

TECHNO-ECONOMIC VIABILITY STUDY REPORT

OF

CAPTIVE SOLAR POWER PLANT
(91 MW DC 70 MW AC GROUND MOUNTED)

SETUP BY
M/S SAI BANDHAN INFINIUM PRIVATE LIMITED

REINTEGRATING YOUR BUSINESS®
rk ASSOCIATES
VALUERS & TECHNO ENGINEERING CONSULTANTS (P) LTD.

VALUATION CENTER OF EXCELLENCE
& RESEARCH CENTRE

REPORT PREPARED FOR

M/S IMPETUS FINSOL LLP XXXX

*****Important - In case of any query/ issue or escalation you may please contact Incident Manager
Valuers@rkassociates.org. We will appreciate your feedback in order to improve our services.***

***NOTE: As per IBA Guidelines please provide your feedback on the report within 15 days of its submission after
which report will be considered to be correct.***

IMPORTANT NOTICE

COPYRIGHT FORMAT: *This report is prepared on the copyright format of R. K. Associates Valuers & Techno Engineering Consultants (P) Ltd. (R. K. Associates) to serve our clients with the best possible information and analysis to facilitate them to take rational business decisions. Legally no one can copy or distribute this format without prior approval from R. K. Associates. It is meant only for the advisory/ reference purpose for the organization/s as mentioned on the cover page of this report. Distribution or use of this format or report or any of its content/ information/ data by any organization or individual other than R.K Associates will be seen as an unlawful act and necessary legal action can be taken against the defaulters. This report is intended for the sole use of the intended recipient/s and contains material that is*
STRICTLY CONFIDENTIAL AND PRIVATE.

DEFECT LIABILITY PERIOD: *In case of any query/ issue or escalation you may please contact Incident Manager at valuers@rkassociates.org. 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 will 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.*

Part O: R. K. Associates Important Disclaimer and Remarks *are integral part of this report and Feasibility assessment is subject to this section. Reader of the report is advised to read all the points mentioned in these sections carefully.*

TABLE OF CONTENTS

SECTIONS	PARTICULARS	PAGE NO.
Part A	Report Summary	4
Part B	INTRODUCTION	
	1. About the Report	6
	2. Executive summary	6
	3. Purpose of the Report	8
	4. Scope of the Report	8
	5. Methodology/ Model Adopted	9
	6. Data Information received from	9
	7. Documents/ Data Referred	10
Part C	Company Profile	
	1. Company Overview	11
	2. Proposed Shareholding Pattern	12
	3. Promoters/Directors Profile	12
Part D	Proposed Unit's Infrastructure Details	
	1. Proposed Plant Location	16
	2. Google Map Location	17
	3. Layout Plan	18
	4. Land Details	19
	5. Site pictures	19
	6. Building & Civil Works	22
	7. Plant and Machinery/ Equipment details	24
	8. Miscellaneous Assets	27
	9. Utilities	28
Part E	Project Technical details	
	1. Capacity of Proposed Bio CNG Plant	32
	2. Process Description	32
	3. Basic Architecture: Flow Chart Of The Bio CNG Plant	35
	4. Technical Specification of the Proposed CBG Facility	35
	5. Technology Used	37
	6. Technological Assessment	38
	7. Testing Standards For Production	39

	8. Manpower	40
Part F	Product Profile	
	1. Introduction	42
	2. Product Category	42
	3. Pricing Strategy	44
	4. Marketing, Selling & Distribution Plan	47
Part G	Feedstock Analysis & Supply	49
Part H	Industry Overview & Analysis	55
Part I	SWOT Analysis	59
Part J	Project Cost and Means of Finance	61
Part K	Project Implementation Schedule	64
Part L	Statutory Approvals Licences NOC	66
Part M	Company's Financial Feasibility	68
Part N	Conclusion	90
Part O	Disclaimer Remarks	92

PART A

REPORT SUMMARY

S. No.	PARTICULAR	DESCRIPTION
1.	Name of the Company:	M/s Sai Bandhan Infinium Private Limited
2.	Registered Address:	3rd Floor, 2137, Bansal House, Nr. Golden Arc, Atabhai Chowk, Bhavnagar, Gujarat, India, 364002
3.	Project Name	91 MW DC [70 MW AC] Ground Mounted Captive Solar Power Plant
4.	Project Location:	(Mithipaladi, Banaskantha (51 MW)/ Runi, Banaskantha (20 MW) and Dhekwadi, Banaskantha (20 MW), Gujarat
5.	Project Type:	91 MW DC Ground Mounted Captive Solar Power Plant (Open Access)
6.	Project Industry:	Renewable Energy
7.	Product Type / Deliverables:	Power Generation
8.	Report Prepared for Organization:	M/s. Impetus Finsol LLP
9.	TEV Consultant Firm:	M/s. R.K Associates Valuers & Techno Engineering Consultants (P) Ltd.
10.	Report type:	Techno-Economic Viability Report
11.	Purpose of the Report:	To assess Technical & Economic Viability for the purpose of seeking external financial assistance to setup captive Solar Power Plant.
12.	Scope of the Report:	To assess, evaluate & comment on Technical, Economical & Commercial Viability of the Project as per data information provided by the client, independent Industry research and data/

		information available on public domain.												
13.	Date of Report:	4 th September, 2024												
14.	Documents referred for the Project:	<div><div>A. PROJECT INITIATION DOCUMENTS:</div><div><div>1. Detailed Project Report</div><div>2. Financial Projections of the Project</div><div>3. Project proposed Schedule</div><div>4. Statutory Approval Details</div><div>5. Layout and Master Plan</div></div><div>B. PROCUREMENT DOCUMENTS:</div><div><div>1. List of Plant & Machinery along with acquisition costs for the same</div><div>2. List of Expected Raw material Supplier</div><div>3. Process Flow Chart</div><div>4. Sanction/proposed map of the sites</div><div>5. Lease/Sale deeds of the Land</div></div><div>C. STATUTORY APPROVALS, LICENCES & NOCs</div><div><div>a. MSME UDYAM Registration Certificate</div><div>b. NOC from Gram Panchayat</div><div>c. NOC/Application for Ground water</div><div>d. Consent to establish approval</div></div></div>												
15.	Means of Finance:	Equity & Debt (D/E Ratio 3.00 TPC)												
16.	Key Financial Indicators:	<table><tr><th>Key Indicators</th><th>Value</th></tr><tr><td>Average DSCR</td><td>2.80</td></tr><tr><td>Average EBITDA Margin</td><td>66.82%</td></tr><tr><td>Avg. PAT Margin</td><td>33.76%</td></tr><tr><td>NPV & IRR</td><td>INR 381.17 Cr. & 17.62%</td></tr><tr><td>Payback Period</td><td>6.94 years</td></tr></table>	Key Indicators	Value	Average DSCR	2.80	Average EBITDA Margin	66.82%	Avg. PAT Margin	33.76%	NPV & IRR	INR 381.17 Cr. & 17.62%	Payback Period	6.94 years
Key Indicators	Value													
Average DSCR	2.80													
Average EBITDA Margin	66.82%													
Avg. PAT Margin	33.76%													
NPV & IRR	INR 381.17 Cr. & 17.62%													
Payback Period	6.94 years													

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

PART B

INTRODUCTION

1. ABOUT THE REPORT:

This is a Techno-Economic Viability Study Report of the proposed 91 MW [DC] Ground mounted Captive Solar Power plant at (Mithipaladi, Banaskantha (51 MW)/ Runi, Banaskantha (20 MW) and Dhekwadi, Banaskantha (20 MW), Gujarat.

2. EXECUTIVE SUMMARY:

Government of India has pledged for transition to clean energy in power sector through nationwide targets with commitment towards Nationally Determined Contribution of 50% of cumulative electric power installed capacity from non-fossil fuel-based energy resources by the year 2030. Government of Gujarat is playing a pivotal role in this energy transition. State has successfully demonstrated its commitment towards clean energy with installed Renewable Capacity of 21.6 GW at present in which the addition of about 12 GW has taken place during last 5 years.

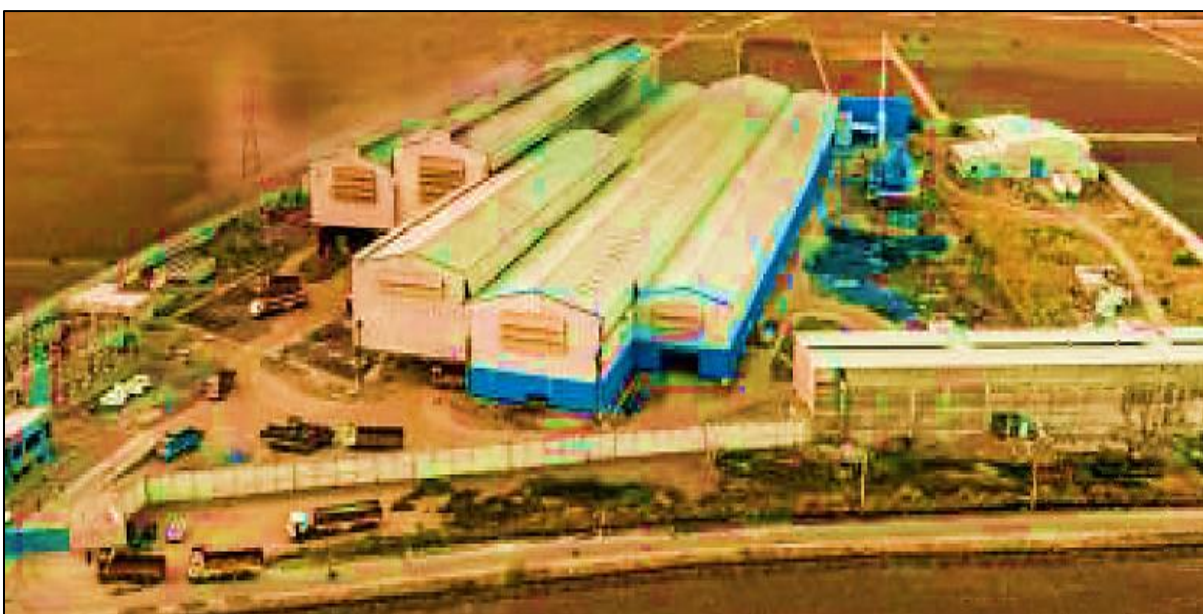
Taking cognizance of the generational shift occurring in electricity sector, the need for expediting efforts for de-carbonization and in an endeavour to embrace renewable energy more effusively, Government of Gujarat has notified a Renewable Energy Policy-2023 (*Reference: GUJARAT RENEWABLE ENERGY POLICY- 2023 G.R. No. REN/e-file/20/2023/0476/B1 Sachivalaya, Gandhinagar, Date: 04/10/2023*) for further encouraging setting up of renewable generation projects based on Wind, Solar and Wind-Solar Hybrid technologies. Ground mount solar under the policy:

- Solar projects can be setup in a solar park, or outside the solar park, on government revenue land, or on private land. Government land or land available with the State Nodal Agency shall be made available to the RE developers as per Clause No. 28 of this Policy.
- The Distribution Licensees may procure from solar power projects in accordance with the Clause No. 16 of this Policy.
- Wheeling of power for captive use or third party sale shall be allowed on payment of charges as per Clause No.15 and energy settlement will be as per Clause No. 14 of this policy.

This executive summary outlines the development of a 91 MW DC [70 MW AC] ground mounted Solar PV power plant for captive purpose located in Gujarat (Mithipaladi, Banaskantha (51 MW)/ Runi, Banaskantha (20 MW) and Dhekwadi, Banaskantha (20 MW), Gujarat). The project, initiated by M/s Sai Bandhan Infinium Private Limited, aims to harness solar energy to meet the organization's growing electricity needs sustainably and to optimize the operation cost while taking the existing Rolling mill to full capacity.

As a parent company M/s Sai Bandhan Infinium Private Limited has been venturing into shipping and ship-breaking industry since last 15 years. The company has forayed into integration with Bandhan TMX with the production capacity of 20,000 MT per month.

IMAGE OF BANDHAN TMX PLANT



The company is having a modern integrated steel manufacturing unit at Bhavnagar – western India, which has the facility of manufacturing of finished steel long product from captive steel semis with adequate refining facility through LRF (Ladle refining furnace) to ensure flawless production of refined steel. This highly sophisticated integrated steel plant facility comprising steel melting shop (SMS) equipped with electric furnace & ladle refining furnace, Continuous Billet Casting unit, Rolling mill with Block mill and German Technology (Thermex). Brief features of integrated plant are as follows:

- 25 Ton X 2 Electric furnace.
- 30 Ton X 1 Ladle refining furnace (for liquid steel refining)
- 3 stand: 6X11 M radius CCM (with copper mould tube)

- Standalone rolling mill equipped with block mill, only it's kind of mill in western India after TATA.
- Well-equipped in-house laboratory.

As per the data/information provided by the client, Company manufacture TMX bars and structural steel under the brand name "Bandhan TMX" through hot charging rolling mill with latest Tempcore quenching technology under licensing of CRM, Belgium's Tempcore cooling technology. Company produces their Captive raw material (Billet) from sponge iron by using this technology for manufacturing of TMX bars. Company manufactures as well as deal in the following items on regular basis:

- Thermo Mechanical Treated (TMX) Bars: Fe 500 D, Fe 550, Fe 550 D, Fe 615 – 8mm to 32 mm.
- M.s Billet.

BANDHAN TMX BLOCK MILL



Historical financial position of the company is shown in the below table as on 31st March 2023 & 31st March 2022:

Particular	As on 31 st March 2023 (Lakhs)	As on 31 st March 2022 (Lakhs)
Total Assets	19,595.46	18,746.10
Long term borrowings	4741.67	2257.94
Short term borrowings	3493.09	9061.62
Turnover	51,010.50	14,940.98
PAT	83.58	233.17
Cash flow at the end	28.34	21.52

As per the recent electricity bills shared the by client, Company is having a sanction load of 33700 KW at present and this integrated manufacturing plant is running for 8 hours per day where it consumes ~60 lakhs units per month to operate at this scope and scale. Current tariff of electricity is INR 5.96 per unit (*subsidized rate as the plant operates only from 10 pm to 6 am*)

As per the internal assessment done by the company, if management decide to run the integrated steel manufacturing unit for 24 hours per day, consumption of power is expected to be more than 1.8 Crores units a month and as the company plans to operate the factory for 24 hours the charges will go up to INR 9.15 per unit. And therefore, the promoters of the Company has planned installation of solar project to offset the electricity consumption while the plant operates for 3 shifts.

The plant will feature high-efficiency solar panels with a combined capacity of 91 MW DC. It will utilize advanced photovoltaic (PV) technology and include a state-of-the-art monitoring system to optimize performance and maintenance. With an initial investment of INR 390.53 Crore, the project is expected to achieve a return on investment (ROI) within 6.94 years. Annual savings on energy costs are estimated at ~INR 53.87 Crore, with a payback period of 6.94 years.

Particular	Hours	Units per month	INR/ Unit	Monthly Expense	Yearly Expense
Current Running Hours	8	60,00,000	5.96	3,57,60,000	42,91,20,000
Proposed Hours	24	1,80,00,000	9.15	16,47,00,000	1,97,64,00,000
Solar Installation	24	1,23,00,000	5.50	6,76,50,000	81,18,00,000
Net-off (Savings)					53,87,40,000

As assessed above, Company is expected to save up to INR 53.87 Crore annually by installing the proposed 91 MW DC captive solar power plant. The primary objectives of the solar power plant are to reduce annual electricity costs by 40%, decrease the carbon footprint by 30,000 tons per year, and ensure a reliable and renewable energy source for M/s Sai Bandhan Infinium Private Limited's operations.

Further, the proposed solar plant is expected to reduce CO2 emissions by 33,000 tons annually, contributing significantly to M/s Sai Bandhan Infinium Private Limited's sustainability goals. Additionally, the project will create ~150 local jobs during the construction phase and ~25 permanent positions for ongoing operations & maintenance.

Plant is expected to be operational from 1st January, 2026 after having a 13 months implementation period from December 2024 to December 2025.

This is a 91 MW DC (70 MW AC) ground mounted Captive solar plant with open access, so whatever we will generate here from solar plant, Gujarat Energy Transmission Corporation Limited (GETCO), power transmission company in the state of Gujarat, India will provide same units credit to the company's electricity bill unit to unit basis.

For the sale of the produced CBG, the company has already secured a LOI from Indian Oil Corporation limited under SATAT initiative to promote Compressed Bio-Gas as an alternative, green transport fuel. **(Ref No.: Indian Oil/SATAT/01/3589 Date: 03.11.2023)** for which company has paid bank guarantee of INR 5.00 lakhs 19th December 2023. Commercial agreement will be signed before C.O.D between the parties.

As per the revised agreement dated 17th July 2024 provided by the client, Company has appointed an ISO 9001 certified Ghaziabad based solution provider M/s Vimal Organics Ltd as EPC consultant. As per the scope of work mentioned in the agreement, M/s Vimal Organics Ltd will be supplying Equipment, Plant & Machinery, will furnish Building & Civil work and will provide its services for electrical, instrumentation & data collection work.

As per the land deed dated 19th June 2024 shared by the client, Company has procured 5.048 Acre (2.043 Hectare) agricultural land at Khata No, 208, 42, 226 Khasra No. 161/1, 160, 157 Village- Reda Harsana, Tehsil - Un, District- Shamli 247778. Company is required to apply for Change of land use (CLU) certificate from the respective authority for setting up the proposed Bio-CNG plant at this agricultural land.

Proposed layout plan has been prepared by the appointed technical consultant Mr. Naman (M/s Star Projects Renewable Resources Private Limited) on 9th May 2024. As per the shared data/information by the client, NOC from the Gram Panchayat has already been taken by the company on 25th October 2023 (Ref: Gram Pradhan - Titu Kumar Gram Panchayat - Harsana, Development Block – Un, District Shamli). Company need to obtain approved layout plan.

