | 37,450 | 37,450 | 37,450 |
| Price per unit - CBG (3% increase) | Rs/ton | 64,203 | 66,129 | 68,113 | 70,156 | 72,261 | 74,429 | 76,662 |
| Price per unit - Digestate (FOM) (3% Increase) | Rs/ton | 1,500.00 | 1,545.00 | 1,591.35 | 1,639.09 | 1,688.26 | 1,738.91 | 1,791.08 |
| Capacity Utilisation |  | 70% | 96% | 96% | 96% | 96% | 96% | 96% |
| Revenue |  |  |  |  |  |  |  |  |
| Revenue - CBG |  | 7.86 | 11.11 | 11.44 | 11.79 | 12.14 | 12.50 | 12.88 |
| Revenue - Digestate (Solid) |  | 3.93 | 5.55 | 5.72 | 5.89 | 6.07 | 6.25 | 6.44 |
| Revenue - Compression charge |  | 0.25 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 |
| Revenue - Carbon Credits |  | 0.30 | 0.30 | 0.30 | 0.30 | 0.30 | 0.30 | 0.30 |
| **Operational Revenues** |  | **12.34** | **17.30** | **17.80** | **18.32** | **18.85** | **19.39** | **19.95** |
| Other Income |  | 0.28 | 0.28 | 0.28 | 0.28 | 0.28 | 0.28 | 0.28 |
| **Total Income** |  | **12.62** | **17.58** | **18.08** | **18.60** | **19.13** | **19.67** | **20.23** |
| Expenses |  |  |  |  |  |  |  |  |
| Power & Fuel |  | 0.99 | 1.40 | 1.44 | 1.48 | 1.53 | 1.57 | 1.62 |
| Paddy Straw |  | 1.68 | 2.37 | 2.44 | 2.51 | 2.59 | 2.67 | 2.75 |
| Cow dung |  | 0.50 | 0.71 | 0.73 | 0.75 | 0.78 | 0.80 | 0.82 |
| Chicken manure |  | 0.20 | 0.28 | 0.29 | 0.30 | 0.31 | 0.32 | 0.33 |
| Water |  | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| Lease Rental |  | 0.20 | 0.21 | 0.23 | 0.25 | 0.27 | 0.29 | 0.31 |
| O&M |  | 1.08 | 1.11 | 1.15 | 1.18 | 1.22 | 1.25 | 1.29 |
| Repair & Maintenance |  | 0.22 | 0.31 | 0.32 | 0.33 | 0.34 | 0.35 | 0.36 |
| SG&A |  | 0.49 | 0.69 | 0.71 | 0.73 | 0.75 | 0.78 | 0.80 |
| Other Expenses |  | 0.36 | 0.47 | 0.48 | 0.50 | 0.51 | 0.53 | 0.54 |
| **Total Expenses** |  | **5.73** | **7.57** | **7.80** | **8.05** | **8.30** | **8.56** | **8.83** |
| **EBITDA** |  | **6.89** | **10.01** | **10.28** | **10.55** | **10.82** | **11.11** | **11.40** |
| Depreciation |  | 2.21 | 2.21 | 2.21 | 2.21 | 2.21 | 2.21 | 2.21 |
| **EBIT** |  | **4.68** | **7.80** | **8.06** | **8.33** | **8.61** | **8.90** | **9.19** |
| Interest |  | 2.42 | 2.24 | 1.98 | 1.70 | 1.38 | 1.04 | 0.65 |
| **PBT** |  | **2.26** | **5.56** | **6.08** | **6.64** | **7.23** | **7.86** | **8.54** |
| One-Time Income (Subsidy) |  | 4.83 |  |  |  |  |  |  |
| **PBT** |  | **7.08** | **5.56** | **6.08** | **6.64** | **7.23** | **7.86** | **8.54** |
| Taxes |  | 0.63 | 1.55 | 1.69 | 1.85 | 2.01 | 2.19 | 2.38 |
| **PAT** |  | **6.46** | **4.02** | **4.39** | **4.79** | **5.22** | **5.67** | **6.17** |