As per data/information provided to us, the company has obtained some Statutory Approvals/NOC's such as NOC from village panchayat, Consent to Establish, PESO approval 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 agricultural 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 provisional estimation of power shared by the client, ~450 KWA of power load connection will be required to run the proposed CBG plant. Currently, the company is in the process to apply for power load connection. NOC for ground water extraction has been

applied by the company on 13th November 2023 (*Application Number: SHML1123NIN0034*).
Company has planned to achieve the C.O.D by 1st October 2025.

Further, the cost of the proposed project from scratch to trial run is being estimated as INR 38.93 Crore, which is proposed to be funded through promoter's equity of INR 11.68 Crore and bank loan of INR 27.25 Crore. Working capital requirements will be met through a WC loan of INR 150.00 lakhs.

At present, the company is in discussion with Financial Institutions to fund the project through a term loan of INR 27.25 Crore. In this regard M/s Superior Agro Ventures Private Limited has appointed R.K. associates to assess the Techno-Economic Viability of the proposed Bio-CNG production plant. The company plans to achieve the financial closure by August, 2024 (expected).

3. PURPOSE OF THE REPORT:

To assess Project's Technical and Financial Feasibility for Client's requirement.

4. SCOPE OF THE REPORT:

To only assess, evaluate & comment on Technical & Financial Feasibility of the proposed Bio-CNG generating plant being set up by M/s Superior Agro Ventures Private Limited as per the data/information provided by the company.

NOTES:

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

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

5. METHODOLOGY/ MODEL ADOPTED:

- Data/ Information collection.
- Review of Data/ Information collected related to TEV study.
- Independent review & assessment of technology used and financial projections provided by the company.
- 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
- Calculation of key financial indicators and ratio analysis including DSCR, NPV & IRR and payback period of the project.
- Report compilation and Final conclusion.

6. DATA/ INFORMATION RECEIVED FROM:

All the data/Information has been received from Mr. Amit Rana (CEO) and the required details about him shown in the below table:

Particulars	Details
Designation	CEO
Company	M/s Superior Agro Ventures Private Limited
Email Address	amitrana2002@gmail.com
Contact No.	+91-9911351936

7. DOCUMENTS / DATA REFERRED:

- Detailed Project Report and Promoters Profile
- Financial Projections of the proposed Bio CNG generating project.
- Production flow chart,
- Product profile along with Pricing Strategy etc.
- Long term Raw Material Supply agreement with FPO.
- Selling, Marketing & Distribution Plan, LOI with the OMC.
- Site/Layout Plan
- Sale/Lease deed of the land

- i. Quotation/Contract agreement with EPC consultant along with details of Plant & Machinery.
- j. Certificates of Statutory approvals/NOC's.
- k. Survey Report.

PART C

COMPANY PROFILE

1. COMPANY OVERVIEW:

As per certificate of incorporation shared by the client/company, M/s Superior Agro Ventures Private Limited was incorporated on 4th August, 2022 as per the Companies Act, 2013 as a Non-government company limited by shares. Below table shows the incorporation details of the company:

Incorporation Details of the Company	
Particular	Description
Company Name	M/s Superior Agro Ventures Private Limited
CIN	U15490PB2022PTC056613
Date of Incorporation	4 th August 2022
Registration Number	056613
ROC Name	ROC Chandigarh
Company Category	Company limited by shares
Company Subcategory	Non-government company
Class of Company	Private
Registered Address	Back Side Old Grain Market, Railway Road, Opposite Water Pump, Kapurthala, Punjab, India, 144601
Authorized Capital	INR 5,00,00,000
Paid up Capital	INR 5,00,00,000
Date of last AGM	30/09/2023
Date of Balance Sheet	31/03/2023
Company Status	Active

Source: Information extracted from MCA website & public domain

As per the amended Memorandum of Association (MoA) on 8th Feb 2024 shared by the client, the company has changed its main objective to carry on the business to produce & sale of Biofuels such as biogas, Bio CNG, Ethanol, Fermented organic manure and Bio Fertilizer for selling to marketing companies or end users and to carry on the business of producers, refiners, processors, Fuel & Gas sales networks, buyers, sellers, distributors, importers, exporters, traders, agents, stockiest, sell & supply of bio energy or any other energy from conventional/non-conventional energy by Biomass, Hydro, thermal, windmill on commercial basis, as civil contractor & engineers, builders etc.

The company is categorised as micro enterprise with Udyam Registration Number *UDYAM-MP-21-0006430* dated *30th June 2023*. In this company, the promoters have proposed to setup 6,000 Kg/Day of Bio-CNG (compressed biogas) plant along with 24 Ton/day of fermented solid organic fertilizer.

2. PROPOSED SHAREHOLDING PATTERN:

Promoters of M/s Superior Agro Ventures Private Limited Mrs. Jaivil Rana and Mrs. Goel are the major shareholders also in the company at present. As per the data/information provided by the client, shareholding pattern of the company is shown in the table below as on 25th July 2024:

Proposed Shareholding Pattern as on 25 th July 2024						
S. No.	Name Of Shareholders	Father's Name	Address	Type Of Shares	Proposed Shareholding	% Shareholding
1.	Mrs. Jaivil Rana	Magan Pal Singh	506, Tower-1, Arcadia Hillocks, Mussoorie Diversion Road, Kutthal Gaon, Dehradun, Uttarakhand-248009	Equity	11,52,200	70%
2.	Mrs. Sakshi Goel	Mr. Sunil Kumar Goel	Plot no.95, Usha Colony, Gujrara, nearby SBI bank, Sahastradhara Road, Kulhan, Dehradun, Uttrakhand.	Equity	49,38,00	30%
Total					16,46,000	100%

Source: Data/Information provided by the client.

3. KEY PROMOTER'S/DIRECTORS PROFILE:

Mrs. Jaivil Rana and Mrs. Mini Panwar are the promoters of M/s Superior Agro Ventures Private Limited as per information available on MCA and both are holding directorship also in 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:

Name	Designation/ DIN	Address & Contact Details	Appointment Date	Qualifications/Experience
------	---------------------	------------------------------	---------------------	---------------------------

Mrs. Jaivil Rana (52 Years)	Director DIN: 02013601	B1/09, Silver City2, Sector Pi2, Greater Noida 201308 G B Nagar, UP +91- 9319061936 jaivilrana24@gmail.com	04/08/2022	<p>As per the data/information provided by the client, Mrs. Jaivil Rana is a post graduate Agriculturist and having 17 years of professional experience in the field of Marketing sales & Quality control. She has worked with Euro Motors Pvt. Ltd, New Delhi from 2005 to 2009 in the field of Marketing, Sales and Budget Preparation.</p> <p>From 2010 to 2016, she has worked with Miracle Adventures and Hospitality Pvt. Ltd., New Delhi in the field of Marketing, Hotel Inventory Management, Guest Relationship, Quality Management. Further from 2017 to 2021, she was associated Knutson Int. Trading, LLC, Czech Republic in the role of Advisor for procurement and quality control, Documentation for Grain Export from India to EU / Gulf Countries.</p>
Mrs. Mini Panwar	Additional Director DIN: 10449033	Plot No. B-1/16, Upper Ground Floor, Nangal Dewat, Vasant Kunj, Delhi- 110070 +91- 8750701282 panwarmini13@	28/01/2024	<p>Mrs. Mini Panwar, a Post-Graduate/LLB is associated with M/s. Akash & Associates since more than 16 years in the field of Taxation and corporate consultancy, Legal Arbitration, GST Appeals, Income Tax Appeals</p>

		gmail.com)		etc.
--	--	-----------------------------	--	------

Source: Data/Information provided by the client

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.

(MRS. JAIVIL RANA DIN: 02013601)

S. No	Company Name (CIN/FCRN)	Designation	Original Date of Appointment	Date Of Appointment at Current Designation
1	UP Bio Gas Energy Private Limited (U35201DL2024PTC424857)	Director	04/01/2024	04/01/2024
2	Superior Agro Ventures Private Limited (U15490PB2022PTC056613)	Director	04/08/2022	04/08/2022
3	Stanmark Global Private Limited (U51909DL2010PTC205175)	Director	19/05/2016	19/05/2016
4	Marlboro Alliance Private Limited (U51100DL2010PTC203621)	Director	03/06/2010	03/06/2010
5	Sevozone Energies & Fertilizers Private Limited (U11100CH2021PTC043865)	Director	03/01/2022	03/01/2022
6	U. P. Infratech Private Limited (U45200DL2008PTC174142)	Director	-	18/02/2008
7	Centurion Holidays Limited (U55101DL2012PLC246200)	Director	-	14/12/2012
8	Transitions Property Management Company Private Limited (U45400DL2009PTC192386)	Director	-	20/07/2009

Source: Information extracted from MCA website & public domain

(MRS. MINI PANWAR DIN: 10449033)

S. No	Company Name (CIN/FCRN)	Designation	Original Date of Appointment	Date Of Appointment at Current Designation
1	Superior Agro Ventures Private Limited (U15490PB2022PTC056613)	Additional Director	28/01/2024	28/01/2024
2	Up Bio Gas Energy Private Limited (U35201DL2024PTC424857)	Director	04/01/2024	04/01/2024

Source: Information extracted from MCA website & public domain

As per informed by the client and data/information available in the public domain, Mr. Amit Rana is appointed as CEO of the company who belongs to farmer family and working towards the Agriculture Development/Green Energy, Advisor & Execution of Biogas Plants, Transformation with new technologies, interaction with Farmers, Cooperatives, SHG and FPO with an ability for uncovering opportunities in both the market place and within the organization. He has worked with MNRE in past. He also having the experience in the field of Retail, Distribution and manufacturing of Agro Products.

PART D

PROPOSED INFRASTRUCTURE DETAILS

1. PROPOSED PLANT LOCATION:

The proposed Bio-CNG generating plant will be set up by M/s Superior Agro Ventures Private Limited at Khata No, 208, 42, 226 Khasra No. 161/1, 160, 157 Village- Reda Harsana, Tehsil - Un, District- Shamli 247778, which is spread over an area of 5.048 Acre (2.043 Hectare) as per the sale deed provided to us by the company.

The location of the plant is in the well-known sugarcane belt of the western Uttara Pradesh, where accessibility of agricultural land for cultivating the Sugarcane & Napier grass is sufficient. Availability of the required raw material is the advantage of the proposed location as many Sugar mill are situated near by the location as shown in the below table:

S. No.	Name of the Sugar Mill	Distance from location
1.	Superior Food Grains (P) Ltd., (Rana Group) Sugar Mill, Village - Gogar, Tehsil – Un, Uttar Pradesh 247778	~5 km away
2.	Bajaj Hindusthan Sugar Ltd., Vill. Thanabhawan, Shamli, UP	~ 24 km away
3.	Upper Doab Sugar Mill, Shamli, Uttar Pradesh 247778	~25 km away
4.	The Kisan Sahkari Chini Mills Ltd., Nanauta, Uttar Pradesh	~27 km away
5.	Uttam Sugar Mills Ltd. (Unit - 4), Nakur, Saharanpur, Uttar Pradesh	~35 km away

Source: Google Map

During the site visit we found that the property is an agricultural land and merged with adjacent plots and not demarcated till the date of survey done by us. The property is having the proximity to the civic amenities such as hospital is situated ~5 km away and market is situated ~4 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	Agricultural land
North	Road

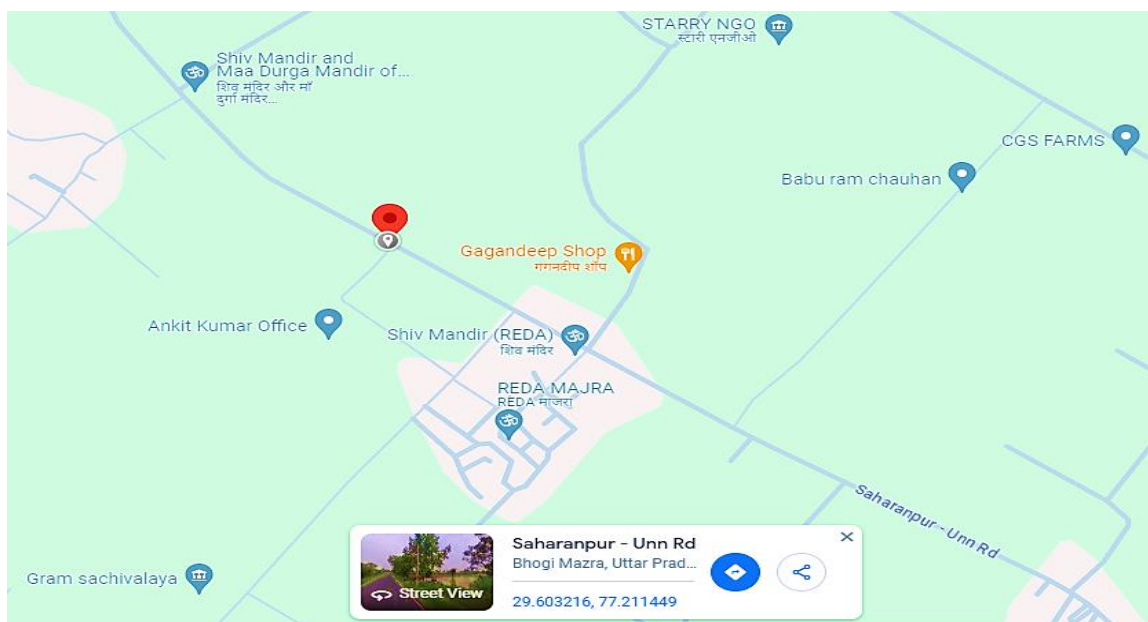
Table: 1 Adjoining Property Details	
Location	Details
South	Agricultural land

Table: 2 Connectivity Details of the Proposed Location	
Connectivity	Details
Road	Meerut - Shamli-Karnal NH 709A - ~7 km away
Rail	SHAMLI Railway station - ~25 km away
Airport	Indira Gandhi International Airport, Delhi - ~152 km away

2. LOCATION MAP:

a) GOOGLE MAP LOCATION:

The Bio-CNG plant is proposed to be commissioned at Khata No, 208, 42, 226 Khasra No. 161/1, 160, 157 Village- Reda Harsana, Tehsil - Un, District- Shamli 247778 with GPS coordinates 29°36'11.6" North and 77°12'41.3" East as per the Google map attached below:



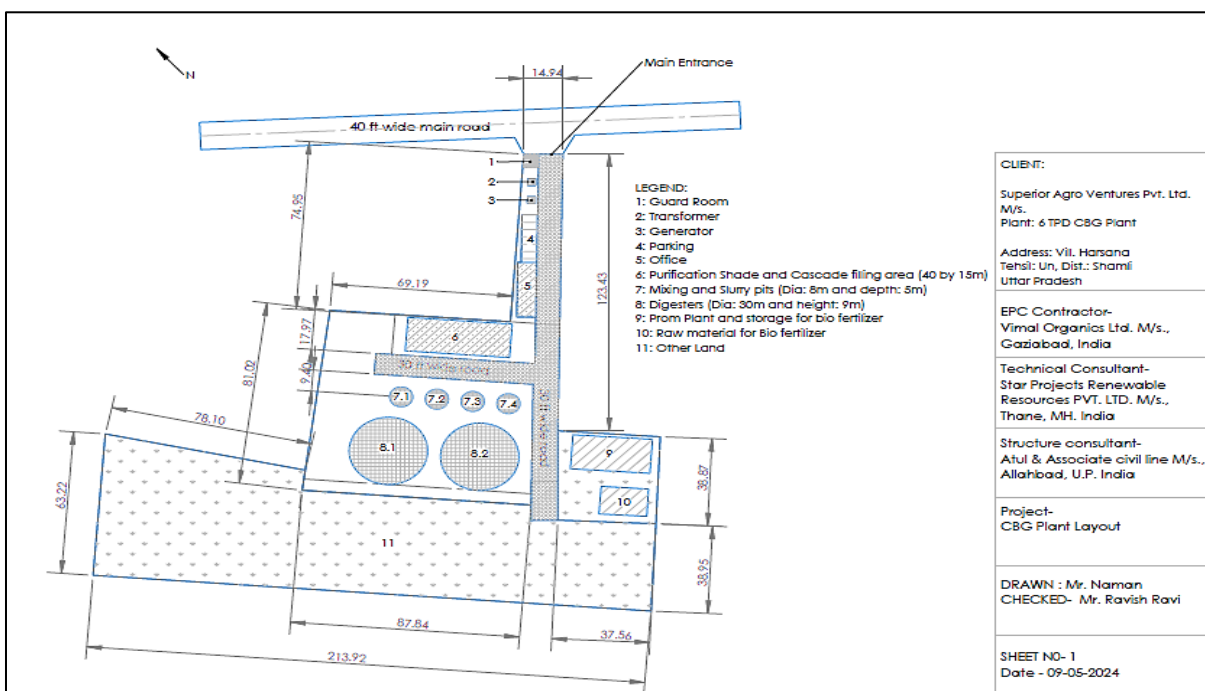
b) GOOGLE MAP LAYOUT:

Demarcation of the land with approximate measurement on the Google map is attached in the below picture:



3. LAYOUT PLAN:

As per the data/information provided by the client/Company, Proposed layout plan has been prepared by the appointed technical consultant Mr. Naman (M/s Star Projects Renewable Resources Private Limited) on 9th May 2024. NOC from the Gram Panchayat has already been taken by the company on 25th October 2023 (Ref: Gram Pradhan - Titu Kumar Gram Panchayat - Harsana, Development Block – UN, District Shamli). Proposed layout plan has been attached below for reference:



4. LAND DETAILS:

As per the land deed executed on 19th June 2024, promoters of the Company has purchased a 5.048 Acre (2.043 Hectare) land at Khata No, 208, 42, 226 Khasra No. 161/1, 160, 157 Village- Reda Harsana, Tehsil - Un, District- Shamli U.P 247778 in INR 4.24 Crore. Below table shows the detail of procured land to set up the proposed Bio CBG unit:

Details of Procured Land for the proposed Unit		
Particular	Land 1	Land 2
Location	Village- Reda Harsana, Tehsil - Un, Shamli U.P 247778	Village- Reda Harsana, Tehsil - Un, Shamli U.P 247778
Area	4.66 Acre	0.388 Acre
Address	Khata No, 208, 42 Khasra No. 161/1, 160	Khata No, 226 Khasra No. 157
Type of land	Agricultural	Agricultural
Seller Name	Mahipal Singh	Mr. Amit Rana
Buyer Name	M/s Superior Agro Ventures Private Limited through its Director Mrs. Jaivil Rana	M/s Superior Agro Ventures Private Limited through its Director Mrs. Jaivil Rana
Considered Value of Land	INR 3.92 Crore	INR 32.62 lakhs

As per informed by client, company needs to obtain Change of land use (CLU) on this agricultural land, to use the land for commercial/industrial purpose by setting up the proposed Bio-CNG plant. The total cost of the land is INR ~4.34 Crore including CLU and other charges of INR 10 lakhs.

During the site visit on 8th May 2024, we found it as a vacant (agricultural) land which was merged with the adjacent agricultural lands and entry of the land is directly connected with 48 ft. UN -Chausana Link Road. As informed by the client, company will start the demarcation and land development work after the sanction of term loan.

5. SITE PICTURES:

Site pictures were captured during the site visit on 8th May 2024, for reference few of the pictures are attached below:







6. BUILDING & CIVIL WORKS:

As per the revised agreement dated 17th July 2024 provided by the client, Company has appointed an ISO 9001 certified Ghaziabad based solution provider M/s Vimal Organics Ltd as EPC consultant. As per the scope of work mentioned in the agreement, M/s Vimal Organics Ltd will be supplying Equipment, Plant & Machinery, will furnish Building & Civil work and will provide its services for electrical, instrumentation & data collection work.

As per the proposed layout plan, Guard Room, Transformer & Generator, Parking, Office, Purification Shade and Cascade filling area (40 by 15m), Mixing and Slurry pits (Dia: 8m and depth: 5m), Digesters (Dia: 30m and height: 9m), Prom Plant and storage for bio fertilizer, Raw material space for Bio fertilizer are proposed to be built at this 5.048 Acre (2.043 Hectare) land. Detailed bifurcation of the proposed Building & Civil works has been shown in the below table along with the estimated cost:

CIVIL WORKS - Site Development + Feed Preparation & Slurry Pits + Digesters (Lakhs)						
S. No.	Particular	Unit	Rate	Amount	GST	Amount Including GST
1	Excavation in M3 (Mixing Pits (03 Nos & Slurry Pit (8 Mtrs X 4 Mtrs) and Digestors (02 Nos) - 30 Mtrs X 10 Mtrs	205	8,000	16.40	2.46	18.86
2	Soil filling in M3	235	13,600	31.96	4.79	36.75
3	Boundry Wall in RMT (upto 1 Mtr height) - 5 Acres of Plot Size (Wall Fencing with Structure Support & Main Gate	476	12,000	57.12	8.57	65.69
4	Pilling of Digesters (02 No) - 30 Mtrs Dia X 12.50 Mtrs height (Pilling in Nos)	180	3,300	5.94	0.89	6.83
5	RCC / PCC of Mixing & Slurry Pits (03 No) - (8 Mtrs Dia X 4.5 Mtrs height (M30) in M3	232	7,000	16.24	2.44	18.68
6	RCC of Digesters (02 No) - 30 Mtrs Dia X 12.50 Mtrs height (M30) in M3 including Center Pillars for Digesters (02 No) od 13 mtr height with 800 mm dia	1,276	9,000	114.84	17.23	132.07
7	Transformer & Genset Platform - 2 Nos (1.8 mtr X 2 Mtrs) in M3	7.20	9,000	0.65	0.10	0.75
8	Civil Work for Purification Shed (15 M X 50 M)	163	6,400	10.43	1.56	12.00
9	Fabrication Work for Purification Shed (15 M X 50 M) in Sq mtrs	750	3,300	24.75	3.71	28.46
10	Civil Work for Solid Liquid Seprators (6 M X 9 M)	63.38	6,400	4.06	0.61	4.66
11	Fabrication Work for Solid Liquid Seprators (6 M X 9 M)	54	3,300	1.78	0.27	2.05
12	Civil Work for storage of Liquid Slurry (20 Mrs X 20 Mtr)	250.00	6,400	16.00	2.40	18.40
13	Civil Work for Pre-Treatment of Raw Material (Shreeder Unit (6 M X 9 M X 7 M ht)	58.83	6,400	3.77	0.56	4.33

14	Fabrication Work for Pre-Treatment of Raw Material (Shredder Unit (6 M X 9 M X 7 M ht)	54	3,300	1.78	0.27	2.05
15	Road - GSB in M3	215	3,200	6.88	1.03	7.91
16	Road - PCC in M3	215	6,500	13.98	2.10	16.07
17	VCB Room in Sq Mtrs	10	13,000	1.30	0.20	1.50
18	Staff Quarters in Sq Mtrs	200	16,000	32.00	4.80	36.80
19	Guard Room (4 m X 6 M)	24	13,000	3.12	0.47	3.59
20	Office + PLC Room + Store (4 m X 6 M) in M3	200	15,000	30.00	4.50	34.50
21	Labour Quarters (6 M X 15 M)	90	13,000	11.70	1.76	13.46
22	Retaining Wall - RCC Wall (122 Mtr X 4 Mtr)	90	13,000	11.70	1.76	13.46
23	Total Steel in Ton for project inclung handling lifting + wastage + local cartage + binding Wire	156	89,000	138.84	16.66	155.50
24	Soil Testing & Horticulture Work	INR		25.00	3.75	28.75
25	Digester monitoring ladder & crow's nest	INR		10.00	1.50	11.50
26	Epoxy & Insulation on Digester	INR		20.00	3.00	23.00
27	Construction of Water Treatment Area & Water Storage	INR		15.00	2.25	17.25
28	CCTV + Street Lights	INR	L/S	10.00	1.80	11.80
29	Parking Area	INR		7.00	1.26	8.26
	Total			642.23	92.68	734.91
	EPC Contractor fee @10%			64.22	11.56	75.78
	Grand Total			706.45	104.24	810.69

Sources: Data/Information provided by the client.

As per the above table, the estimated cost of the Building & Civil works is ~INR 810.69 lakhs including applicable GST and 10% EPC consultant cost as per the signed agreement. Cost of the Building & Civil works has been considered on the basis of shared details/EPC contract provided to us by the client. As a TEV consultant we have checked major unit cost considered in EPC contract which we found in permissible range.

7. PLANT & MACHINERY/ EQUIPMENTS DETAILS:

Appointed EPC consultant M/s Vimal Organics Ltd is agreed to supply all the Equipment, Plant & Machinery as per scope of work mentioned in the EPC agreement. Detailed bifurcation of the proposed Plant & Machinery has been shown in the below table along with the estimated cost:

Plant & Machinery and Mechanical Equipment (Lakhs)						
S. No.	Particulars of unit required	Unit	Rate	Amount	GST	Amount Including GST
1	Mixers of 11 Kva for Mixing Pits & Slurry Pit (04 Nos) with Accessories	4	8.00	32.00	3.84	35.84
2	Submersible Pumps of 7.5 KVA for transferring the Slurry with Accessories	4	7.00	28.00	3.36	31.36
3	Installation of Pumps & Mixers in Mixing & Slurry Pits	8	2.00	16.00	2.88	18.88
4	Mapro - Sequential Gas Mixing System with Technology (Italian) - 55 HP with Accessories	1	50.00	50.00		50.00
5	Gas Mixing System - Peso approved flame proof 1000 RPM Motor, Cyclone Separator for removal of oil from the gas, Compressor mounted Indian Instrumentation & gauges, Suction Filter, Sound Reducing Canopy, Control Panel with soft Starter, HDP & SS Pipes, Valves, PLC Panel for Operation of the pneumatic valves, Control Panel for air compressor, blower etc., Gravel filter 1100 NM3/hr. with other accessories & Installations	2	60.00	120.00	21.60	141.60
6	Mixing System - Piping (HDPE / SS / Heat Resistant Gas Pipes & Valves	2.00	35.00	70.00	12.60	82.60
7	Heating System	L/S		74.00	13.32	87.32
8	EU Origin Double Membrane Roof (3300 CuM each), outer shell PVC coated Polyester fabric, inner shell PVC/PE, belts from wall to Centre pillar Polyester fabric,	2	70.00	140.00	25.20	165.20

	Safety net & border rope, incl. valve & coupling, Air blower with hosepipes, flanges, deflation flap, Over-/Under pressure valve for membrane gas roof mechanical gas level indicator.					
9	VPSA Biogas Purification Plant (Sonitech-850 m3/hr) + H2S Desulphurization Tower (Filled with Catalyst) + Chiller + Automatic Control Panel with PLC + CO2 Gas Dryer - (Output Pressure 0.2-0.4 Bar) with Control panel + Metane Recovery Unit	1	125.00	125.00		125.00
10	PSA Absorber Towers - Filled with Molecular Sieves (P140 + 4A + Booster Chemical) - Made in France	1	40.00	40.00	7.20	47.20
11	Piping & Valves	1	45.00	45.00	8.10	53.10
12	Biogas burner / Flare	1	18.00	18.00	3.24	21.24
13	Condensate and Sediment trap (VS-5) for removing the Moisture	2	16.00	32.00	5.76	37.76
14	Honeywell Biogas chromatograph analyzer + Online Biogas Analyzer for (Ch4, H2S + Co2 + Moisture)	1	65.00	65.00	11.70	76.70
15	Over / Under Gas Pressure Relief Valve ((Hydraulic - OUPV)	2	8.00	16.00	2.88	18.88
16	Biogas Compressor (JYOTECH) of capacity 550 Nm3/hr with discharge pressure 250 Kg/cm2g for bottling of CNG into Cascades with Suction Pressure :1.05 to 1.3 Bar	1	100.00	100.00	18.00	118.00
17	CNG Cylinder Cascade with Capacity- 4500 litre (75L X 60 Nos) with Tubing Sandvik, Parker / Swagelok / Jindal Fittings - Seamless Alloy Steel & PESO approved	10	21.00	210.00	37.80	247.80
18	Cascades Safety Valves, Tubing SS 316 connecting System with 4 Nos of Output for Cascades filling, Pressure Gauge, Safety Valves,	L/s		16.00	2.88	18.88

	Seal Excel Ratnamani / Sandvik					
19	LCV Post with Mass Flow Meter, GIC Gauge Manifold with QRC & Connected 5 Meters Hose, QRC and Vent Line	3	3.45	10.35	1.86	12.21
20	Solid Liquid Separators with Platform & Conveyor	3	15.00	45.00	8.10	53.10
21	WTP / ETP & Rain Water Harvesting System	1	50.00	50.00	9.00	59.00
22	Conveyor Belt for Solid Liquid Separators & Packing	L/S		35.00	6.30	41.30
23	Lab setup for monitoring of digestion process stability.	L/S		10.00	1.80	11.80
	Total			1,347.3	207.42	1,554.77
	EPC Contractor fee @10%			134.74	24.25	158.99
	Grand Total			1,482.0	231.68	1,713.76

Source: Data/information provided by the client.

Thus, as per shared EPC contract provided by the client, the estimated cost for plant & machinery will be ~INR 1713.76 lakhs including applicable GST and 10% EPC fees. ~45% of TPC is the cost Plant & Machinery

The estimated cost of the Plant & Machinery has been provided to us by the client as per EPC agreement. However, as a TEV consultant, the cost of major plant & machinery has been verified by us independently, which we found reasonable & in the permissible range although the cost may change as per specifications & brand.

Note: It is to be noted here that the cost estimation done by us is just a general assessment for TEV purpose. However, detailed cost vetting is out of scope of this TEV report.

8. MISCELLANEOUS ASSETS:

Apart from the major Plant & Machinery miscellaneous assets such as Electricity Infrastructure (Electrical, Instrumentation, PLC, and data collection), Vehicles and Office equipment will also be required for the proposed CBG manufacturing unit. Detailed bifurcation of the proposed miscellaneous assets has been shown in the below table along with the estimated cost:

Miscellaneous Assets (INR lakhs)						
S. No.	Particulars of unit required	Unit	Rate	Amount	GST	Amount Including GST

A) Electrical, Instrumentation, PLC, data collection						
1	Grid OLTC Transformer 100 KWA with Cables	1	14.00	14.00	2.52	16.52
2	Electrical Panels	1	40.00	40.00	7.20	47.20
3	CT-PT, GO-DO Set, Lighting Arrestors, Servo, Earthing, ACB Panel with Power Factor (400 KVAR ADFC with 1600 AMP ACB), VCB and Cable for HT & LT	1	35.00	35.00	6.30	41.30
4	SCADA - Schneider / Honeywell Process Solutions with Control Panel with Switches	1	41.10	41.10	7.40	48.50
5	Cables & Fittings	L/S	30.00	30.00	5.40	35.40
6	Genset (Diesel) - 250 KVA	1	20.00	20.00	3.60	23.60
7	Fire Fighting System	1	25.00	25.00	4.50	29.50
8	Lighting & UPS	10	1.00	10.00	1.80	11.80
	Total			215.10	38.72	253.82
	EPC Contractor fee @10%			21.51	3.87	25.38
	Total			236.61	42.59	279.20
B) Off-site Facilities and office equipment						
1	Tractor Mounted Pay loaders, Trollies & Tankers (3 Nos & 02 Trollies)	L/S	15	15.00	0.75	15.75
2	Napier Grass Cutter Machine (10 TPH)	2	11.45	22.90	4.12	27.02
3	Weighbridge - 100 Ton	1	9.10	9.10	1.64	10.74
4	Computer & Furniture etc.	L/S		10.00		10.00
	Total			57.00	6.51	63.51

Source: Data/information provided by the client.

Thus the cost of Electrical, Instrumentation, PLC, data collection is INR 279.20 lakhs including GST & 10% EPC fess. Tentative cost of Off-site Facilities and office equipment is INR 63.51 lakhs including applicable GST. We found that the costs are in the line with prevailing market standard. It is to be noted here that the cost vetting of the proposed project cost is out of scope of this report.

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

a. WATER:

As per the data/information provided by the client, ~96 kl water will required on daily basis for proposed plant and water requirement will be fulfilled by setting up the proposed Well (70 Mt. depth). Company has applied for "No Objection Certificate" for groundwater extraction to Ground water department (Namami Gange & Rural Water

supply department), Ministry of Jal Shakti, Government of Uttara Pradesh on 13th November 2023 (*Application Number: SHML1123NIN0034*), after approval the Company can extract 25 m³ water per hour for 2 hours on daily basis. As per the NOC application, maximum allowable annual extraction of ground water is 17,500 Cubic metre i.e. 50 cubic metre per day.

b. ELECTRICITY:

As per the data/information provided to us by the client regarding Parasitic Consumption of Power (Tentative), proposed Bio CBG plant will be required a connected load of 500 KVA. Out of which, ~85% of connected load i.e. 426 kva will be the expected running load for the proposed plant. Component wise estimation of the power consumption is shown in the below table:

Parasitic Consumption of Power (Tentative)				
Particulars	Connected Load (Kwh)	Units	operational hours	Power consumption
Feed Pre-Treatment Unit	20	2	6	240
Submersible Pumps for Feeding	7.5	2	8	120
Compressors for Balloon & Pneumatic valves	10	2	2	40
Feeding system	11	2	8	176
Liquid Gas Mix system	55	1	16	880
Heating System	80	1	6	480
Solid Liquid Separators	10	2	12	240
Pressure boosting system	10	2	16	320
H2S scrubber	15	1	16	240
CO2 removal & purification system	66	1	16	1056
Compressors	97	1	16	1552
Instrumentation and biogas piping and electric panels	5	1	16	80
Organic fertiliser plant	30	1	10	300
Miscellaneous	10	1	16	160
Total Load & Unit	426.5			5884 Kwh/day

Sources: Data/information shared by the client.

Thus, ~INR 6.49 Crore per ton is the expected CAPEX for the proposed 6,000 KGPB Bio-CNG generating plant including GST, land, pre-operative and preliminary expenses, transportation costs, convey vehicle etc. As a TEV consultant we have verified the major costs which we found reasonable & in the permissible range as per the tertiary research

done by us, data/information available in the public domain and information provided by the third party consultants/vendors.

For reference, 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. (Ref: <https://pib.gov.in/PressReleasePage.aspx?PRID=1868887>). Some of the other references are shown in the below table:

Reference for Bio Gas Plant			
S. No.	Name of the Party	Contact details	Remarks
1.	M/s Jog Waste to Energy Pvt Ltd	info@jogwte.com +91 9723269295 www.jogwte.com	<ul style="list-style-type: none"> As per JOGWTE, the average installation cost as per EPC basis from scratch to successful trial run would be ranging INR 5.5-6.5 Crore per ton including preliminary and pre-operative expenses and other contingent costs.
2.	The Global Green Growth Institute, GGGI India	nishant.bhardwaj@gggi.org	<ul style="list-style-type: none"> As per information provided by GGGI, The capital expenditure (CAPEX) for a typical 8-10 TPD Bio-CNG plant varies from INR 32-50 Crore which varies based on the type of biomass feedstock and technology deployed. It has been estimated that the plant and machinery costs contributes ~76% of CAPEX. (Excluding preliminary and pre-operative expenses and excluding all other costs such as engineering, consultancy, installation costs etc. i.e. EPC Costs)
3.	Ministry of New & Renewable energy	MNRE	<ul style="list-style-type: none"> The economics of a CBG plant can vary depending on various factors such as the scale of the plant, technology used, feedstock cost, government incentives and market demand for CBG. ~INR 20-25 crore is the cost of installing a 5

			TPD capacity CBG plant, while ~75-80% of the CAPEX cost is for purchasing plant machinery.
4.	Others vendors	On the public domain	<ul style="list-style-type: none"> CSTR technology which is flexible for all types of organic wastes including mixed wastes. Capital cost for this technology is approximately INR 4-6 Crore per ton including all the costs from scratch to Successful trial run.

Note: It is to be noted that the detailed cost vetting is out of scope of this TEV and we have done this activity for TEV purpose only.