***(Continued)***

***(INR Crores, unless mentioned otherwise)***

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Particulars** | **Units** | **FY 2034** | **FY 2035** | **FY 2036** | **FY 2037** | **FY 2038** | **FY 2039** | **FY 2040** | **FY 2041** |
| **Year** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| **Technical Assumptions** |  |  |  |  |  |  |  |  |  |
| Sale Quantity - CBG | in TPA | 1,750 | 1,750 | 1,750 | 1,750 | 1,750 | 1,750 | 1,750 | 1,750 |
| Sale Quantity - Digestate (Solid) | in TPA | 37,450 | 37,450 | 37,450 | 37,450 | 37,450 | 37,450 | 37,450 | 37,450 |
| Price per unit - CBG (5% increase) | Rs/ton | 78,962 | 81,330 | 83,770 | 86,283 | 88,872 | 91,538 | 94,284 | 97,113 |
| Price per unit - Digestate (Solid) | Rs/ton | 1,844.81 | 1,900.16 | 1,957.16 | 2,015.87 | 2,076.35 | 2,138.64 | 2,202.80 | 2,268.88 |
| Capacity Utilisation |  | 96% | 96% | 96% | 96% | 96% | 96% | 96% | 96% |
| Revenue |  |  |  |  |  |  |  |  |  |
| Revenue - CBG |  | 13.27 | 13.66 | 14.07 | 14.50 | 14.93 | 15.38 | 15.84 | 16.31 |
| Revenue - Digestate (Solid) |  | 6.63 | 6.83 | 7.04 | 7.25 | 7.46 | 7.69 | 7.92 | 8.16 |
| Revenue - Compression charge |  | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 |
| Revenue - Carbon Credits |  | 0.30 | 0.30 | 0.30 | 0.30 | 0.30 | 0.30 | 0.30 | 0.30 |
| **Operational Revenues** |  | **20.53** | **21.13** | **21.75** | **22.38** | **23.03** | **23.70** | **24.40** | **25.11** |
| Other Income |  | 0.28 | 0.28 | 0.28 | 0.28 | 0.28 | 0.28 | 0.28 | 0.28 |
| **Total Income** |  | **20.81** | **21.41** | **22.03** | **22.66** | **23.31** | **23.98** | **24.68** | **25.39** |
| Expenses |  |  |  |  |  |  |  |  |  |
| Power & Fuel |  | 1.67 | 1.72 | 1.77 | 1.82 | 1.88 | 1.93 | 1.99 | 2.05 |
| Paddy Straw |  | 2.83 | 2.91 | 3.00 | 3.09 | 3.18 | 3.28 | 3.38 | 3.48 |
| Cow dung |  | 0.85 | 0.87 | 0.90 | 0.93 | 0.95 | 0.98 | 1.01 | 1.04 |
| Chicken manure |  | 0.34 | 0.35 | 0.36 | 0.37 | 0.38 | 0.39 | 0.41 | 0.42 |
| Water |  | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| Lease Rental |  | 0.34 | 0.37 | 0.40 | 0.43 | 0.46 | 0.50 | 0.54 | 0.58 |
| O&M |  | 1.33 | 1.37 | 1.41 | 1.45 | 1.49 | 1.54 | 1.59 | 1.63 |
| Repair & Maintenance |  | 0.37 | 0.38 | 0.39 | 0.40 | 0.41 | 0.43 | 0.44 | 0.45 |
| SG&A |  | 0.82 | 0.85 | 0.87 | 0.90 | 0.92 | 0.95 | 0.98 | 1.00 |
| Other Expenses |  | 0.56 | 0.58 | 0.59 | 0.61 | 0.63 | 0.65 | 0.67 | 0.69 |
| **Total Expenses** |  | **9.11** | **9.40** | **9.70** | **10.01** | **10.33** | **10.66** | **11.01** | **11.36** |
| **EBITDA** |  | **11.70** | **12.01** | **12.32** | **12.65** | **12.98** | **13.32** | **13.67** | **14.02** |
| Depreciation |  | 2.21 | 2.21 | 2.21 | 2.21 | 2.21 | 2.21 | 2.21 | 2.21 |
| **EBIT** |  | **9.49** | **9.80** | **10.11** | **10.44** | **10.77** | **11.11** | **11.46** | **11.81** |
| Interest |  | 0.23 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **PBT** |  | **9.26** | **9.80** | **10.11** | **10.44** | **10.77** | **11.11** | **11.46** | **11.81** |
| One-Time Income (Subsidy) |  |  |  |  |  |  |  |  |  |
| **PBT** |  | **9.26** | **9.80** | **10.11** | **10.44** | **10.77** | **11.11** | **11.46** | **11.81** |
| Taxes |  | 2.58 | 2.73 | 2.81 | 2.90 | 3.00 | 3.09 | 3.19 | 3.29 |
| **PAT** |  | **6.69** | **7.07** | **7.30** | **7.53** | **7.77** | **8.02** | **8.27** | **8.53** |

1. **PROJECTED BALANCE SHEET:**

Below table shows the Projected Balance Sheet of the proposed Bio CNG generating project from the period FY 2025-26 to FY 2040-41. FY 2025-26 would be the implementation period of the project:

***(INR Crores)***

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Particulars** | **FY 2026** | **FY 2027** | **FY 2028** | **FY 2029** | **FY 2030** | **FY 2031** | **FY 2032** | **FY 2033** |
| **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| Equity Share Capital | 29.92 | 29.92 | 29.92 | 29.92 | 29.92 | 29.92 | 29.92 | 29.92 |
| Additional Contributions | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| Reserves and Surplus |  | 6.46 | 10.47 | 14.86 | 19.65 | 24.87 | 30.54 | 36.71 |
| Current Liabilities |  | 0.47 | 0.62 | 0.64 | 0.66 | 0.68 | 0.70 | 0.73 |
| Long term loans | 29.92 | 23.57 | 21.17 | 18.47 | 15.47 | 12.17 | 8.57 | 4.37 |
| **Total Liabilities** | **63.84** | **64.42** | **66.18** | **67.89** | **69.70** | **71.64** | **73.74** | **75.72** |
| Gross Fixed Assets | 59.84 | 59.84 | 59.84 | 59.84 | 59.84 | 59.84 | 59.84 | 59.84 |
| Accumulated Depreciation |  | 2.21 | 4.42 | 6.64 | 8.85 | 11.06 | 13.27 | 15.49 |
| **Net Fixed Assets** | **59.84** | **57.63** | **55.41** | **53.20** | **50.99** | **48.78** | **46.56** | **44.35** |
| Cash & Bank Balance | 0.00 | 1.40 | 4.81 | 8.67 | 12.63 | 16.72 | 20.97 | 25.10 |
| Bank Deposit | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| Stocks | 0.00 | 0.89 | 1.25 | 1.29 | 1.33 | 1.37 | 1.41 | 1.45 |
| Trade Receivables | 0.00 | 0.51 | 0.71 | 0.73 | 0.75 | 0.77 | 0.80 | 0.82 |
| **Total Current Assets** | **4.00** | **6.79** | **10.77** | **14.69** | **18.71** | **22.87** | **27.17** | **31.37** |
| **Total Assets** | **63.84** | **64.42** | **66.18** | **67.89** | **69.70** | **71.64** | **73.74** | **75.72** |

***(Continued)***

***(INR Crores)***

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Particulars** | **FY 2034** | **FY 2035** | **FY 2036** | **FY 2037** | **FY 2038** | **FY 2039** | **FY 2040** | **FY 2041** |
| **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| Equity Share Capital | 29.92 | 29.92 | 29.92 | 29.92 | 29.92 | 29.92 | 29.92 | 29.92 |
| Additional Contributions | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| Reserves and Surplus | 43.40 | 50.47 | 57.77 | 65.30 | 73.07 | 81.09 | 89.36 | 97.88 |
| Current Liabilities | 0.75 | 0.77 | 0.80 | 0.82 | 0.85 | 0.88 | 0.90 | 0.93 |
| Long term loans | - | - | - | - | - | - | - | - |
| **Total Liabilities** | **78.06** | **85.16** | **92.48** | **100.04** | **107.84** | **115.88** | **124.18** | **132.74** |
| Gross Fixed Assets | 59.84 | 59.84 | 59.84 | 59.84 | 59.84 | 59.84 | 59.84 | 59.84 |
| Accumulated Depreciation | 17.70 | 19.91 | 22.12 | 24.34 | 26.55 | 28.76 | 30.97 | 33.19 |
| **Net Fixed Assets** | **42.14** | **39.93** | **37.71** | **35.50** | **33.29** | **31.08** | **28.86** | **26.65** |
| Cash & Bank Balance | 29.59 | 38.83 | 48.29 | 57.99 | 67.92 | 78.10 | 88.53 | 99.21 |
| Bank Deposit | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| Stocks | 1.49 | 1.54 | 1.59 | 1.63 | 1.68 | 1.73 | 1.78 | 1.84 |
| Trade Receivables | 0.84 | 0.87 | 0.89 | 0.92 | 0.95 | 0.97 | 1.00 | 1.03 |
| **Total Current Assets** | **35.93** | **45.23** | **54.77** | **64.54** | **74.55** | **84.81** | **95.32** | **106.08** |
| **Total Assets** | **78.06** | **85.16** | **92.48** | **100.04** | **107.84** | **115.88** | **124.18** | **132.74** |

1. **PROJECTED CASH FLOW STATEMENT:**

***(INR Crores)***

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **YEAR** | **FY 2026** | **FY 2027** | **FY 2028** | **FY 2029** | **FY 2030** | **FY 2031** | **FY 2032** | **FY 2033** |
| **Particulars** | **Constr.** | **12 M** | **12 M** | **12 M** | **12 M** | **12 M** | **12 M** | **12 M** |
| **A. SOURCE OF FUND** |  |  |  |  |  |  |  |  |
| Net Profit | 0.00 | 6.46 | 4.02 | 4.39 | 4.79 | 5.22 | 5.67 | 6.17 |
| Increase in Equity / Share Capital/USL | 33.92 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Increase in TL | 29.92 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Increase in Current Liabilities | 0.00 | 0.47 | 0.15 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 |
| Depreciation | 0.00 | 2.21 | 2.21 | 2.21 | 2.21 | 2.21 | 2.21 | 2.21 |
| **TOTAL** | **63.84** | **9.14** | **6.38** | **6.62** | **7.02** | **7.45** | **7.91** | **8.40** |
| **B. APPLICATION OF FUNDS** |  |  |  |  |  |  |  |  |
| Capital Expenses | 59.84 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Bank Deposit | 4.00 |  |  |  |  |  |  |  |
| Decrease in Term Loan |  | 6.35 | 2.40 | 2.70 | 3.00 | 3.30 | 3.60 | 4.20 |
| Trade Receivable |  | 0.51 | 0.20 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 |
| Inventory |  | 0.89 | 0.37 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| **TOTAL** | **63.84** | **7.74** | **2.97** | **2.76** | **3.06** | **3.36** | **3.66** | **4.27** |
| Opening Balance | 0.00 | 0.00 | 1.40 | 4.81 | 8.67 | 12.63 | 16.72 | 20.97 |
| Net Surplus/ Deficit | 0.00 | 1.40 | 3.41 | 3.86 | 3.96 | 4.09 | 4.24 | 4.14 |
| **Closing Balance** | **0.00** | **1.40** | **4.81** | **8.67** | **12.63** | **16.72** | **20.97** | **25.10** |

***(Continued)***

***(INR Crores)***

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **YEAR** | **FY 2034** | **FY 2035** | **FY 2036** | **FY 2037** | **FY 2038** | **FY 2039** | **FY 2040** | **FY 2041** |
| **Particulars** | **12 M** | **12 M** | **12 M** | **12 M** | **12 M** | **12 M** | **12 M** | **12 M** |
| **A. SOURCE OF FUND** |  |  |  |  |  |  |  |  |
| Net Profit | 6.69 | 7.07 | 7.30 | 7.53 | 7.77 | 8.02 | 8.27 | 8.53 |
| Increase in Equity / Share Capital/USL | 0.00 | 0.00 | 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 | 0.00 | 0.00 |
| Increase in Current Liabilities | 0.02 | 0.02 | 0.02 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 |
| Depreciation | 2.21 | 2.21 | 2.21 | 2.21 | 2.21 | 2.21 | 2.21 | 2.21 |
| **TOTAL** | **8.92** | **9.31** | **9.54** | **9.77** | **10.01** | **10.26** | **10.51** | **10.77** |
| **B. APPLICATION OF FUNDS** |  |  |  |  |  |  |  |  |
| Capital Expenses | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Bank Deposit |  |  |  |  |  |  |  |  |
| Decrease in Term Loan | 4.37 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Trade Receivable | 0.02 | 0.02 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 |
| Inventory | 0.04 | 0.04 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| **TOTAL** | **4.44** | **0.07** | **0.07** | **0.07** | **0.08** | **0.08** | **0.08** | **0.08** |
| Opening Balance | 25.10 | 29.59 | 38.83 | 48.29 | 57.99 | 67.92 | 78.10 | 88.53 |
| Net Surplus/ Deficit | 4.48 | 9.24 | 9.46 | 9.70 | 9.93 | 10.18 | 10.43 | 10.68 |
| **Closing Balance** | **29.59** | **38.83** | **48.29** | **57.99** | **67.92** | **78.10** | **88.53** | **99.21** |