PART E

PROJECT TECHNICAL DETAILS

1. CAPACITY OF THE PROPOSED BIO-CNG UNIT:

This Bio-CNG generating plant is proposed to be set up with a designed capacity of 14,500 M3/Day to generate the 6,000 kg/day bio CNG as per LOI with OMC along with 24 Ton/Day of solid organic fertilizer as illustrated in the below table:

Capacity of the proposed Bio-CNG plant	
Particular	Capacity
Bio-CNG Plant Design Capacity	14,500 M3/Day
Biogas Plant Generation (Design Capacity x 86%)	13,416 M3/Day
Bio-CNG Plant Capacity	6,100 kg/Day
Leakage factor @1.64%	~100 kg/day
Net Output	6,000 Kg/day
Compost Plant Capacity	24,000 kg/Day

Source: Data/information provided by the client.

2. PRODUCTION PROCESS OF BIO CNG (CBG):

OVERVIEW:

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

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

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

a) HYDROLYSIS:

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

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

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

b) ACEDOGENESIS:

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

c) ACETOGENESIS:

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

d) METHANOGENESIS:

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

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

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

e) BIOGAS GENERATION:

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

Particular	Concentration
Methane (CH ₄)	50-60 %
Carbon dioxide (CO ₂)	36-40 %
Water vapour (H ₂ O) saturated mass	3- 4 %
Hydrogen sulphide (H ₂ S)	50-2500 PPM
Ammonia (NH ₃)	0-300 PPM
Non-gaseous particulates and oil	Low concentration

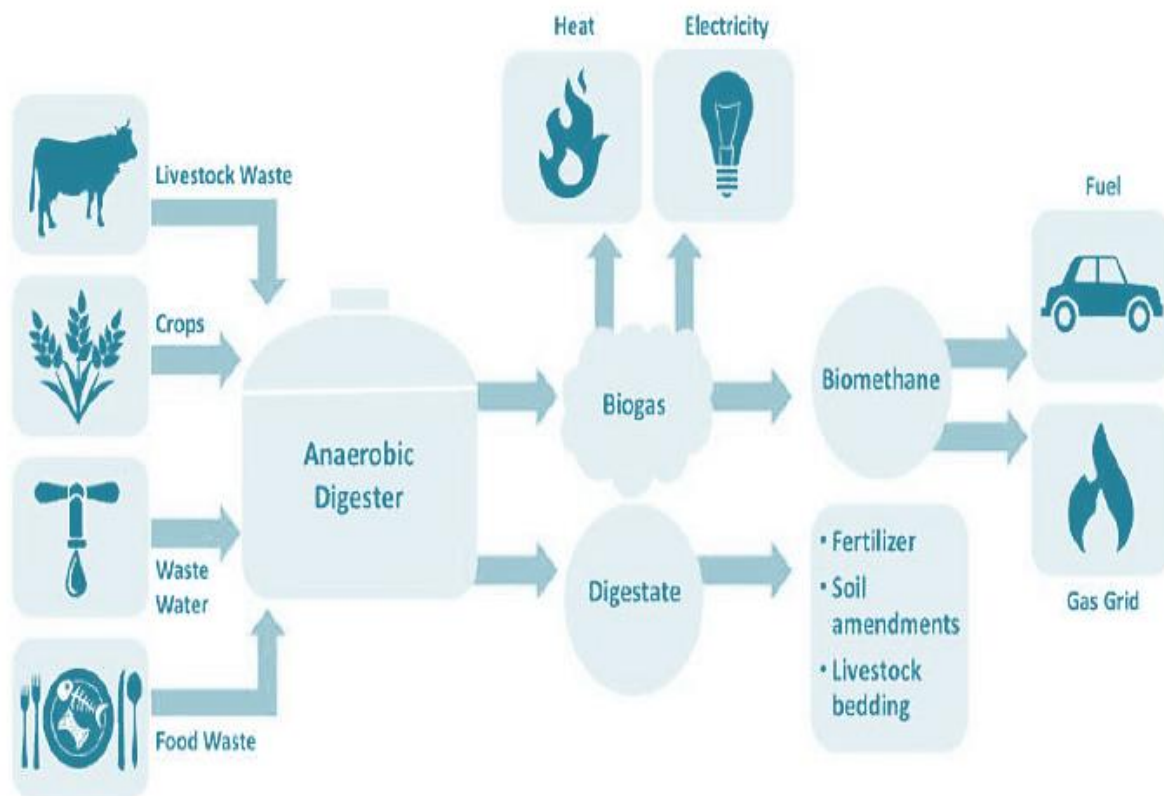
f) BIOGAS UPGRADATION:

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

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

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

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



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

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

Mechanical Equipment		
S. No.	Particular	Technical specification
1.	Mixers	11 Kva for Mixing Pits & Slurry Pit (04 Nos) with Accessories
2.	Submersible Pumps	7.5 KVA for transferring the Slurry with Accessories
3.	Mapro	Sequential Gas Mixing System with Technology (Italian) - 55 HP
4.	Gas Mixing System	Peso approved flame proof 1000 RPM Motor, Cyclone Separator for removal of oil from the gas, Compressor mounted Indian Instrumentation & gauges, Suction Filter,

		Sound Reducing Canopy, Control Panel with soft Starter, HDP & SS Pipes, Valves, PLC Panel for Operation of the pneumatic valves, Control Panel for air compressor, blower etc., Gravel filter 1100 NM3/hr. with other accessories & Installations
5.	Double Membrane Raw Gas holder	3300 CuM (Fabric - EU Origin) including all accessories and safety valve and observation window
6.	VPSA Biogas Purification Plant	(Sonitech-850 m3/hr) + H2S Desulphurization Tower (Filled with Catalyst) + Chiller + Automatic Control Panel with PLC + CO2 Gas Dryer - (Output Pressure 0.2-0.4 Bar) with Control panel + Methane Recovery Unit
7.	PSA Absorber Towers	Filled with Molecular Sieves (P140 + 4A + Booster Chemical) - Made in France
8.	Condensate and Sediment trap	(VS-5) for removing the Moisture
9.	Biogas Analyser	Honeywell Biogas chromatograph analyzer + Online Biogas Analyzer for (Ch4, H2S + Co2 + Moisture)
10.	Over/Under Gas Pressure Relief Valve	Hydraulic - OUPV
11.	Biogas Compressor	(JYOTECH) of capacity 550 Nm3/hr with discharge pressure 250 Kg/cm2g for bottling of CNG into Cascades with Suction Pressure :1.05 to 1.3 Bar
12.	CNG Cylinder Cascade	CNG Cylinder Cascade with Capacity- 4500 litre (75L X 60 Nos) with Tubing Sandvik, Parker / Swagelok / Jindal Fittings - Seamless Alloy Steel & PESO approved
13.	Cascades	Cascades Safety Valves, Tubing SS 316 connecting System with 4 Nos of Output for Cascades filling, Pressure Gauge, Safety Valves, Seal Excel Ratnamani / Sandvik
14.	LCV Post	with Mass Flow Meter, GIC Gauge Manifold with QRC & Connected 5 Meters Hose, QRC, Vent Line
15.	SCADA System	Schneider / Honeywell Process Solutions with Control Panel with Switches
16.	Solid Liquid Separators with Platform	
17.	Conversion of Liquid Fertilizers into Solid Bio Fertilizer	
18.	WTP / ETP & Rain Water Harvesting System	
19.	Conveyor Belt for Solid Liquid Separators & Packing	
20.	Lab setup for monitoring of digestion process stability.	
21.	Napier Grass Cutter Machine	(10 TPH)
22.	Weighbridge	AMCO Electronic Weighbridges Model - Aew100t1050plmad Capacity -100 Ton P P Size -50ftx10ft

23.	Genset	(Diesel) - 250 KVA
24.	Transformers	630 KVA Oil Cooled Transformer As Per IS: 1180 (part-1) 2014, EEL-1,3P,50Hz Voltage ratio 11/.433 KV Wound COPPER WITH OLTC

5. TECHNOLOGY USED:

a) TECHNOLOGY SUPPLIER, EPC CONTRACTOR:

As per the data/information provided by the client, Company has appointed an ISO 9001 certified Ghaziabad based solution provider M/s Vimal Organics Ltd. As per the scope of work mentioned in the agreement, EPC Contractor undertakes to supply 14500 CuM Compressed Bio Gas, Bio-Fertilizer. Below table shows the basic details of EPC contractor as per the data/information provided by the client and available in the public domain:

Particular	Description
Name	M/s Vimal Organics Limited
CIN	U27105DL1984PLC017452
GST No.	09AAACV7698G1ZP
Reg. Address	D-35, B S R Industrial Area, Bulandshahr Road Industrial Area, Ghaziabad- 201009, Uttar Pradesh, India
Website	https://www.vimalorganics.com/
About the Company	As per the data/information available in public domain, Vimal Organics Limited was incorporated as a Private Limited Company in the year 1984 and converted into a Public Limited Company in 1994. Company is engaged in manufacturing, supplying and exporting a wide range of equipments which are used in industries.
Services	Turnkey Projects for Fertilizer & Micro Nutrients, Turnkey Projects for Chemicals, Turnkey Projects for Food Processing, Activated Bleaching Clay, Individual Equipment and Mechanical Conveying System.
Standards & Quality Certifications	SSI Registration No - (C/20/56/01683/PMT/SSI/0) CHEMEXCIL, FIEO, FICCI,CII, SEA,

b) PROPOSED TECHNOLOGY:

Company has proposed to commission this Bio CNG plant with “**Sequential Gas Mixing System**” which is an Italian based technology supplied by “Mapro International S.p.A.” Sequential Gas Mixing (SGM) ensures anaerobic digesters are mixed continuously to without thermal layering and accumulation of volatile fatty acid (VFA) pockets.

Gas Injection Mixing Systems gives comparatively higher operational efficiency due to no sedimentation because of the mixing by gas bubbling from the bottom in the proposed. Further, production of gas is high due to complete and uniform mixing and to a low temperature gradient in the sludge.

Proposed Technology (Sequential Gas Mixing System)		
S. No.	Particular	Description
1.	Mapro	Sequential Gas Mixing System with Technology (Italian) - 55 HP
2.	Gas Mixing System	Peso approved flame proof 1000 RPM Motor, Cyclone Separator for removal of oil from the gas, Compressor mounted Indian Instrumentation & gauges, Suction Filter, Sound Reducing Canopy, Control Panel with soft Starter, HDP & SS Pipes, Valves, PLC Panel for Operation of the pneumatic valves, Control Panel for air compressor, blower etc., Gravel filter 1100 NM3/hr.

Power consumption is low up to 50% energy saving compared to mechanical mixing system due to no friction between sludge and mechanical parts. This technology is more reliability as no corrosion and no struvite. Maintenance cost is low as no parts in movement inside the sludge.

6. LATEST TECHNOLOGY/TECHNOLOGICAL ASSESSMENT:

Anaerobic digester technology has come up with several innovations in the last few years which assists project developers to implement a scalable, viable bio-CNG plant with improved process efficiency at a lesser cost. Now a days several conventional anaerobic digester technologies exist such as Continuous stirred tank reactor (CSTR), KVIC models and more, recent innovations in technologies such as plug and play digester models ensure improved efficiency and automation of the process compared to conventional technologies.

Promoters of M/s Superior Agro Ventures Private Limited are convinced by Sequential Gas Mixing System as it is more efficient and evidently proven Italian technology.

CFD ANALYSIS COMPARISON:

As per the data/information provided by the client, Professors & scientists from Italian university has applied a three-dimensional CFD (Computational Fluid Dynamics) model in order to verify the mixing efficiency of a gas mixing system in comparison with mechanical mixing systems on a WWTP.

The study showed that the gas injection system gives better results than mechanical mixing systems both in terms of maximum sludge speed (3 m/s versus 1 m/s), kinetic energy (0.24 m²/s² versus 0.001 m²/s²) and dead zones (5% versus 50%) with the same energy consumption, equal to 140 kWh for both systems.

In particular, the system mixed by means of gas recirculation, made it possible to reach linear speeds between 1 and 2 m/s while in the case of mixing with mixers, values > 0.5 m/s were not reached.

In terms of kinetic energy density, it is noted that in the case of mixing with gas lances, turbulent kinetic energies between 0.05 and 0.2 m²/s² were observed while in the case of mixing with mechanical mixers, values <0.05 m²/s² were observed. Concerning the distribution of dead zones, the effectiveness of the mixing system with gas lances is observed with even greater evidence, clearly superior to that obtained with mechanical mixing systems.

Thus as per the above technical assessment, M/s Superior Agro Ventures Private Limited has proposed the appropriate Sequential Gas Mixing System with Italian Technology which is a recognized and proven technology. 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 to achieve the economies of scale.

7. TESTING STANDARDS FOR PRODUCTION:

CBG or Compressed Bio Gas consist of mainly methane (more than 90%) and other gasses like carbon dioxide (less than 4%), etc. CBG is produced by anaerobic digestion of biomass and waste sources like agricultural residue, cattle dung, sugarcane press mud, municipal solid waste, sewage treatment plant waste, etc.

This Biogas can be purified to remove hydrogen sulphide (H₂S), carbon dioxide (CO₂), water vapor and when this purified biogas (methane content more than 90%) is compressed to

maximum 250 bar and filled up in cascades (group of high pressure cylindrical vessels) it is called Compressed Bio Gas or CBG.

CBG has properties almost similar to CNG and hence a vehicle running on CNG can straightway be filled with CBG without any modification in the vehicle. Ministry of Road Transport and Highways, Government of India, vide Gazette Notification no. 395 dated 16.6.2015 has permitted usage of CBG for motor vehicles as an alternate of CNG. BIS has issued IS 16087 2016 standards on CBG which is similar to BIS specifications IS 15958:2012 for CNG.

8. MANPOWER:

As per information shared by the client/company, a proper ratio between the administrative, managerial, supervisory and shop floor staff has been maintained with a view to affording proper industrial and professional management at various levels in estimating the manpower requirement. The basic structure of the manpower will require the following kind of resources to operate the plant 24*7 for 350 days a year:

Proposed manpower details along with Cost (INR)		
Workers on Wages		
Category	Number	Average Monthly Salary
Skilled Workers	6	20,000
Semi-Skilled Workers	2	15,000
Un-Skilled Worker	6	12,000
Sub Total	14	
Factory Supervision		
Category	Number	Average Monthly Salary
Shift Supervisor	2	35,000
Field Officer	1	25,000
Store In-Charge	1	15,000
Store Assistant	1	12,000
Chemist	1	18,500
Sub Total	6	
Office Staff		
Category	Number	Average Monthly Salary
General Manager	1	65,000
Accounts Manager	1	25,000

Accounts Assistant	2	10,000
Office Assistant -Marketing	2	15,000
Office boy	2	10,000
Sub Total	8	
Grand Total	28	

Source: Data/information provided by the client

Company has proposed to deploy 28 human resources initially as shown in the above table, which comes out with ~4 workers per ton for the proposed Bio-CNG generating plant which is in permissible range as per the standard benchmark of the industry considering the operational scope & scale of the proposed plant. This is a tentative figure provided by the client, Estimated manpower may change as per the actual requirement post C.O.D.

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

PART F

PRODUCT PROFILE

1. INTRODUCTION:

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

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

2. PRODUCT CATEGORY:

a) BIO CNG:

The proposed plant will be generating 6,000 Kg/ day of Bio-CNG as per LOI with OMC which has a gross calorific value of 12,500 Kcal/Kg. Methane is the most valuable component under the aspect of using biogas as a fuel; the other components do not contribute to the calorific value and thus are "washed out" in the purification plants in order to obtain a gas with almost 95- 96% CH₄. Methane is the flammable compound in biogas. Composition of the purified Bio-CNG has been shown in the below table:

Composition of Purified Bio-CNG		
Ingredient	Value	Test Method
CH ₄ (Percentage)	95-96 %	IS-5130 (Part3)
CO ₂ + N ₂ + O ₂ (Percentage)	4-5 %	IS-15130 (Part3)
Only CO ₂	< 4 %	IS-15130 (Part3)
H ₂ S (Mg/M ³)	5 (Mg/M ³)	ISO- 6326-3
Moisture (Mg/M ³)	5 (Mg/M ³)	IS-15641 (Part2)

Source: Data/information provided by the client

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

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

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

b) ORGANIC FERTILIZER:

The plant has a capacity to produce 24,000 Kg/ day of solid organic fertilizers. The material drawn from the digester is called sludge, or effluent., which is rich in nutrients (ammonia, phosphorus, potassium, and more than a dozen trace elements) and is an excellent soil conditioner.

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

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

In other words, one ton of slurry provides 44 kg of nutrients as compared to 19 Kg through farmyard manure and 27 Kg by compost. Micro nutrients such as zinc (Zn), copper (Cu) and manganese present in the original material are also recovered in biogas

slurry and can proved useful to crops when used as organic manure. The nutrient composition of slurry manure is shown in the below table:

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

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



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

To derive maximum benefits from the stored digested slurry, it is essential to prevent its exposure to the sun as any such exposure would result in loss of ammoniacal nitrogen content of the slurry. It is advisable to dig, two or three manure pits near the biogas plant. The slurry is then carried and stored in these pits which are covered with solid waste from the farm. The fresh biogas slurry when used by mixing with irrigation water to growing crops gives better yields as compared to other modes of its applications.

3. PRICING STRATEGY:

As per the data/information provided by the client, Company has already signed a LOI with Indian Oil Corporation Ltd on 3rd November 2023. (**Ref No. - Indian Oil/SATAT/01/3589**). However signing of commercial agreement between IOCL & company is in the process for which bank guarantee of INR 5.00 lakhs has been paid by the company.