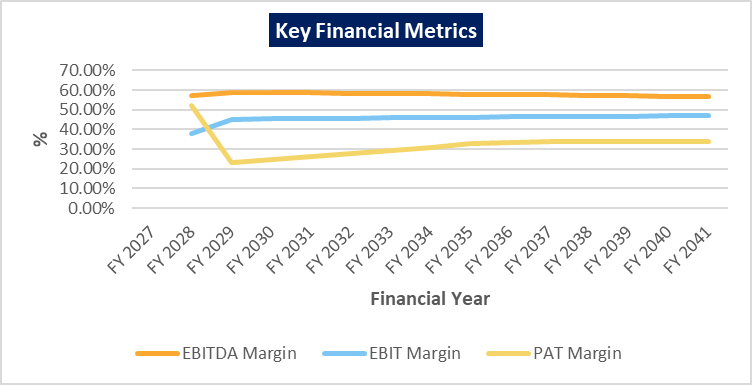
1. **KEY FINANCIAL RATIO:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **YEAR** | **FY 2027** | **FY 2028** | **FY 2029** | **FY 2030** | **FY 2031** | **FY 2032** | **FY 2033** | **FY 2034** |
| **EBITDA Margin %** | 57.20% | 58.90% | 58.72% | 58.54% | 58.37% | 58.19% | 58.01% | 57.83% |
| **EBIT Margin %** | 37.89% | 45.09% | 45.30% | 45.51% | 45.70% | 45.88% | 46.05% | 46.21% |
| **PAT Margin %** | 52.30% | 23.21% | 24.66% | 26.16% | 27.69% | 29.26% | 30.90% | 32.56% |

***(Continue)***

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **YEAR** | **FY 2027** | **FY 2028** | **FY 2029** | **FY 2030** | **FY 2031** | **FY 2032** | **FY 2033** | **Average** |
| **EBITDA Margin %** | 57.65% | 57.47% | 57.29% | 57.10% | 56.91% | 56.72% | 56.53% | **57.70%** |
| **EBIT Margin %** | 46.36% | 46.50% | 46.63% | 46.75% | 46.86% | 46.96% | 47.05% | **45.65%** |
| **PAT Margin %** | 33.46% | 33.57% | 33.66% | 33.74% | 33.82% | 33.89% | 33.96% | **32.19%** |

1. **GRAPHICAL REPRESENTATION OF KEY RATIOS:**



1. **ESTIMATED KEY FINANCIAL METRICS:**

**DEBT SERVICE COVERAGE RATIO (DSCR)**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Particulars** | | **FY27** | **FY28** | **FY29** | **FY30** | **FY31** | **FY32** | **FY33** | **FY34** | **Total** |
| PAT | | 6.46 | 4.02 | 4.39 | 4.79 | 5.22 | 5.67 | 6.17 | 6.69 | **43.40** |
| Depreciation | | 2.21 | 2.21 | 2.21 | 2.21 | 2.21 | 2.21 | 2.21 | 2.21 | **17.70** |
| Interest Cost | | 2.42 | 2.24 | 1.98 | 1.70 | 1.38 | 1.04 | 0.65 | 0.23 | **11.62** |
| **Amount Available for Repayment** | | **11.08** | **8.47** | **8.58** | **8.70** | **8.81** | **8.92** | **9.03** | **9.12** | **72.72** |
| Interest Cost | | 2.42 | 2.24 | 1.98 | 1.70 | 1.38 | 1.04 | 0.65 | 0.23 | **11.62** |
| Repayment of Loan | | 6.35 | 2.40 | 2.70 | 3.00 | 3.30 | 3.60 | 4.20 | 4.37 | **29.92** |
| **Repayment Obligation** | | **8.77** | **4.64** | **4.68** | **4.70** | **4.68** | **4.64** | **4.85** | **4.60** | **41.54** |
| **DSCR** | | **1.26** | **1.83** | **1.83** | **1.85** | **1.88** | **1.92** | **1.86** | **1.99** | **1.75** |
| **Average D.S.C.R.** | **1.75** | | | | | | | | | |
| **Max. D.S.C.R.** | **1.99** | | | | | | | | | |

1. **SENSITIVITY ANALYSIS OF D.S.C.R:**

The proposed project is found comparatively more sensitive with respect to the cost of raw material, than the revenue and any surge in the interest rate. Sensitivity analysis of the project with respect to 5% decrease in the revenue, 5% increase in the cost of raw material, 2% increment in the proposed interest rate and 5% decrease in generation 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** |
|  | If the projected revenue decreased by 5% | 1.63 | 1.83 |
|  | If the projected Cost of raw material increased by 5% | 1.65 | 1.80 |
|  | If interest rate is increased by 2% | 1.67 | 1.97 |
|  | If the generation is decreased by 5% | 1.67 | 1.88 |

1. **NPV,IRR AND PAYBACK PERIOD OF THE PROJECT:**

***(INR Crores)***

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Particulars** | **FY 2026** | **FY 2027** | **FY 2028** | **FY 2029** | **FY 2030** | **FY 2031** | **FY 2032** | **FY 2033** |
| NOPAT | 0.00 | 4.97 | 7.23 | 7.42 | 7.61 | 7.81 | 8.02 | 8.23 |
| Depreciation | 0.00 | 2.21 | 2.21 | 2.21 | 2.21 | 2.21 | 2.21 | 2.21 |
| Interest Cost | 0.00 | 2.42 | 2.24 | 1.98 | 1.70 | 1.38 | 1.04 | 0.65 |
| **Cash Inflow** | **0.00** | **9.60** | **11.68** | **11.61** | **11.52** | **11.41** | **11.27** | **11.09** |
| Interest on Term Loan | 0.00 | 2.42 | 2.24 | 1.98 | 1.70 | 1.38 | 1.04 | 0.65 |
| Prin. Repayment of TL | 0.00 | 6.35 | 2.40 | 2.70 | 3.00 | 3.30 | 3.60 | 4.20 |
| **Loan Liabilities** | **0.00** | **8.77** | **4.64** | **4.68** | **4.70** | **4.68** | **4.64** | **4.85** |
| Weighted Average cost of capital | 10.32% | | | | | | | |
| Terminal Growth Rate | 1.50% | | | | | | | |
| Equity/ USL/ Promoters Contribution | 29.92 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Total Project Cost | 59.84 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Terminal Value | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Equity IRR cash flow** | **-29.92** | **0.83** | **7.04** | **6.93** | **6.83** | **6.73** | **6.63** | **6.24** |
| **Project IRR cash flow** | **-59.84** | **9.60** | **11.68** | **11.61** | **11.52** | **11.41** | **11.27** | **11.09** |

***(Continue)***

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Particulars** | **FY 2034** | **FY 2035** | **FY 2036** | **FY 2037** | **FY 2038** | **FY 2039** | **FY 2040** | **FY 2041** |
| NOPAT | 8.45 | 8.67 | 8.90 | 9.13 | 9.37 | 9.61 | 9.87 | 10.12 |
| Depreciation | 2.21 | 2.21 | 2.21 | 2.21 | 2.21 | 2.21 | 2.21 | 2.21 |
| Interest Cost | 0.23 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Cash Inflow** | **10.88** | **10.88** | **11.11** | **11.34** | **11.58** | **11.83** | **12.08** | **12.34** |
| Interest on Term Loan | 0.23 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Prin. Repayment of TL | 4.37 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Loan Liabilities** | **4.60** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |
| Weighted Average cost of capital | 10.32% | | | | | | | |
| Terminal Growth Rate | 1.50% | | | | | | | |
| Equity/ USL/ Promoters Contribution | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Total Project Cost | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Terminal Value | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 141.97 |
| **Equity IRR cash flow** | **6.29** | **10.88** | **11.11** | **11.34** | **11.58** | **11.83** | **12.08** | **154.31** |
| **Project IRR cash flow** | **10.88** | **10.88** | **11.11** | **11.34** | **11.58** | **11.83** | **12.08** | **154.31** |
| **Equity IRR (%)** | **24.37%** | | | | | | | |
| **Project IRR (%)** | **20.39%** | | | | | | | |
| **NPV (INR Cr)** | **56.38** | | | | | | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Discount Rate** | | | |
| **Particulars** | **Weight** | **Cost** | **Weighted Cost** |
| Equity | 50.00% | 11.42% | 5.71% |
| Debt | 50.00% | 10.00% | 3.61% |
| **Total** |  |  | **9.32%** |
| Company Risk Premium |  |  | 1.00% |
| **Appropriate Discount Rate** |  |  | **10.32%** |

|  |  |  |
| --- | --- | --- |
| **Payback Period of the Project** | | |
| **Financial Year** | **Cash Accrual** | **Accumulated Cash Accrual** |
| **FY 2026** | - | - |
| **FY 2027** | 8.67 | 8.67 |
| **FY 2028** | 6.23 | 14.90 |
| **FY 2029** | 6.60 | 21.50 |
| **FY 2030** | 7.00 | 28.50 |
| **FY 2031** | 7.43 | 35.93 |
| **FY 2032** | 7.89 | 43.82 |
| **FY 2033** | 8.38 | 52.20 |
| **FY 2034** | 8.90 | 61.10 |
| **FY 2035** | 9.28 | 70.38 |
| **FY 2036** | 9.51 | 79.89 |
| **FY 2037** | 9.74 | 89.64 |
| **FY 2038** | 9.98 | 99.62 |
| **FY 2039** | 10.23 | 109.85 |
| **FY 2040** | 10.48 | 120.33 |
| **FY 2041** | 10.74 | 131.07 |
| **TPC** | **INR 59.84 Crores** | |
| **Payback Period** | **7.86 Years** | |

Thus, the project will be having a payback period of **7.86** **years** and NPV, Equity IRR & Project IRR of the project as on COD will **INR 56.38 Crores**, **24.37% & 20.39%** respectively, which indicates worthiness of the project.

1. **OTHER FINANCIAL RATIOS:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Particulars** | **FY 2026** | **FY 2027** | **FY 2028** | **FY 2029** | **FY 2030** | **FY 2031** | **FY 2032** | **FY 2033** |
| **Return On Sale (%)** | - | 52.30% | 23.21% | 24.66% | 26.16% | 27.69% | 29.26% | 30.90% |
| **Return On Capital (%)** | - | 7.31% | 11.90% | 11.99% | 12.07% | 12.14% | 12.18% | 12.25% |
| **Return On Investment** | - | 21.58% | 13.42% | 14.67% | 16.01% | 17.44% | 18.96% | 20.61% |
| **Return On Net Worth** | - | 15.99% | 9.05% | 9.00% | 8.94% | 8.88% | 8.80% | 8.73% |
| **DSCR** | - | 1.26 | 1.83 | 1.83 | 1.85 | 1.88 | 1.92 | 1.86 |
| **Fixed Assets Coverage** | - | 2.44 | 2.62 | 2.88 | 3.30 | 4.01 | 5.43 | 10.15 |
| **Interest Coverage Ratio** | - | 4.59 | 3.78 | 4.33 | 5.13 | 6.38 | 8.60 | 13.95 |
| **Current Ratio** | - | 8.49 | 10.92 | 16.79 | 22.21 | 27.43 | 32.49 | 37.43 |
| **Tol / TNW** | 100% | 59.54% | 49.09% | 39.18% | 30.11% | 21.86% | 14.38% | 7.21% |
| **Debt - Equity Ratio** | 100% | 58.38% | 47.69% | 37.86% | 28.88% | 20.70% | 13.29% | 6.19% |