As informed by the client, company has planned to sell its Bio CNG at two Retail Outlets of IOCL at Panipat and Yamuna Nagar in Haryana. The current retail selling price of CNG at OMC outlets in Panipat and Yamuna Nagar is around INR 80.40 per kg on 28th May 2024. (<https://www.v3cars.com/haryana/cng-price-in-yamunanagar>), however the procurement price of Bio-CNG at Indian Oil as per the SATAT Scheme falls under the slab of INR 62.86 per kg without GST. "CBG Pricing Circular- SATAT Scheme" is attached below for reference:

 <p>कोर्पोरेट कार्यालय Corporate Office</p>	<p>इंडियन ऑयल कॉर्पोरेशन लिमिटेड कोर्पोरेट कार्यालय : स्कोप कॉम्प्लेक्स, कोर-2 7, इन्स्टिट्यूशनल एरिया, लोधी रोड, नई दिल्ली-110 003 Indian Oil Corporation Limited Corporate Office : SCOPE Complex, Core-2 7, Institutional Area, Lodhi Road, New Delhi-110 003 Website : www.iocl.com</p>																																									
<p>Ref: CO/AE&SD/01 Date: 20.05.2022</p>																																										
<p>To Stakeholders of SATAT Scheme Sub: Purchase price of Compressed Bio-Gas (CBG) under SATAT scheme</p>																																										
<p>You are kindly aware that, 'SATAT' (Sustainable Alternative Towards Affordable Transportation) scheme on CBG was launched on 1.10.2018. As per the scheme, procurement price of CBG purified as per IS 16087: 2016 standards, compressed at 250 bar pressure and delivered to OMC Retail Outlets in cascades (up to 25 km one way distance from CBG Plant) was fixed at Rs. 46/kg + applicable taxes for period from 1.10.2018 to 31.3.2024. It was also informed that minimum procurement price will not be lower than Rs. 46/kg + applicable taxes up to 31.3.2029. To facilitate entrepreneurs for financial closure of the projects as well as promote setting up of CBG Plants, it has been decided that the CBG prices shall be indexed to the prevalent Retail Selling Price (RSP) of CNG in the market (or CBG RSP for markets where CNG is not available).</p>																																										
<p>Accordingly, the following revised procurement pricing of CBG shall be implemented:-</p>																																										
<p>1.0 The minimum procurement price of CBG will not be lower than Rs. 46/kg + applicable taxes for the period up to 31.3.2029.</p> <p>2.0 The Retail Selling Price of CBG in a market shall be at par with RSP of CNG (as provided by the authorized CGD entity).</p> <p>3.0 The following slabs for CBG procurement price have been decided, which will be the procurement price of CBG delivered at IndianOil Retail Outlet situated at any distance (up to 75 km one way) as per IS 16087 2016 specification (or its latest version) and compressed at 250 bar pressure: -</p>																																										
<table border="1"> <thead> <tr> <th>S No</th> <th>Lower Retail Selling Price of CBG in Slab including tax Rs./kg</th> <th>Higher Retail Selling Price of CBG in Slab including tax Rs./kg</th> <th>Procurement price of CBG Without GST Rs./kg</th> <th>Procurement price of CBG With GST Rs./kg</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>70.01</td> <td>75.00</td> <td>54.00</td> <td>56.70</td> </tr> <tr> <td>2</td> <td>75.01</td> <td>80.00</td> <td>55.25</td> <td>58.01</td> </tr> <tr> <td>3</td> <td>80.01</td> <td>85.00</td> <td>59.06</td> <td>62.01</td> </tr> <tr> <td>4</td> <td>85.01</td> <td>90.00</td> <td>62.86</td> <td>66.01</td> </tr> <tr> <td>5</td> <td>90.01</td> <td>95.00</td> <td>66.67</td> <td>70.01</td> </tr> <tr> <td>6</td> <td>95.01</td> <td>100.00</td> <td>70.48</td> <td>74.01</td> </tr> <tr> <td>7</td> <td></td> <td></td> <td>74.29</td> <td>78.01</td> </tr> </tbody> </table>	S No	Lower Retail Selling Price of CBG in Slab including tax Rs./kg	Higher Retail Selling Price of CBG in Slab including tax Rs./kg	Procurement price of CBG Without GST Rs./kg	Procurement price of CBG With GST Rs./kg	1	70.01	75.00	54.00	56.70	2	75.01	80.00	55.25	58.01	3	80.01	85.00	59.06	62.01	4	85.01	90.00	62.86	66.01	5	90.01	95.00	66.67	70.01	6	95.01	100.00	70.48	74.01	7			74.29	78.01	<p>Note: The above table is applicable strictly for supply of CBG at a one-way distance up to 75 km from the CBG Plant. For distance beyond 75 km, the price will be first adjusted as defined in para</p>	
S No	Lower Retail Selling Price of CBG in Slab including tax Rs./kg	Higher Retail Selling Price of CBG in Slab including tax Rs./kg	Procurement price of CBG Without GST Rs./kg	Procurement price of CBG With GST Rs./kg																																						
1	70.01	75.00	54.00	56.70																																						
2	75.01	80.00	55.25	58.01																																						
3	80.01	85.00	59.06	62.01																																						
4	85.01	90.00	62.86	66.01																																						
5	90.01	95.00	66.67	70.01																																						
6	95.01	100.00	70.48	74.01																																						
7			74.29	78.01																																						
<p>Page 1 of 2 पञ्जीकृत कार्यालय : इंडियन ऑयल भवन, जी-9, अली यावर जंग मार्ग, बान्द्रा (ई.), मुम्बई - 400051, महाराष्ट्र (भारत) Regd. Office : IndianOil Bhawan, G-9, Ali Yavar Jung Marg, Bandra (E), Mumbai - 400051, Maharashtra (India) CIN : L23201MH1959GOI011388</p>																																										

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

4.0 The upward and downward movement of CNG price will change the slab for a particular market at any point in time and the rate applicable for CBG procurement will change accordingly.

5.0 Additional transportation cost for transportation of CBG beyond 75 km (one-way distance) from CBG Plant shall be considered separately, at mutually discussed & agreed rates. This additional transportation costs shall be recovered from the market through inclusion in the Retail Selling price (RSP) build-up of CBG. If the recovery from market is not possible for additional transportation, the same shall not be paid.

6.0 This revised procurement price of CBG is being offered considering in view that presently RSP of CNG is greater than Rs. 70/kg in nearly all markets. If there is a reduction in CNG RSP from these levels, there will be revision in the price as agreed by Oil & Gas Company committee. The minimum procurement price of CBG as announced earlier will not be lower than Rs. 46/kg + applicable taxes for the period up to 31.3.2029.

7.0 The revised procurement pricing of CBG as detailed above shall form part of the Expression of Interest (EOI), Letter of Intent (LOIs) issued by IndianOil and Commercial Agreements executed by IndianOil under SATAT scheme with due acceptance by both parties.

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

For Indian Oil Corporation Ltd.

(Shantanu Gupta)
Executive Director (AE&SD)

20/05/2022

It is to be noted that Panipat RO is located within 75 km range thus the procurement price will be decided according to the Pricing circular shown above, while Yamuna Nagar RO is located ~80 km away from the project location and thus the procurement price will be decided according to the para 5.0 of the Pricing circular shown above.

As per the shared agreement dated 15th July 2024 with M/s Anagram Development and farmers producers Private Ltd (FPO) for sale/handling of Bio-fertilizer produced at the proposed unit, Bio fertilizer will be selling out at an agreed price of INR 6.00 per kg which is reasonable and competitive rate of the market. For reference, IPL Rohana CBG Plant is selling FOM @ INR 10 per kg in 30 kg bags at present.

As per the current market scenario, the fermented organic solid manure/fertilizer is sold to farmers or outlets at around INR 6.00 to 7.00 per kg including with packing and bagging facilities. Whereas the bulk-selling rate of solid fermented organic manure/fertilizer is around 4.00 to 5.00 per kg.

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

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>

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 62.86/kg without GST. The selling rate of fermented organic solid and liquid fertilizers is assumed as INR 6.00 per kg.

4. MARKETING, SELLING & DISTRIBUTION PLAN:

a) BIO CNG:

The Bio-CNG produced has to be sold to Indian Oil Corporation Ltd stations, for which the company have already signed a LOI (**Ref No. - Indian Oil/SATAT/01/3589, Date: 3rd November 2023**).

b) ORGANIC FERTILIZER:

As per data/information provided by the client, M/s Superior Agro Ventures Private Limited has made an agreement on 29th February 2024 with a Chandigarh based facilitator M/s Sevozone Energies & Fertilizers Pvt Ltd (related party) for sale/handling of Bio-fertilizer produced at the proposed unit.

As per the agreement, M/s Sevozone Energies & Fertilizers Pvt Ltd has selling arrangements with Punjab Agro (A Punjab government undertaking & Nodal Agency for organic farming in Punjab) via letter number PAGREXCO/2022/1017 dated 3rd Oct 2022 and ready to sale the available Bio-fertilizer ~ 20 ton/day of M/s Superior Agro Ventures



Private Limited from FY 2025-26 for next 10 years under competitive rates as per government's rule & regulations.

As per the current market scenario, the remaining 4 TPD fermented organic solid manure/fertilizer is to be sold to farmers or outlets at around INR 6.00 to 7.00 per kg including packing and bagging facilities. Whereas the bulk-selling rate of solid fermented organic manure/fertilizer is around 5.00 to 6.00 per kg.

Other than this arrangement, Government of U.P. issued the government order number 43/2022/1101/87-8(1) AESD/2022 dated 3rd October 2022 and making the mandatory provision for sale of Bio fertilizer on Government Licensed fertilizers shop in the state under the clause of 2.4 of UP Bio Energy Policy 2022.

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

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

 एक कदम स्वच्छता की ओर कॉर्पोरेट कार्यालय Corporate Office	इंडियन ऑयल कॉर्पोरेशन लिमिटेड कॉर्पोरेट कार्यालय : स्कोप कॉम्प्लेक्स, कोर-2 7, इन्स्टीट्यूशनल एरिया, लोदी रोड, नई दिल्ली-110 003 Indian Oil Corporation Limited Corporate Office : SCOPE Complex, Core-2 7, Institutional Area, Lodhi Road, New Delhi-110 003 Website : www.iocl.com	
Ref: IndianOil/SATAT/01/3559 Date: 03.11.2023		
To, Superior Agro Ventures Private Limited Backside Old Grain Market, Railway Road, Opp. Water Pump, Kapurthala, Punjab - 144601		
Sub: Letter of Intent for supply of CBG to IndianOil under SATAT		
Madam/ Sir,		
This has reference to the following:		
Notice Inviting Expression of Interest (NIEOI) ref.: NIEOI released on: NIEOI application dated: NIEOI file reference number: Status of CBG Plant as on date of application: CBG plant location as per NIEOI application: CBG Quantity as per NIEOI application:	CBG62 01.09.2023 30.09.2023 977563 Proposed Village-Harsana, Tehsil- Un, Shamli, Uttar Pradesh 6.0 Tonnes Per Day	
We also refer to documents submitted in the EOI and/or correspondences exchanged with IndianOil and your willingness to provide Compressed Bio Gas (CBG) to IndianOil from the above mentioned CBG plant for marketing through IndianOil's Retail Outlet(s).		
Based on the evaluation of the EOI submitted by you, we hereby issue this Letter of Intent (LOI) for retailing of CBG produced from your above mentioned CBG Plant on following broad terms and conditions:-		
1. In accordance with the NIEOI, you shall be responsible for, inter alia, the following obligations: a. You shall be responsible for planning, preparation, engineering and execution of the CBG Plant, including storage of raw material, operation and maintenance of the CBG Plant, maintaining final product output quantity and quality, managing the by-products and wastes from the CBG Plant as per existing central / state government norms and providing performance guarantee for the CBG Plant at your cost.		
<div style="text-align: right;">(contd..)</div>		
पंजीकृत कार्यालय : इंडियन ऑयल भवन, जी-9, अली यादव जंग मार्ग, बान्द्रा (ई.), मुंबई - 400051, महाराष्ट्र (भारत) Regd. Office : IndianOil Bhawan, G-9, Ali Yavar Jung Marg, Bandra (E), Mumbai - 400051, Maharashtra (India) CIN : L23201MH1959G01011388		

PART G

FEEDSTOCK ANALYSIS

1. INTRODUCTION:

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

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

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

Approximate Required Quantities of the Substances (Alone)		
Sr. No.	Item	Daily RequiredQuantity (Ton)
1	Napier Grass	120-150
2	Poultry Droppings	98-100
3	Food Waste	175-180
4	Sugarcane Press mud	120-150

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

Proposed Combination of Raw material		
S. No.	Item	Daily Input Quantity (Ton)
1	Napier Grass / Agriculture Residue	Between 80 - 100
2	Sugarcane Press mud	Between 40 - 50

Note: As informed by the client, the proposed plant will be designed for mix feed. Napier Grass will be used as major feed stock and Pressmud is considered as backup Raw material source.

2. NAPIER GRASS / AGRICULTURAL RESIDUE:

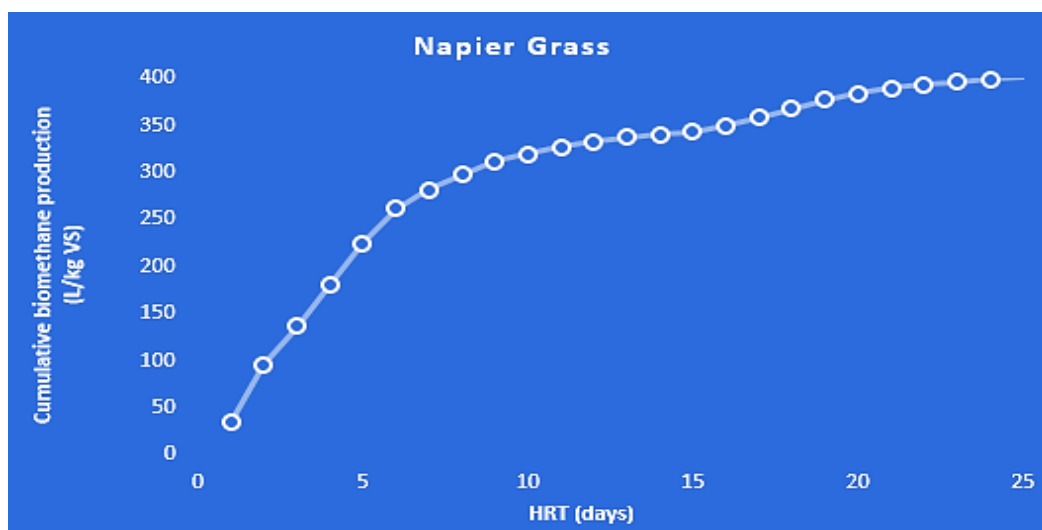
Napier grass, also known as elephant grass, is a productive and versatile forage grass native to Africa and Southeast Asia. Napier Grass is an ideal substrate for biogas Production. In India, the reported annual production yield of Napier grass ranges from 150-200 tonnes per acre per year, which is significantly higher (25-35 tonnes per hectare) compared to other energy grasses like miscanthus and switchgrass.

Composition of Super Napier grass		
Parameters, %	Fresh, %	Dry Matter, %
Crude Protein, %	1.21	8.12
Crude Fibre, %	5.37	36.02
Crude Fat, %	10.12	67.87
Moisture, %	85.09	-
Ash, %	1.01	6.77
Neutral Detergent Fibre, %	10.2	68.41

Napier grass is categorised as lignocellulosic biomass, with its carbohydrate composition typically consisting of 35-39 per cent cellulose, 19-23% xylan and 15-19% lignin on a dry mass basis. With an energy output-to-input ratio of approximately 25:1, it emerges as one of the most promising energy crop.

Studies have shown that Napier Grass has a high methane yield due to higher cellulose and crude protein, making it an efficient source of Bio-CNG with the potential for significant energy output. The cultivation of Super Napier stick seed grows very easy and fast and get the height of 6 feet in 30 days. This fast-growing perennial grass can reach a height of 10-15 feet and can be harvested 5-6 times annually. Below is the presentation of Bio methane Potential of Napier Grass:

Bio methane Potential of Napier Grass				
S. No.	Solid loading (%)	HRT (days)	Inoculum (%)	Bio methane production (L/kg VS)
1	5	25	50	400.84



Napier grass, also known as elephant grass, is a productive and versatile forage grass native to Africa and Southeast Asia. Due to its high yield, it is widely used as feed for livestock and in bioenergy applications. While it may be a relatively new energy crop in India, Thai farmers have been cultivating it for over 30 years, with more than 130 varieties. This fast-growing perennial grass can reach a height of 10-15 feet and can be harvested 5-6 times annually.

The first harvest occurs four months after planting, followed by subsequent harvests every two months for up to seven years. Napier grass is categorised as lignocellulosic biomass, with its carbohydrate composition typically consisting of 35-39 per cent cellulose, 19-23 per cent xylan and 15-19 per cent lignin on a dry mass basis. With an energy output-to-input

ratio of approximately 25:1, it emerges as one of the most promising energy crops for the creation of cost-effective and efficient bioenergy systems.

In India, the reported annual production yield of Napier grass ranges from 150-200 tonnes per acre per year, which is significantly higher (25-35 tonnes per hectare) compared to other energy grasses like miscanthus and switchgrass. However, there are specific varieties that have shown even higher yields. Few microbiologist and farmer, achieved biomass productivity of 350-400 tonnes per acre per year by cultivating a hybrid variety called Super Napier in Maharashtra's Gondia district.

Through experiments, it was discovered that with a 24-hour microbial pre-treatment, 100 kgs of the grass yielded 6 kgs. of biogas, which had a 62.3 per methane content. Alternatively, when the same feedstock underwent a 24-hour pre-treatment with 1 per cent Noah, a slightly higher yield of 6.5 kg of biogas with 61.5 per cent methane content was obtained.

At present, the utilisation of Napier grass in CBG plants in India is still in its nascent stages, with no operational plants solely focused on Napier grass. However, several ventures are underway. The primary challenge in effectively utilising Napier grass lies in its resistance to enzymatic and microbial hydrolysis. Consequently, pre-treatment of the lignocellulosic biomass is imperative to enhance digestibility and maximise biogas production.

Another crucial factor to consider is the operational intricacies of a CBG plant exclusively reliant on Napier grass. Numerous laboratory-scale studies have demonstrated that co-digestion, involving a combination of Napier grass with cow dung or food waste, results in higher yields compared to using Napier grass alone.

Moreover, it is essential to note that Napier grass is a warm-season grass and undergoes dormancy during the winter months. To ensure an uninterrupted supply of feedstock throughout the year for the CBG plant, it is vital to have alternative feedstock options available during the winter season.