**(Continue)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Particulars** | **FY 2034** | **FY 2035** | **FY 2036** | **FY 2037** | **FY 2038** | **FY 2039** | **FY 2040** | **FY 2041** |
| **Return On Sale (%)** | 32.56% | 33.46% | 33.57% | 33.66% | 33.74% | 33.82% | 33.89% | 33.96% |
| **Return On Capital (%)** | 12.27% | 11.61% | 11.03% | 10.52% | 10.06% | 9.66% | 9.29% | 8.96% |
| **Return On Investment** | 22.35% | 23.63% | 24.40% | 25.18% | 25.98% | 26.80% | 27.64% | 28.50% |
| **Return On Net Worth** | 8.65% | 8.38% | 7.96% | 7.59% | 7.26% | 6.97% | 6.71% | 6.47% |
| **DSCR** | 1.99 | - | - | - | - | - | - | - |
| **Fixed Assets Coverage** | - | - | - | - | - | - | - | - |
| **Interest Coverage Ratio** | 40.34 | - | - | - | - | - | - | - |
| **Current Ratio** | 41.89 | 46.49 | 56.73 | 66.56 | 76.00 | 85.06 | 93.74 | 102.05 |
| **Tol / TNW** | 0.97% | 0.92% | 0.87% | 0.83% | 0.79% | 0.76% | 0.73% | 0.71% |
| **Debt - Equity Ratio** | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |

1. **BREAK-EVEN ANALYSIS:**

***(INR Crores)***

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Particulars** | **FY 2026** | **FY 2027** | **FY 2028** | **FY 2029** | **FY 2030** | **FY 2031** | **FY 2032** | **FY 2033** |
| TOTAL SALES | - | 12.34 | 17.30 | 17.80 | 18.32 | 18.85 | 19.39 | 19.95 |
| LESS: VARIABLE COST | - | 4.09 | 5.77 | 5.94 | 6.12 | 6.30 | 6.49 | 6.69 |
| **CONTRIBUTION** | **-** | **8.25** | **11.53** | **11.86** | **12.19** | **12.54** | **12.90** | **13.27** |
| TOTAL FIXED COST | - | 6.27 | 6.24 | 6.05 | 5.84 | 5.59 | 5.32 | 5.01 |
| Profit / PBT | - | 1.98 | 5.28 | 5.80 | 6.36 | 6.95 | 7.58 | 8.26 |
| **PV RATIO** | **-** | **67%** | **67%** | **67%** | **67%** | **67%** | **67%** | **66%** |
| **BEP Sales** | - | **2.46** | **2.69** | **2.79** | **2.89** | **3.00** | **3.11** | **3.23** |
| **BEP%** | - | **20%** | **16%** | **16%** | **16%** | **16%** | **16%** | **16%** |

**(Continue)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Particulars** | **FY 2034** | **FY 2035** | **FY 2036** | **FY 2037** | **FY 2038** | **FY 2039** | **FY 2040** | **FY 2041** |
| TOTAL SALES | 20.53 | 21.13 | 21.75 | 22.38 | 23.03 | 23.70 | 24.40 | 25.11 |
| LESS: VARIABLE COST | 6.89 | 7.09 | 7.30 | 7.52 | 7.75 | 7.98 | 8.21 | 8.46 |
| **CONTRIBUTION** | **13.65** | **14.04** | **14.44** | **14.86** | **15.29** | **15.73** | **16.18** | **16.65** |
| TOTAL FIXED COST | 4.67 | 4.52 | 4.61 | 4.70 | 4.80 | 4.90 | 5.01 | 5.12 |
| Profit / PBT | 8.98 | 9.52 | 9.83 | 10.16 | 10.49 | 10.83 | 11.18 | 11.53 |
| **PV RATIO** | **66%** | **66%** | **66%** | **66%** | **66%** | **66%** | **66%** | **66%** |
| **BEP Sales** | **3.35** | **3.48** | **3.61** | **3.75** | **3.90** | **4.05** | **4.21** | **4.38** |
| **BEP%** | **16%** | **16%** | **17%** | **17%** | **17%** | **17%** | **17%** | **17%** |

1. **TERM LOAN INPUTS:**

|  |  |
| --- | --- |
| **Term Loan Repayment Inputs** | |
| **Total loan amount** | **INR 29,91,91,403.25** |
| **Rate of Interest** | **10.00%** |
| **1st Disbursement** | **April-25** |
| **IDC Start & End Month** | **April-25 to April-26** |
| **IDC Period (construction period)** | **13 Months** |
| **Commencement /Operation Start** | **May-26** |
| **Moratorium Start & End Month (only interest to pay)** | **April 2025 to April 2026** |
| **Repayment Start** | **May 2026** |
| **Repayment End** | **March 2034** |
| **Repayment Period** | **95 Months** |

**(INR Crores)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **YEAR/ASSET HEAD** | **2026** | **2027** | **2028** | **2029** | **2030** | **2031** | **2032** | **2033** | **2034** |
| Opening Balance | - | 29.92 | 23.57 | 21.17 | 18.47 | 15.47 | 12.17 | 8.57 | 4.37 |
| Disbursement | 29.92 | - | - | - | - | - | - | - | - |
| Repayment | - | 6.35 | 2.40 | 2.70 | 3.00 | 3.30 | 3.60 | 4.20 | 4.37 |
| Closing balance | 29.92 | 23.57 | 21.17 | 18.47 | 15.47 | 12.17 | 8.57 | 4.37 | - |
| Interest | - | 2.42 | 2.24 | 1.98 | 1.70 | 1.38 | 1.04 | 0.65 | 0.23 |
| IDC | 1.89 | 0.25 | - | - | - | - | - | - | - |
| **Term Loan Interest** | **1.89** | **2.67** | **2.24** | **1.98** | **1.70** | **1.38** | **1.04** | **0.65** | **0.23** |