There are many Operational and under construction plants using Napier Grass as Raw material in India such as Maruti Suzuki India Limited, Manesar Unit – Food waste or Napier Grass as Raw Material, APSS Adarsh Bio Agro Pvt. Ltd, Wardha, Maharashtra (EPC partner – Gruner Renewable Energy (GRE)) – 50 TPD of Napier grass, producing an output of 3 TPD of Bio-CNG per day, GPS Renewable – Multiple Bio-CNG projects with 150 TPD Agri-residue including paddy straw, Napier grass for Reliance Industries, producing an output of

18 to 20 TPD of Bio-CNG per day and Gruner Renewable Energy – Multiple Bio-CNG projects worth of Rs. 1500 Cr on Agri-residue including paddy straw, Napier grass.

3. RAW MATERIAL SUPPLY ANALYSIS:

As per the data/information provided by client, plant will require ~100 tons per day Agriculture Residue (Napier Grass, Rice stubble etc.) and ~40-50 ton per day sugarcane press mud to produce the 6 ton Bio-CNG per day.

Required Raw Materials for Plant		
Particular	Quantity	Cubic Metre
Napier Grass (Yield@ 6.10%)	100 Ton / Day	222
Total Raw Material need / day for Feed	100 Ton / Day	222
Adding 100% Water to maintain TS @ 10% Max		222
Sub-Total (Total input / day in both Digesters)		444
hydraulic retention time HRT Time @ 26 Days		12432

Source: Data/Information provided by the client.

As per the data/information provided by the client, company has made a long term raw material supply agreement with M/s. Anagram Development and Farmer Producer Company Limited (FPO) on 15th July 2024.

According to the terms & conditions stated in the agreement, M/s. Anagram Development and Farmer Producer Company Limited (FPO) will supply 100 ton per day Agriculture Residual/Napier grass/Rice Stubble etc. to M/s Superior Agro Ventures Private Limited as per the specifications and in the manner as mutually agreed between the parties.

As per our tertiary research and data/information available in public domain, M/s. Anagram Development and Farmer Producer Company Limited is a private company incorporated on 19th October 2015 with prime focus on the production of cereal crops and vegetables, Black Gram, wheat, paddy, and mustard. These are the primary products. Bearing CIN U01403UP2015PTC073940 (ROC-Kanpur), Company is involved in Agricultural and animal husbandry service activities, except veterinary activities.

The FPC has 1500 farmers as its registered members with an average landholding size of 0.5 acres (0.2 hectares). The minimum and maximum size of landholding is 0.25 acres (0.1 hectares) and 2.5 acres (1.01 hectares).

Company is having a turnover of INR 56,47,105 in FY 2022 which has increased by ~59% in FY 2023 to INR 89,74,829.38.

The FPC rents out farm machinery obtained from Farm Machinery Bank (FMB), and agricultural inputs such as pesticides, micro-nutrients to its members. This is expected to result in quality agricultural production and would ultimately lead to improved market linkages. Through this plan, the company aims to enhance each farmer's income by 20% by the end of the financial year 2024.

Broad service models of the FPC	
Particular	Quantity
Farm Machinery Bank (FMB):	The FPC rents farm machinery to its member farmers and other farmers as per requirement. In the financial year 2023-2024, the FPC earned an income worth INR 2,95,000. For the five upcoming years, the FPC has planned to increase the rent by an inflation- adjusted rate of 3.23% as per CPI.
Inputs:	The FPC provides fertilizers, pesticides, micronutrients, and seeds to its farmers. The member farmers purchase input from the FPC. It is not planning to enhance its stock of inputs in next five years because it wants to utilize its capital for establishing a wheat mill. And therefore, the FPC looks forward to an opportunity to tie-up with CNG plants for supply of bio-fertilizer
	Storage: The FPC has a pre-established space for storage capacity of 3000 MT at its premise which would be utilized for storing wheat grains and milled wheat. The same Space can be used by its farmers. The FPC would not bear the rental cost for storage.
Seed Processing Unit:	The FPC is done for establishing a 200 MT seed processing unit. The unit would be operational by the end of financial year 2024.
Small Food processing Unit:	The FPC having the small food processing unit like Oil expeller with filter press, Dall mill & wheat dalia making machines. FPC processes the mustard oil, Wheat Dalia & different grams and packaging in own brand for further marketing.

4. PRICING:

Pricing of the raw material i.e. Agriculture Residue (Napier Grass/Rice Stubble etc.) is considered as per the long term supply agreement with FPO, according to which rate of chopped Napier grass mutually agreed between the parties as INR 100 per quintals i.e. INR 1.00 per kg.

PART H

INDUSTRY OVERVIEW

1. INTRODUCTION:

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

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

2. POTENTIAL AND EXPANSION:

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

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

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

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

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

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

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

3. CHALLENGES:

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

Feedstock Availability	Quality of Feedstock (including multiple feedstocks)	Technology Challenges	Bio-CNG and by-products' Market Challenges	Financing, and Implementation Challenges
<ul style="list-style-type: none"> No formal market for trading of feedstock Uncertainty of long-term regular supply of feedstock 	<ul style="list-style-type: none"> Variation in quality of feedstock throughout the year Some projects are designed to take multiple 	<ul style="list-style-type: none"> Technologies are sensitive to the quality of feedstock – slight change in 	<ul style="list-style-type: none"> Year-on-year variation in feedstock price – established feedstock pricing mechanism is 	<ul style="list-style-type: none"> There are schemes by public sector banks to finance Bio-CNG project, but less private sector banks are financing Bio-

<ul style="list-style-type: none"> • Demand supply mismatch - requirement of large storage facility • Unorganized biomass value chain – lack of sufficient collection, processing and transportation facility 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • feedstock quality will significantly impact the Bio-CNG production rate • Capital intensive technologies high upfront project cost 	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • CNG project that too at high cost of debt. • Lack of access to infrastructure i.e. road network and CGD network near project sites. • Large set of approvals are required from PESO, pollution control board, MNRE - subsidy disbursement etc.
---	--	---	---	--

4. GOVERNMENT INITIATIVES:

- Government has announced the phased mandatory blending of compressed biogas (CBG) in compressed natural gas (CNG) for transportation and piped natural gas (PNG) for domestic purposes in the latest interim budget for FY 2024-25.
- The government has increasingly focused on the production of compressed biogas in India. It is currently aiming to set up 5,000 CBG plants by FY25 under SATAT.
- Under Waste To Energy Programme, MNRE is providing the subsidy of INR 4.0 Cr per 4800 kg/day for Bio CNG generation from new biogas plant and INR 3.0 Cr per 4800 kg/day for Bio CNG generation from existing Biogas plant, while the maximum CFA of INR 10.0 Cr/project for both cases.
- GOBARDHAN: Ministry of Drinking Water and Sanitation, Financial assistance of INR 50 lakh per district is available for setting up model GOBARDHAN projects. SATAT Scheme OF MoPNG for encouraging OMCS's to issuance of LOI to the producers.
- Eight Biogas Development and Training Centres (BDTCs) have been established at India's premier Institutions to provide Technical Assistance, R & D, Testing and Validation of New Biogas Models / Designs, field inspections of biogas plants, and training and skill development.

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

5. CONCLUSION:

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

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

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

PART I

SWOT ANALYSIS

SWOT ANALYSIS	
STRENGTHS	<ul style="list-style-type: none"> • Strategic Location: The project is situated in UN, Shamli. Many sugar mills are situated near by the location of the proposed Bio CNG plant ensures the availability of raw material (press mud). Further availability of agricultural land in western U.P., supply of Napier grass will also be good as farmers are interest towards commercial agriculture & contract farming. • Growing Demand: Due to renewable source of energy, demand for Bio-CNG is expected to grow at a CAGR of ~6 % in the upcoming years. • LOI: The produced 6 TPD Bio CNG will be supplied to IOCL as per the LOI issued by OMC under SATAT scheme, which is an effortless avenue for the project to generate the revenue. (<i>Ref No. - Indian Oil/SATAT/01/3589, Date: 3rd November 2023</i>). • Government Support: The project will be entitled to avail incentives of INR 4.0 Cr per 4800 kg/day for Bio CNG generation from new biogas plant, Under Waste to Energy Programme of Ministry of New and Renewable Energy. Further, Government of Uttar Pradesh is providing the subsidy of INR 75 lac / Ton under the provision of UP Bio Energy Policy 2022 and project is eligible for 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 INR 1500 / Ton to CBG Plants • Technology: The proposed plant will be commissioned with Mapro - Sequential Gas Mixing Technology (Italian), which is a proven technology empirically.
WEAKNESSES	<ul style="list-style-type: none"> • CAPEX: The proposed Bio CNG plant would be set up by a high initial investment, in which ~65% capital would be required for land, building and plant & machinery only. • 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	<ul style="list-style-type: none"> • Increasing Alternate fuel's Demand: As the transportation industry is expanding, there will be an organic demand for Bio CNG/CBG as an alternate fuel due to mandatory blending of compressed biogas (CBG) in compressed natural gas (CNG) for transportation. • Expansion Potential: The Company is having the plan to expand its business in future for manufacturing Bio Coal and Bio Pellets. • Government Support: The project can benefit from government initiatives and policies aimed at promoting the Bio CNG production to achieve Net Zero target by 2070.
THREATS	<ul style="list-style-type: none"> • Fluctuating Raw Material Prices: With the increasing demand of sugarcane press mud, the prices are shooting up rapidly. • Economic Factors: Profitability of the project may hamper due to any blockage of feed stock. • Dependency on LOI: Any breach of the LOI agreement with OMC, the company may require to search the new approach to sell its production in the market. • Manufacturing Experience: Promoters are having experience of different industries, however entering into Bio CNG generating business may explore new multidimensional challenges. • Farmers Awareness: Increasing awareness of Bio Fertilizer in Farmers and Marketing of Organic Fertilizer can adversely affect the projected revenue of the company expected to generate from by-products.

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 42.65 Crore as shown in the below table along with Means of finance:

Total Project Cost		
S. No.	Capital Cost Head	Amount (INR Crore)
1.	Land Cost	4.34
2.	Building & Civil Works	8.11
3.	Plant & Machinery	17.52
4.	Electricity Infrastructure	2.79
5.	Vehicles	0.16
6.	Office equipment	0.10
7.	Interest During Construction (IDC)	2.42
	Sub Total	35.43
8.	Preliminary & Preoperative	2.40
9.	Contingencies at ~4% of Total Project Cost	0.57
	Sub Total	38.40
10.	Working Capital Margin @ 25% of WC Gap	0.54
	Grand Total (TPC)	38.93

Source: Data/Information provided by the company.

Means of Finance		
S. No.	Particular	Amount (INR Crore)
1.	Equity	11.68
2.	Term Loan from Bank	27.25
	Total	38.93
	CC Loan	1.50

Source: Data/Information provided by the company.

Notes:

- It is to be noted that the detailed vetting of the project cost is out of scope of this TEV report and we have relied upon the data/information provided by the client regarding Total Project

- cost in good faith, however as a TEV consultant we have cross verified the cost of the major components of TPC independently wherever required for the purpose of TEV only.
2. As per the sale deed executed on 19th June 2024, promoters of the Company has purchased a 5.048 Acre (2.043 Hectare) agricultural land at Khata No, 208, 42, 226 Khasra No. 161/1, 160, 157 Village- Reda Harsana, Tehsil - Un, District- Shamli U.P 247778. Total cost of the land would be INR ~4.34 Crore including INR 10 lakhs for Change of land use (CLU) and other charges.
 3. The estimated cost of the Building & Civil works is ~INR 810.69 lakhs including applicable GST and 10% EPC consultant cost as per the signed agreement. Cost of the Building & Civil works has been considered on the basis of shared details/EPC contract provided to us by the client. As a TEV consultant we have checked major unit cost considered in EPC contract which we found in permissible range.
 4. As per shared EPC contract provided by the client, the estimated cost for plant & machinery will be ~INR 1713.76 lakhs including applicable GST and 10% EPC fees. ~45% of TPC is the cost Plant & Machinery. The estimated cost of the Plant & Machinery has been provided to us by the client as per EPC agreement. However, as a TEV consultant, the cost of major plant & machinery has been verified by us independently, which we found reasonable & in the permissible range although the cost may change as per specifications & brand.
 5. The cost of Electrical, Instrumentation, PLC, data collection is INR 279.20 lakhs including GST & 10% EPC fess. Tentative cost of Off-site Facilities and office equipment is INR 63.51 lakhs including applicable GST. We found that the costs are in the line with prevailing market standard.
 6. As per the data/information provided by the client, applicable Interest during Construction (IDC) is 11.50%. Thus the company is required to pay INR 2.66 Crore as IDC from September 2024 to September 2025 (13 months) as per the proposed Loan repayment schedule.
 7. Preliminary & Pre-Operative Expenses has been considered based on the estimate of company's resources involvement as INR 2.40 Crore. However, Company did not provide us any invoices/bills against these tentative costs considered. We recommend that the bank/financial institutions advice the company to submit actual cost based on the final quotations/invoices/bills. This will help validate the assertion of different costs considered by the client.
 8. Contingency cost of INR 0.57 Crore has been considered based on general assumption and professional experience (~2 of Hard Cost of the Project).
 9. The project is proposed to be funded through a term loan of INR 27.25 crores and promoter's Equity of INR 11.68 crores. Further, as per the working capital assessment, the working

capital will require as INR 2.0.6 Crore, which will be funded through WC loan of INR 1.50 Cr.
and promoter's margin of INR 0.52 (~25% of required WC).

PART K

PROJECT IMPLEMENTATION SCHEDULE

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

S. No.	Particulars	Activity	Expected completion date	Status
1.	Land	Land Procurement	19 th June 2024	CLU is pending
		Land Development	31 st October 2024	Scheduled
2.	Sanction of Rupee Term Loan	Sanction of Rupee Term Loan	31 st August 2024	Scheduled
3.	Building & Civil Works	Appointment of Architect	July 2023	Completed
		Building/Layout Plan Preparation	9 th May 2023	Completed
		Building Plan Sanction	1 st September 2024	Scheduled
		Appointment of Civil contractor/ developer	31 st August 2024	Scheduled
		Building & Civil Works completion	31 st December, 2024	Scheduled
4.	Plant & Machinery	Finalization of P&M suppliers	1 st September 2024	Scheduled
		Orders to P&M suppliers	October, 2024	Scheduled
		Arrival of P&M	March, 2025	Scheduled
		Installation of P&M	June, 2025	Scheduled
		Utility Installation	August, 2025	Scheduled

5.	Statutory Approvals, registrations & NOCs	From the respective authorities	1 st September, 2025	Pending except the approval obtained as per "Section L"
6.	Finishing & Trail Run	Informed by client	20 th September, 2025	Scheduled
7.	Commercial Operation Date	Informed by client	1 st October 2025	Scheduled

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 October 2025.

PART L

STATUTORY APPROVALS | LICENCES | NOC

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

S. No.	REQUIRED APPROVALS	DATE REFERENCE NO.	STATUS (Approved/ Applied For/ Pending)
1.	Certificate of Incorporation <i>Ministry of Corporate Affairs, Government of India</i>	4 th August 2022 CIN: U15490PB2022PTC056613	Approved
2.	Land conversion to Industrial/Non agriculture <i>Sub Divisional Magistrate, UN, Shamli, U.P.</i>	-	Pending
3.	NOC from Gram Panchayat <i>Gram Panchayat Harsana, UN, Shamli, Uttar Pradesh</i>	25 th October 2023	Approved
4.	Labour Licence Registration & grant of license under The Factories Act, 1948 <i>Labour Department, Government of Uttar Pradesh</i>	-	Pending
5.	Building and civil works Plan Sanction Approval <i>Concerned local development authority</i>	-	Pending
6.	Pre-establishment fire NOC <i>Fire and Emergency Services, Government Of Uttar Pradesh</i>	-	Apply in due course
7.	Fire NOC (on completion) <i>Fire and Emergency Services, Government Of Uttar Pradesh</i>	-	Will be Applied post C.O.D

8.	New HT line - non domestic /industrial Power Connection <i>Uttar Pradesh Power Corporation Limited</i>	-	Pending
9.	Consent to Establish under Air (Prevention and Control of Pollution) Act, 1981 & Water (Prevention and Control of Pollution) Act, 1974 <i>Uttar Pradesh Pollution Control Board</i>	21 st October 2023 193603/UPPCB/Circle3(UP PCBHO)/CTE/SHAMLI/2023	Approved
10.	No Objection Certificate (NOC) for ground water abstraction <i>Ground water department (Namami Gange & Rural Water supply department), Ministry of Jal Shakti, Government of Uttara Pradesh</i>	13th November 2023 (Application Number: SHML1123NIN0034)	Applied
11.	Petroleum & Explosives Safety Organisation (PESO) <i>Ministry of Commerce & Industry, Government of India</i>	28 th November 2023 Prior Approval No : A/G/HO/UP/05/623 &A/G/HO/UP/06/602 (G124605)	Approved

Observation Note:

- As per the data/information provided by the client, application of No Objection Certificate (NOC) for ground water abstraction was submitted on 13th November 2023 (*Application Number: SHML1123NIN0034*).
- Consent to establish is valid from 21st Oct, 2023 to 20th Oct 2028 (*Ref. No. - 193603/UPPCB/Circle3(UPPCBHO)/CTE/SHAMLI/2023*)
- 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

PROJECT'S FINANCIAL FEASIBILITY

1. PROJECTIONS OF THE PROJECT:

The financial projections of the proposed Solar power project are prepared from FY 2026 (3 months) to FY 2051 based on the expected COD and loan tenure as per the best practice in industry to assess the financial feasibility of the project:

A. PROJECTED PROFIT & LOSS ACCOUNT:

(INR Crore)