1. **DEPRECIATION SCHEDULE (STRAIGHT LINE METHOD):**

**(INR Crores)**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **YEAR/ASSET HEAD** | **2027** | **2028** | **2029** | **2030** | **2031** | **2032** | **2033** |
| Building | 9.74 | 9.74 | 9.74 | 9.74 | 9.74 | 9.74 | 9.74 |
| SLM Depreciation - Build | 0.31 | 0.31 | 0.31 | 0.31 | 0.31 | 0.31 | 0.31 |
| Plant & Machinery | 50.09 | 50.09 | 50.09 | 50.09 | 50.09 | 50.09 | 50.09 |
| SLM Depreciation - P&M | 1.90 | 1.90 | 1.90 | 1.90 | 1.90 | 1.90 | 1.90 |
| **Total SLM Depreciation** | **2.21** | **2.21** | **2.21** | **2.21** | **2.21** | **2.21** | **2.21** |

***(Continue)***

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **YEAR/ASSET HEAD** | **2034** | **2035** | **2036** | **2037** | **2038** | **2039** | **2040** | **2041** |
| Building | 9.74 | 9.74 | 9.74 | 9.74 | 9.74 | 9.74 | 9.74 | 9.74 |
| SLM Depreciation - Build | 0.31 | 0.31 | 0.31 | 0.31 | 0.31 | 0.31 | 0.31 | 0.31 |
| Plant & Machinery | 50.09 | 50.09 | 50.09 | 50.09 | 50.09 | 50.09 | 50.09 | 50.09 |
| SLM Depreciation - P&M | 1.90 | 1.90 | 1.90 | 1.90 | 1.90 | 1.90 | 1.90 | 1.90 |
| **Total SLM Depreciation** | **2.21** | **2.21** | **2.21** | **2.21** | **2.21** | **2.21** | **2.21** | **2.21** |

1. **KEY ASSUMPTIONS & BASIS:**

|  |  |  |
| --- | --- | --- |
| **S. No.** | **Item** | **Assumptions and Basis** |
|  | **General** | * 1. The projections of the firm are done for the period from FY 2026 to FY 2041, 16 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 May 2026.   2. We have considered both Revenue & cost based model (top to bottom approach) while making the future financial projections.   3. Revenue modelling has been done based on required production as per the tripartite agreement between W2Jwala, GAIL and Indian Oil-Adani Gas. 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. |
|  | **Revenue Build up** | * 1. The plant is assumed to be operational for 350 days for 24 hours annually.   2. Company will be generating the revenue by selling 5TPD Bio-CNG to GAIL as per tripartite agreement on 18th February 2025 and by-products (Fermented Organic Manure). Below table shows the Revenue of the company @70% capacity utilization in the first operational year:  |  |  |  |  | | --- | --- | --- | --- | | **Revenue @70% capacity** | | | | | **Products** | **Unit Price** | **Annual Quantity**  **(TPA)** | **Amount (INR Cr.)** | | Sale of Bio-CNG | INR 64.20/Kg | 1,750 | 7.86 | | Revenue – Compression Charges | INR 2.00/Kg | 1,750 | 0.25 | | Revenue-FOM | INR 1.50/Kg | 37,450 | 3.93 | | Revenue-Carbon Credits | - | - | 1.00 | | **Total Revenue (INR)** | | | **12.34** |  * 1. Thus, the company is expected to generate INR 12.34 Crores (@ 70% Capacity Utilization) in the initial year. Further it is expected to increase up to INR 25.11 Crores till FY 2040-41 (@ 96% Capacity Utilization).   2. Based on the forecasting, the company is achieving an average revenue growth rate of 3% Y-o-Y basis from FY 2027-28 due to a 3% escalation assumed in the selling price during the forecasted period.   3. As per the information provided by the client, the revenue from carbon credits is assumed constant @ INR 0.30 Crore on a conservative basis.   4. Apart from this, the company is supposed to deposit INR 4.00 Crores with the bank as security. We have assumed the company would earn the interest income on this deposit @ 7% annually.   5. Company is eligible for a subsidy of INR 4.15 crores under Waste to Energy Programme of Ministry of New and Renewable Energy and INR 67.50 Lakhs (INR 0.075 Cr per KM) under “Direct Pipeline Infrastructure” scheme of Ministry of Petroleum and Natural Gas. |
|  | **Pricing (Average Price Per Unit)** | * 1. 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 | INR 64.203 per kg | | Compression Charges | INR 2.00 per kg | | Selling price of FOM | INR 1.50 per kg |  * 1. The Bio-CNG produced has to be sold to GAIL will purchase the CBG from W2Jwala (Seller/Producer) and onward sale of Biogas/CBG by GAIL to the CGD Entity after pooling with APM/NAPM domestic gas, meeting the required specifications, for use in Geographical Area of Chandigarh [GA-2.01] in the State of Chandigarh, Haryana, Punjab & Himachal Pradesh, for which the company have already secured a purchase agreement/LOI, the procurement price of Bio-CNG from GAIL as per the SATAT Scheme is around @INR 64.203 per kg without GST excluding compression charges @ INR 2/Kg.   2. The by-product of digestate is called fermented organic manure/fertilizer, which is being sold in the current market at INR 1.50 per kg.   3. The selling price of Bio-CNG is considered on conservative side as INR 64.203/kg (excluding compression charges @ INR 2/Kg). The selling rate of organic solid fertilizers is assumed as INR 1.50 per kg on conservative side.   4. An escalation factor of 3% has been considered in the prices of the sellable products during the forecasted periods considering the micro and macro-economic factors. |
|  | **Capacity Utilization** | * 1. The proposed CBG generating plant will be commissioned which will be operating at 96% (12,000 M3/Day) of the designed capacity to generate 5,000 Kg Bio-CNG per day as per tripartite agreement under CBG-CGD Synchronisation Scheme under SATAT initiative.   2. We have assumed 96% capacity utilisation of the plant from the throughout the projected period since 5,000 kg Bio CNG has to be supplied by the company. |
|  | **Capital Expenditure** | * 1. The estimated cost of the Building & Civil works is ~INR 8.65 Crores including GST.   2. The cost of Plant & Machinery has been considered as per the technical offer bid received from EPC Contractor (ISGEC) and technology provider (Sauter). The estimated cost for plant & machinery will be ~INR 42.66 crores including GST.   3. According to the details provided by the company, W2Jwala has proposed a total cost of INR 1.80 crore (inclusive of GST) for the construction of a 9-kilometer MDPE pipeline connecting the project site to the CGD (IOC Adani) entity’s pipeline network for the distribution of Bio-CNG. This equates to a cost of INR 20 lakh per KM.   4. Pre-Operative Expenses has been taken as per the data/information shared by the company/client, 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 3.33 crores.   5. Contingency cost of INR 1.25 crores (~2.50% of TPC) has been considered based on general assumption. Interest during Construction will be paid from April 2025 by the company @ 10.00%.   6. Hence, INR 10.02 Crore per ton excluding GST, IDC & contingency expenses will be the capex for this proposed plant which is slightly on the higher side in comparison with the industrial and sectoral benchmarks*.* But, the adoption of advanced german technology, pre-treatment system for paddy straw, Additional for laying the pipeline to ensure delivery of Bio-CNG, Oversized Anaerobic Digester Tanks for Optimal Gas Yield, Advance Gas Processing and Grid Injection System makes the higher capital expenditure justifiable. |
|  | **Expenses** | * 1. The paddy straw will be costing @ INR 1800 per ton including transportation. Cattle dung and Chicken Manure is collected from various dairy farms/ nearby villages @ INR 410 per MT including transportation and used as inoculants. The cost of the raw material @ 100% capacity has been shown in the below table:  |  |  |  |  | | --- | --- | --- | --- | | **Raw material Cost @ 100% capacity** | | | | | **Raw Material** | **INR/Unit** | **Annual Quantity** | **Amount INR Crore** | | Cattle Dung including Transportation | 410 | 13,315 | 2.40 | | Paddy Straw including Transportation | 1800 | 17,520 | 0.72 | | Chicken Manure including Transportation | 410 | 7,008 | 0.29 | | Water | 10 | 7,300 | 0.01 | | **Total** | **INR 3.41 Crore** | | |  * 1. As per our tertiary research and data available in the public domain, we found the unit rate are in the permissible range. Escalation of 3% is considered during forecasted period.   2. As per information provided by the client, estimated annual consumption of the power will be 17,66,940 Kwh. As per information available on the public domain, the applicable per unit charges will INR 8 per Kwh. Thus, the annual electricity expenses would be INR 1,41,35,520 (@100% Capacity). An escalation rate of 3% is assumed on it.   3. As per information shared by the client/company, Jwala Bioenergy Private Limited is planning to outsource the Operations & Maintenance (O&M) of its biogas plant to a third-party service provider, which is yet to be finalized. As part of this arrangement, the selected service provider will be responsible for managing all aspects of plant operations, maintenance, and associated activities. The cost of O&M is considered as INR 9 Lakhs per month. A 3% escalation rate has been considered during the forecasted period.   4. Land has been procured for 16 years (with an option of renewal of 10 years at the end of 16 years) on an annual lease rental of INR 19,83,871/annum through an executed lease deed on 27th September 2024 with an annual escalation rate of 8%.   5. Transportation Cost for the FOM has been considered as INR 4.00 per ton per KM. The distance for transport is assumed to be 25 KM on average with an average load of 100 TPD of fertilizers which makes the cost to be INR 10,000 per day and an annual escalation rate of 3% has been considered.   6. Cost for Spare Parts, OEM Service and SG&A Expenses are considered as 1.2%, 0.6% and 4% of Operational Revenue respectively.   7. The cost of Insurance is assumed as INR 10,00,000 per year and an annual escalation rate of 3% has been considered. Insurance covers CBG Plant and Facilities.   8. The cost of licensing and other approvals is assumed as INR 1,82,500 per year and an annual escalation rate of 3% has been considered. Insurance covers CBG Plant and Facilities. |
|  | **Partial Loan** | * 1. The project is proposed to be funded through a term loan of INR 29.92 crore and promoter’s margin of INR 29.92 crores.   2. The tenure of the loan will be 9 years from April 2025 to March 2034. The repayment period of the loan will be 95 months post C.O.D. i.e., 1st May 2026, the next 13 months will be considered as moratorium period.   3. As per discussion with client, Interest rate has been considered as 10.00%. |