Year Ending	31- Mar-26	31- Mar-27	31- Mar-28	31- Mar-29	31- Mar-30	31- Mar-31	31- Mar-32	31- Mar-33	31- Mar-34	31- Mar-35	31- Mar-36	31- Mar-37	31- Mar-38
<i>Year Counter</i>	1	2	3	4	5	6	7	8	9	10	11	12	13
<i>Months Counter</i>	3	12	12	12	12	12	12	12	12	12	12	12	12
<i>Number of day</i>	90	365	366	365	365	365	366	365	365	365	366	365	365
<i>Number of Hours per day</i>	24	24	24	24	24	24	24	24	24	24	24	24	24
<u>Revenue</u>													
Revenue	33.32	135.12	136.13	137.78	139.83	141.92	144.43	146.18	148.35	150.56	153.23	155.09	157.40
<u>Operating Expenses</u>													
O & M Expenses	0.67	2.73	2.87	3.01	3.16	3.32	3.49	3.66	3.84	4.03	4.25	4.45	4.67
Lease Rentals for land	0.26	1.07	1.07	1.12	1.12	1.12	1.18	1.18	1.18	1.23	1.24	1.23	1.30
Insurance Expenses	0.18	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Banking charges+ Transmission	10.54	42.75	44.33	43.99	43.77	43.55	43.45	45.27	45.05	44.82	44.72	44.37	46.36

TECHNO-ECONOMIC VIABILITY REPORT

91 MW DC [70 MW AC] SOLAR POWER PLANT

Charges +Fixed demand Charges													
Depreciation & Amortization	2.61	10.60	10.63	10.60	10.60	10.60	10.63	10.60	10.60	10.60	10.63	10.60	10.60
Total operating expenses	14.27	57.87	59.64	59.45	59.38	59.32	59.49	61.44	61.39	61.42	61.57	61.39	63.66
Preliminary Expenses written off	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Expenses	14.27	57.87	59.64	59.45	59.38	59.32	59.49	61.44	61.39	61.42	61.57	61.39	63.66
EBIT	19.05	77.25	76.49	78.33	80.45	82.60	84.94	84.74	86.96	89.15	91.66	93.70	93.74
Interest expenses													
Interest on term loan	6.96	27.48	26.78	26.09	25.39	24.35	22.96	21.56	20.17	18.78	17.39	16.00	14.61
Profit before Taxes (PBT)	12.09	49.77	49.71	52.24	55.06	58.25	61.98	63.17	66.79	70.36	74.27	77.70	79.13
Tax	2.07	8.54	8.53	8.96	9.45	10.00	10.64	10.84	11.46	12.07	12.74	15.07	23.38
Profit after Taxes (PAT)	10.02	41.23	41.18	43.28	45.61	48.25	51.35	52.33	55.33	58.29	61.53	62.63	55.75

(Continued)

Year Ending (INR Crore)	31-Mar-39	31-Mar-40	31-Mar-41	31-Mar-42	31-Mar-43	31-Mar-44	31-Mar-45	31-Mar-46	31-Mar-47	31-Mar-48	31-Mar-49	31-Mar-50	31-Mar-51
Year Counter	14	15	16	17	18	19	20	21	22	23	24	25	26
Months Counter	12	12	12	12	12	12	12	12	12	12	12	12	12
Number of day	365	366	365	365	365	366	365	365	365	366	365	365	365
Number of Hours per day	24	24	24	24	24	24	24	24	24	24	24	24	24

TECHNO-ECONOMIC VIABILITY REPORT

91 MW DC [70 MW AC] SOLAR POWER PLANT

Revenue													
Revenue	159.74	162.57	164.54	166.99	169.48	172.47	174.56	177.17	179.81	182.98	185.20	187.96	190.76
Operating Expenses													
O & M Expenses	4.90	5.16	5.41	5.68	5.96	6.27	6.57	6.90	7.24	7.63	7.99	8.39	8.80
Lease Rentals for land	1.30	1.30	1.36	1.36	1.36	1.43	1.43	1.43	1.50	1.50	1.50	1.58	1.58
Insurance Expenses	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Banking charges+ Transmission Charges +Fixed demand Charges	46.13	46.02	45.67	45.44	47.47	47.37	47.00	46.77	46.53	48.75	48.37	48.13	47.89
Depreciation & Amortization	10.60	10.63	10.60	10.60	10.60	10.63	10.60	10.60	10.60	10.63	10.60	10.60	10.60
Total operating expenses	63.66	63.85	63.76	63.81	66.12	66.43	66.33	66.42	66.60	69.24	69.19	69.42	69.60
Preliminary Expenses written off	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Expenses	63.66	63.85	63.76	63.81	66.12	66.43	66.33	66.42	66.60	69.24	69.19	69.42	69.60
EBIT	96.08	98.72	100.77	103.18	103.35	106.04	108.24	110.74	113.20	113.75	116.02	118.54	121.17
Interest expenses													
Interest on term loan	13.22	11.83	10.43	9.04	7.30	5.22	3.13	1.04	0.00	0.00	0.00	0.00	0.00
Profit before Taxes (PBT)	82.87	86.89	90.34	94.14	96.05	100.82	105.11	109.70	113.20	113.75	116.02	118.54	121.17
Tax	24.88	26.41	27.71	29.07	29.84	31.42	32.81	34.28	35.42	35.68	36.41	37.22	38.04
Profit after Taxes (PAT)	57.98	60.48	62.63	65.07	66.21	69.41	72.29	75.42	77.78	78.07	79.60	81.33	83.13

B. PROFORMA BALANCE SHEET:

Below table shows the Projected Balance Sheet of the proposed solar power project from the period FY 2025 to FY 2051. From 1st December 2024 to 31st December 2025 would be the implementation period of the project:

(INR Crore)

Year Ending	31- Mar-25	31- Dec-25	31- Mar-26	31- Mar-27	31- Mar-28	31- Mar-29	31- Mar-30	31- Mar-31	31- Mar-32	31- Mar-33	31- Mar-34	31- Mar-35	31- Mar-36	31- Mar-37
Year Counter	0	0	1	2	3	4	5	6	7	8	9	10	11	12
Months Counter	4	9	3	12	12	12	12	12	12	12	12	12	12	12
Liabilities														
Equity	97.63	97.63	97.63	97.63	97.63	97.63	97.63	97.63	97.63	97.63	97.63	97.63	97.63	97.63
Reserve & Surplus	0.00	0.00	10.02	51.25	92.43	135.70	181.32	229.57	280.92	333.25	388.58	446.87	508.39	571.02
Secured Loan	87.87	292.90	285.58	278.25	270.93	263.61	248.96	234.32	219.67	205.03	190.38	175.74	161.09	146.45
Current Liabilities														
Short term liabilities	0.00	0.00	7.32	7.32	7.32	7.32	14.64	14.64	14.64	14.64	14.64	14.64	14.64	14.64
Total	185.50	390.53	400.55	434.45	468.31	504.27	542.56	576.17	612.87	650.56	691.24	734.88	781.76	829.75
Assets														
Plant & Machinery	185.50	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53
Total Gross Block	185.50	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53
Depreciation			2.61	13.21	23.84	34.44	45.04	55.64	66.27	76.87	87.47	98.07	108.70	119.30
Net Block	185.50	390.53	387.92	377.32	366.69	356.09	345.49	334.89	324.26	313.66	303.06	292.46	281.83	271.23

TECHNO-ECONOMIC VIABILITY REPORT

91 MW DC [70 MW AC] SOLAR POWER PLANT

Total Non-Current Assets	185.50	390.53	387.92	377.32	366.69	356.09	345.49	334.89	324.26	313.66	303.06	292.46	281.83	271.23
Current Assets														
Cash & Cash Equivalent	0.00	0.00	12.63	57.14	101.62	148.18	197.07	241.28	288.61	336.90	388.18	442.42	499.93	558.52
Total Current Assets	0.00	0.00	12.63	57.14	101.62	148.18	197.07	241.28	288.61	336.90	388.18	442.42	499.93	558.52
TOTAL	185.50	390.53	400.55	434.45	468.31	504.27	542.56	576.17	612.87	650.56	691.24	734.88	781.76	829.75

(Continued)

Year Ending	31-Mar-38	31-Mar-39	31-Mar-40	31-Mar-41	31-Mar-42	31-Mar-43	31-Mar-44	31-Mar-45	31-Mar-46	31-Mar-47	31-Mar-48	31-Mar-49	31-Mar-50	31-Mar-51
Year Counter	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Months Counter	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Liabilities														
Equity	97.63	97.63	97.63	97.63	97.63	97.63	97.63	97.63	97.63	97.63	97.63	97.63	97.63	97.63
Reserve & Surplus	626.77	684.75	745.23	807.86	872.93	939.14	1008.5	1080.8	1156.2	1234.0	1312.1	1391.7	1473.0	1556.1
Secured Loan	131.80	117.16	102.51	87.87	65.90	43.93	21.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Current Liabilities														
Short term liabilities	14.64	14.64	14.64	14.64	21.97	21.97	21.97	21.97	0.00	0.00	0.00	0.00	0.00	0.00
Total	870.85	914.19	960.02	1008.0	1058.4	1102.6	1150.1	1200.4	1253.8	1331.6	1409.7	1489.3	1570.6	1653.8
Assets														

TECHNO-ECONOMIC VIABILITY REPORT

91 MW DC [70 MW AC] SOLAR POWER PLANT

Plant & Machinery	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53
Total Gross Block	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53
Depreciation	129.90	140.50	151.13	161.73	172.33	182.93	193.56	204.16	214.76	225.36	235.99	246.59	257.19	267.79
Net Block	260.63	250.03	239.40	228.80	218.20	207.60	196.97	186.37	175.77	165.17	154.54	143.94	133.34	122.74
Total Non-Current Assets	260.63	250.03	239.40	228.80	218.20	207.60	196.97	186.37	175.77	165.17	154.54	143.94	133.34	122.74
Current Assets														
Cash & Cash Equivalent	610.22	664.16	720.62	779.21	840.24	895.08	953.15	1014.0	1078.1	1166.5	1255.2	1345.4	1437.3	1531.0
Total Current Assets	610.22	664.16	720.62	779.21	840.24	895.08	953.15	1014.0	1078.1	1166.5	1255.2	1345.4	1437.3	1531.0
TOTAL	870.85	914.19	960.02	1008.0	1058.4	1102.6	1150.1	1200.4	1253.8	1331.6	1409.7	1489.3	1570.6	1653.8

C. PROJECTED CASH FLOW STATEMENT:

(INR Crore)

Year Ending	31-Mar-25	31-Dec-25	31-Mar-26	31-Mar-27	31-Mar-28	31-Mar-29	31-Mar-30	31-Mar-31	31-Mar-32	31-Mar-33	31-Mar-34	31-Mar-35	31-Mar-36	31-Mar-37
Year Counter	0	0	1	2	3	4	5	6	7	8	9	10	11	12
Months Counter	4	9	3	12	12	12	12	12	12	12	12	12	12	12
A. Source Of Fund														
Net Profit	0.00	0.00	10.02	41.23	41.18	43.28	45.61	48.25	51.35	52.33	55.33	58.29	61.53	62.63

TECHNO-ECONOMIC VIABILITY REPORT

91 MW DC [70 MW AC] SOLAR POWER PLANT

Increase in Equity / Share Capital/USL	97.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Increase in TL	87.87	205.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Depreciation	0.00	0.00	2.61	10.60	10.63	10.60	10.60	10.60	10.63	10.60	10.60	10.60	10.63	10.60
Total	185.50	205.03	12.63	51.83	51.81	53.88	56.21	58.85	61.98	62.93	65.93	68.89	72.16	73.23
B. Application Of Funds														
Capital Expenses	185.50	205.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Decrease in Term Loan	0.00	0.00	0.00	7.32	7.32	7.32	7.32	14.64	14.64	14.64	14.64	14.64	14.64	14.64
Total	185.50	205.03	0.00	7.32	7.32	7.32	7.32	14.64	14.64	14.64	14.64	14.64	14.64	14.64
Opening Balance	0.00	0.00	0.00	12.63	57.14	101.62	148.18	197.07	241.28	288.61	336.90	388.18	442.42	499.93
Net Surplus/ Deficit	0.00	0.00	12.63	44.51	44.49	46.56	48.89	44.21	47.33	48.29	51.28	54.24	57.51	58.58
Cumulative Balance	0.00	0.00	12.63	57.14	101.62	148.18	197.07	241.28	288.61	336.90	388.18	442.42	499.93	558.52

(Continued)

Year Ending	31-Mar-38	31-Mar-39	31-Mar-40	31-Mar-41	31-Mar-42	31-Mar-43	31-Mar-44	31-Mar-45	31-Mar-46	31-Mar-47	31-Mar-48	31-Mar-49	31-Mar-50	31-Mar-51
Year Counter	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Months Counter	12	12	12	12	12	12	12	12	12	12	12	12	12	12

A. Source Of Fund

TECHNO-ECONOMIC VIABILITY REPORT

91 MW DC [70 MW AC] SOLAR POWER PLANT

Net Profit	55.75	57.98	60.48	62.63	65.07	66.21	69.41	72.29	75.42	77.78	78.07	79.60	81.33	83.13
Increase in Equity / Share Capital/USL	0.00	0.00	0.00	0.00	0.00	0.00	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	0.00	0.00	0.00	0.00	0.00	0.00
Depreciation	10.60	10.60	10.63	10.60	10.60	10.60	10.63	10.60	10.60	10.60	10.63	10.60	10.60	10.60
Total	66.35	68.58	71.11	73.23	75.67	76.81	80.03	82.89	86.02	88.39	88.70	90.20	91.93	93.73
B. Application Of Funds														
Capital Expenses	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Decrease in Term Loan	14.64	14.64	14.64	14.64	14.64	21.97	21.97	21.97	21.97	0.00	0.00	0.00	0.00	0.00
Total	14.64	14.64	14.64	14.64	14.64	21.97	21.97	21.97	21.97	0.00	0.00	0.00	0.00	0.00
Opening Balance	558.52	610.22	664.16	720.62	779.21	840.24	895.08	953.15	1014.0	1078.1	1166.5	1255.2	1345.4	1437.3
Net Surplus/ Deficit	51.70	53.94	56.47	58.58	61.03	54.84	58.07	60.92	64.05	88.39	88.70	90.20	91.93	93.73
Cumulative Balance	610.22	664.16	720.62	779.21	840.24	895.08	953.15	1014.0	1078.1	1166.5	1255.2	1345.4	1437.3	1531.0

D. KEY FINANCIAL RATIO:

Year Ending	31-Mar-26	31-Mar-27	31-Mar-28	31-Mar-29	31-Mar-30	31-Mar-31	31-Mar-32	31-Mar-33	31-Mar-34	31-Mar-35	31-Mar-36	31-Mar-37	31-Mar-38
EBITDA Margin %	65.01%	65.01%	64.00%	64.54%	65.12%	65.67%	66.17%	65.22%	65.76%	66.25%	66.76%	67.25%	66.29%

TECHNO-ECONOMIC VIABILITY REPORT

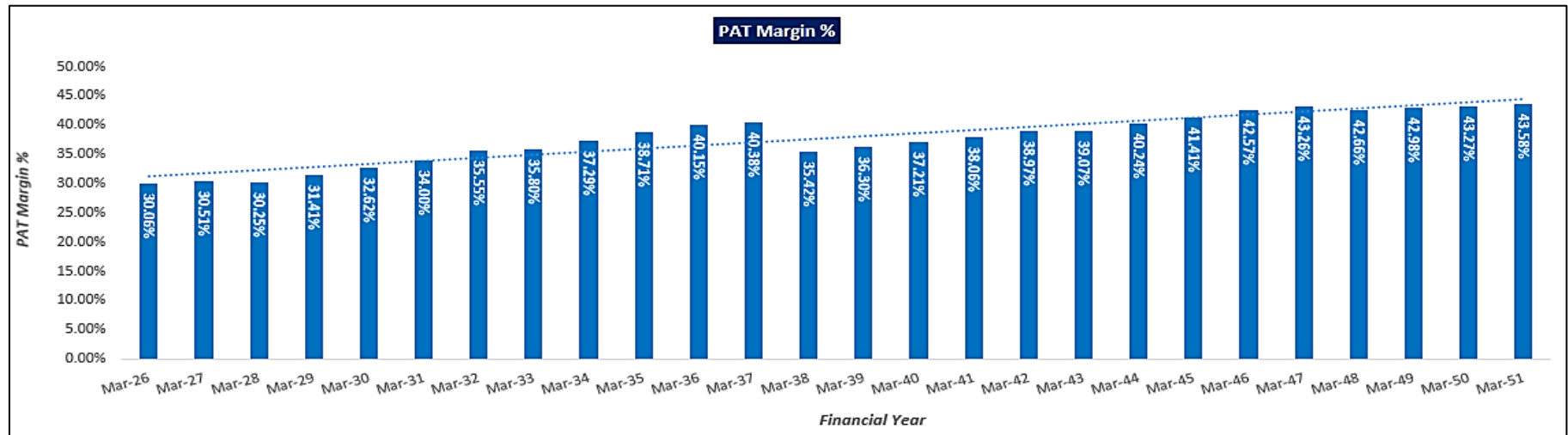
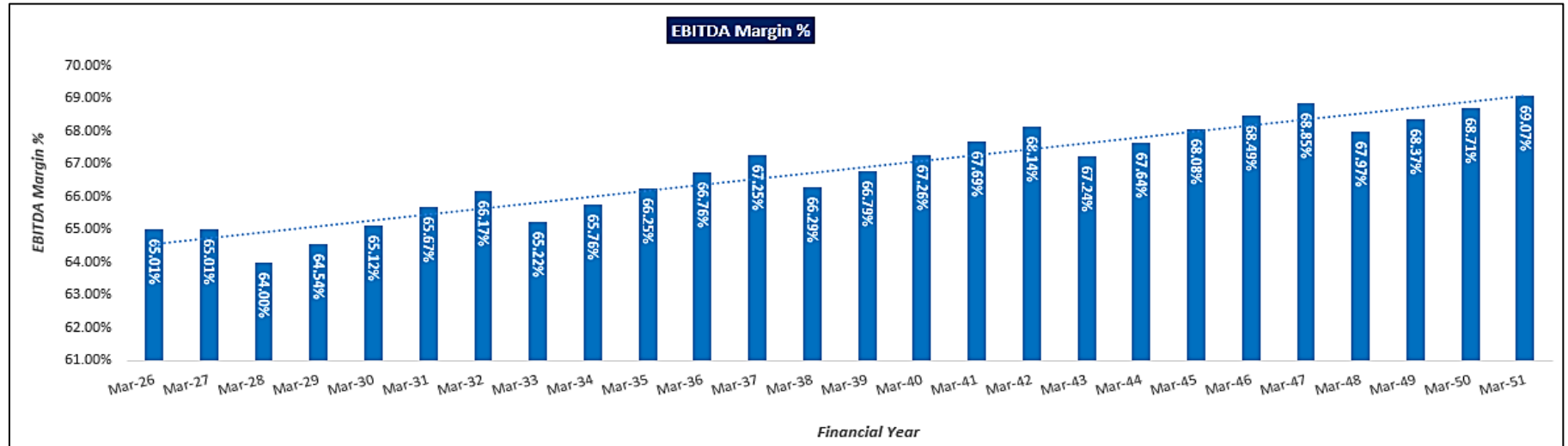
91 MW DC [70 MW AC] SOLAR POWER PLANT