**Key Findings:**

* + - 1. Average DSCR, EBIDTA margin, EBIT margin is 1.75, 57.70%, and 45.65% respectively during the estimated period.
      2. The company is having a positive NPV and IRR, of INR 56.38 crores and 20.39% 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 7.86 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.

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| **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 **1.75, 57.70%,** and **45.65%** 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 **7.86 Years** in the line with sectoral trends.

The proposed Bio-CNG generating facility is having a positive **NPV and IRR** as **INR 56.38 crores** and **20.39%** respectivelyat a 96% 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.

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| **Declaration** | 1. The undersigned does not have any direct/indirect interest in the above property/project/Company. 2. The information furnished herein is true and correct to the best of our knowledge, logical and scientific assumptions. 3. This TEV Report is carried out by our Financial Analyst team on the request from M/s W2Jwala Bioenergy Private Limited. 4. 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. 5. We have submitted TEV report to State Bank of India, SME Branch, Vatika First India Place, Mehrauli-Gurgaon Road, Sector-28, Gurugram, Haryana-122002 as requested by the client/company. |
| **Number of Pages in the Repost** | 93 |
| **Enclosed Documents** | Disclaimer & Remarks 84-87 |
| **Place** | Noida |
| **Date** | 24th February 2025 |

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| **FOR ON BEHALF OF**  **M/S. R.K. ASSOCIATES VALUER & TECHNO ENGINEERING CONSULTANTS PVT. LTD.** | | |
| **SURVEYED BY** | **PREPARED BY** | **REVIEWED BY** |
| **Mr. Atul Gola** | **Mr. Gaurav Kumar** | **Mr. Rachit Gupta** |
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| --- | --- |
| **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.
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