Average	66.82%												
EBIT Margin %	57.17%	57.17%	56.19%	56.85%	57.53%	58.20%	58.81%	57.97%	58.62%	59.21%	59.82%	60.42%	59.56%
Average	60.11%												
PAT Margin %	30.06%	30.51%	30.25%	31.41%	32.62%	34.00%	35.55%	35.80%	37.29%	38.71%	40.15%	40.38%	35.42%
Average	37.76%												
Revenue growth rate Y-o-Y (%)		305.56%	0.75%	1.21%	1.49%	1.49%	1.77%	1.21%	1.49%	1.49%	1.77%	1.21%	1.49%
Average	13.61%												

Year Ending	31-Mar-39	31-Mar-40	31-Mar-41	31-Mar-42	31-Mar-43	31-Mar-44	31-Mar-45	31-Mar-46	31-Mar-47	31-Mar-48	31-Mar-49	31-Mar-50	31-Mar-51
EBITDA Margin %	66.79%	67.26%	67.69%	68.14%	67.24%	67.64%	68.08%	68.49%	68.85%	67.97%	68.37%	68.71%	69.07%
Average	66.82%												
EBIT Margin %	60.15%	60.73%	61.25%	61.79%	60.98%	61.48%	62.00%	62.51%	62.96%	62.16%	62.64%	63.07%	63.52%
Average	60.11%												
PAT Margin %	36.30%	37.21%	38.06%	38.97%	39.07%	40.24%	41.41%	42.57%	43.26%	42.66%	42.98%	43.27%	43.58%
Average	37.76%												
Revenue growth rate Y-o-Y (%)	1.49%	1.77%	1.21%	1.49%	1.49%	1.77%	1.21%	1.49%	1.49%	1.77%	1.21%	1.49%	1.49%
Average	13.61%												

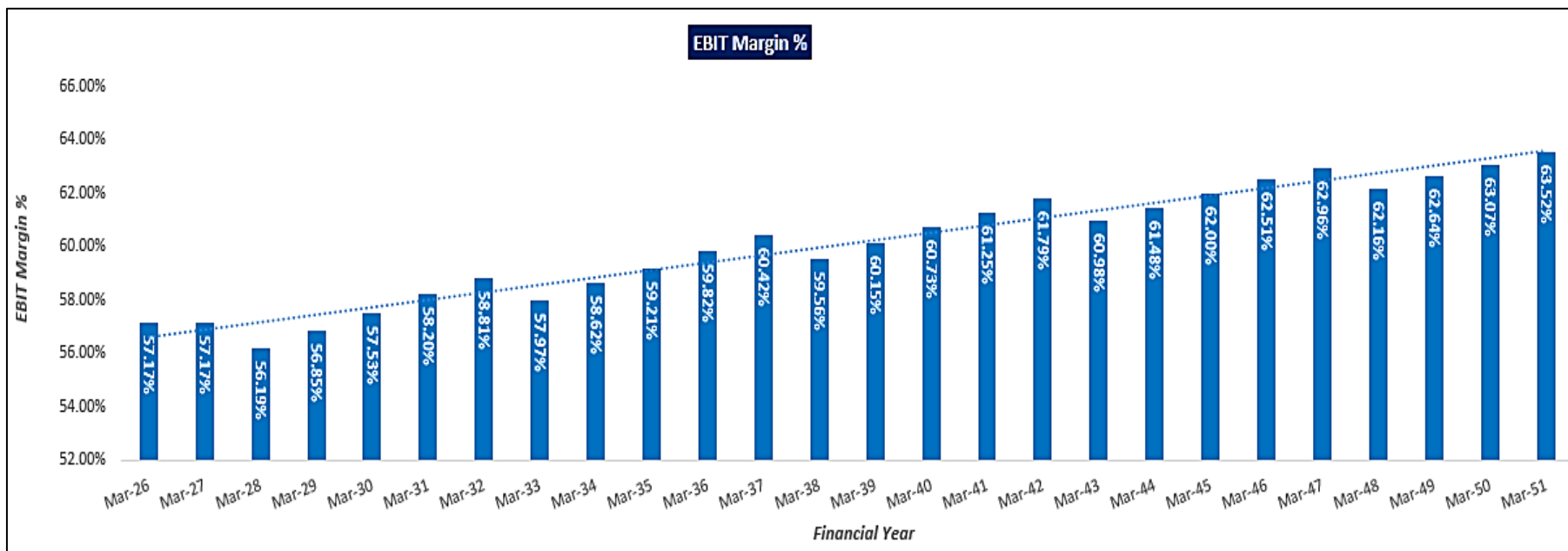
Note: The proposed solar power plant is having an average revenue growth rate of 13.61% during the forecasted period. Average EBITDA Margin & EBIT Margin of the project are 66.82% & 60.11% respectively. The project will be operational only 3 months during FY 2026 and as per the trends analysis above, PAT margin is growing from 30.06% in FY 2026 to 43.58% in FY 2051 due to the lower interest cost on borrowings in the later projected years.

E. GRAPHICAL REPRESENTATION OF KEY RATIOS:



TECHNO-ECONOMIC VIABILITY REPORT

91 MW DC [70 MW AC] SOLAR POWER PLANT



F. ESTIMATED KEY FINANCIAL METRICS:

DEBT SERVICE COVERAGE RATIO (D.S.C.R)

(INR Crore except DSCR)

Year Ending	31- Mar-26	31- Mar-27	31- Mar-28	31- Mar-29	31- Mar-30	31- Mar-31	31- Mar-32	31- Mar-33	31- Mar-34	31- Mar-35	31- Mar-36	31- Mar-37	31- Mar-38
Year Counter	1	2	3	4	5	6	7	8	9	10	11	12	13
Months Counter	3	12	12	12	12	12	12	12	12	12	12	12	12
Cash accrual	12.63	51.83	51.81	53.88	56.21	58.85	61.98	62.93	65.93	68.89	72.16	73.23	66.35
Interest on term loan	6.96	27.48	26.78	26.09	25.39	24.35	22.96	21.56	20.17	18.78	17.39	16.00	14.61

TECHNO-ECONOMIC VIABILITY REPORT

91 MW DC [70 MW AC] SOLAR POWER PLANT

Subtotal	19.59	79.31	78.59	79.96	81.60	83.20	84.93	84.50	86.10	87.67	89.55	89.23	80.96
Interest on term loan	6.96	27.48	26.78	26.09	25.39	24.35	22.96	21.56	20.17	18.78	17.39	16.00	14.61
Loan Repayment	0.00	7.32	7.32	7.32	7.32	14.64	14.64	14.64	14.64	14.64	14.64	14.64	14.64
Subtotal	6.96	34.80	34.10	33.41	32.71	38.99	37.60	36.21	34.82	33.43	32.04	30.64	29.25
DSCR	2.82	2.28	2.30	2.39	2.49	2.13	2.26	2.33	2.47	2.62	2.80	2.91	2.77

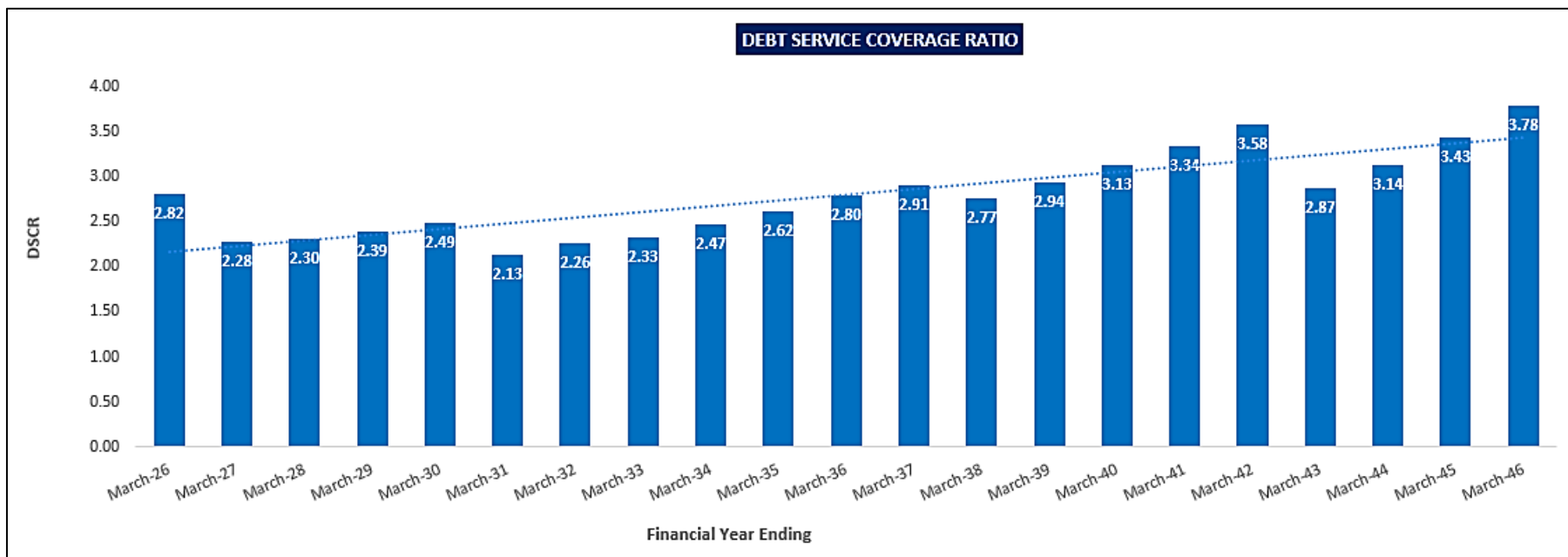
(Continue)

Year Ending	31- Mar-39	31- Mar-40	31- Mar-41	31- Mar-42	31- Mar-43	31- Mar-44	31- Mar-45	31- Mar-46	31- Mar-47	31- Mar-48	31- Mar-49	31- Mar-50	31- Mar-51
Year Counter	14	15	16	17	18	19	20	21	22	23	24	25	26
Months Counter	12	12	12	12	12	12	12	12	12	12	12	12	12
Cash accrual	68.58	71.11	73.23	75.67	76.81	80.03	82.89	86.02	88.39	88.70	90.20	91.93	93.73
Interest on term loan	13.22	11.83	10.43	9.04	7.30	5.22	3.13	1.04	0.00	0.00	0.00	0.00	0.00
Subtotal	81.80	82.94	83.66	84.71	84.11	85.25	86.02	87.06	88.39	88.70	90.20	91.93	93.73
Interest on term loan	13.22	11.83	10.43	9.04	7.30	5.22	3.13	1.04	0.00	0.00	0.00	0.00	0.00
Loan Repayment	14.64	14.64	14.64	14.64	21.97	21.97	21.97	21.97	0.00	0.00	0.00	0.00	0.00
Subtotal	27.86	26.47	25.08	23.69	29.27	27.18	25.10	23.01	0.00	0.00	0.00	0.00	0.00
DSCR	2.94	3.13	3.34	3.58	2.87	3.14	3.43	3.78					
Average D.S.C.R	2.80												
Max. D.S.C.R	3.78												

Note: D.S.C.R has been calculated for loan repayment period from FY 2026 to FY 2046.

TECHNO-ECONOMIC VIABILITY REPORT

91 MW DC [70 MW AC] SOLAR POWER PLANT



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

(INR Crore)

Year Ending	31- Mar-25	31- Dec-25	31- Mar-26	31- Mar-27	31- Mar-28	31- Mar-29	31- Mar-30	31- Mar-31	31- Mar-32	31- Mar-33	31- Mar-34	31- Mar-35	31- Mar-36	31- Mar-37
<i>Year Counter</i>	0	0	1	2	3	4	5	6	7	8	9	10	11	12
<i>Months Counter</i>	4	9	3	12	12	12	12	12	12	12	12	12	12	12
EBIT	0.00	0.00	19.05	77.25	76.49	78.33	80.45	82.60	84.94	84.74	86.96	89.15	91.66	93.70
Less: Taxes	0.00	0.00	2.07	8.54	8.53	8.96	9.45	10.00	10.64	10.84	11.46	12.07	12.74	15.07
Add: Dep.	0.00	0.00	2.61	10.60	10.63	10.60	10.60	10.60	10.63	10.60	10.60	10.60	10.63	10.60

TECHNO-ECONOMIC VIABILITY REPORT

91 MW DC [70 MW AC] SOLAR POWER PLANT

Amortisation														
NOPAT	0.00	0.00	19.59	79.31	78.59	79.96	81.60	83.20	84.93	84.50	86.10	87.67	89.55	89.23
Capex	185.50	205.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Free Cash Flow to Firm	-185.50	-205.03	19.59	79.31	78.59	79.96	81.60	83.20	84.93	84.50	86.10	87.67	89.55	89.23
Discount Period	0.33	1.08	1.33	2.33	3.33	4.33	5.33	6.33	7.33	8.33	9.33	10.33	11.33	12.33
Discount Factor	0.97	0.90	0.88	0.80	0.72	0.65	0.59	0.54	0.49	0.44	0.40	0.36	0.33	0.30
PV of FCFF	-179.54	-184.38	17.19	63.10	56.70	52.30	48.39	44.74	41.41	37.35	34.51	31.86	29.50	26.65
Terminal Value														
PV of TV														
FCFF+TV	-185.50	-205.03	19.59	79.31	78.59	79.96	81.60	83.20	84.93	84.50	86.10	87.67	89.55	89.23
PV of FCF+ PV of TV	-179.54	-184.38	17.19	63.10	56.70	52.30	48.39	44.74	41.41	37.35	34.51	31.86	29.50	26.65

(Continue)

Year Ending	31-Mar-38	31-Mar-39	31-Mar-40	31-Mar-41	31-Mar-42	31-Mar-43	31-Mar-44	31-Mar-45	31-Mar-46	31-Mar-47	31-Mar-48	31-Mar-49	31-Mar-50	31-Mar-51
Year Counter	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Months Counter	12	12	12	12	12	12	12	12	12	12	12	12	12	12
EBIT	93.74	96.08	98.72	100.77	103.18	103.35	106.04	108.24	110.74	113.20	113.75	116.02	118.54	121.17
Less: Taxes	23.38	24.88	26.41	27.71	29.07	29.84	31.42	32.81	34.28	35.42	35.68	36.41	37.22	38.04
Add: Dep.	10.60	10.60	10.63	10.60	10.60	10.60	10.63	10.60	10.60	10.60	10.63	10.60	10.60	10.60

TECHNO-ECONOMIC VIABILITY REPORT

91 MW DC [70 MW AC] SOLAR POWER PLANT

Amortisation														
NOPAT	80.96	81.80	82.94	83.66	84.71	84.11	85.25	86.02	87.06	88.39	88.70	90.20	91.93	93.73
Capex	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Free Cash Flow to Firm	80.96	81.80	82.94	83.66	84.71	84.11	85.25	86.02	87.06	88.39	88.70	90.20	91.93	93.73
Discount Period	13.33	14.33	15.33	16.33	17.33	18.33	19.33	20.33	21.33	22.33	23.33	24.33	25.33	26.33
Discount Factor	0.27	0.25	0.22	0.20	0.18	0.17	0.15	0.14	0.12	0.11	0.10	0.09	0.08	0.08
PV of FCFF	21.93	20.09	18.47	16.89	15.51	13.96	12.83	11.74	10.77	9.91	9.02	8.32	7.68	7.10
Terminal Value														1018.7
PV of TV														77.21
FCFF+TV	80.96	81.80	82.94	83.66	84.71	84.11	85.25	86.02	87.06	88.39	88.70	90.20	91.93	1112.4
PV of FCF+ PV of TV	21.93	20.09	18.47	16.89	15.51	13.96	12.83	11.74	10.77	9.91	9.02	8.32	7.68	84.31
NPV	INR 381.17 Crore													
IRR	17.62%													

Key Input for NPV & IRR		
S. No.	Key Input	Description
1.	Weight of Debt Wd	75%
2.	Cost of Debt Kd	9.50%
3.	Tax	29.12%
4.	Post tax Kd	6.73%
5.	Weight of Equity We	25%

TECHNO-ECONOMIC VIABILITY REPORT

91 MW DC [70 MW AC] SOLAR POWER PLANT

6.	Cost of Equity Ke	14.97% (https://kunaldesai.blog/nifty-50-cagr-last-20-years/)
7.	Project Risk premium	1.50%
8.	Discount rate	10.29%
9.	Expected growth rate(Terminal)	1.00%

Payback Period of the Project		
Financial Year	Cash Accrual	Accumulated Cash Accrual
31-Mar-26	12.63	12.63
31-Mar-27	51.83	64.46
31-Mar-28	51.81	116.27
31-Mar-29	53.88	170.15
31-Mar-30	56.21	226.36
31-Mar-31	58.85	285.21
31-Mar-32	61.98	347.19
31-Mar-33	62.93	410.12
31-Mar-34	65.93	476.05
31-Mar-35	68.89	544.94
31-Mar-36	72.16	617.09
31-Mar-37	73.23	690.32
31-Mar-38	66.35	756.67
31-Mar-39	68.58	825.25
31-Mar-40	71.11	896.36
31-Mar-41	73.23	969.59
31-Mar-42	75.67	1045.26
31-Mar-43	76.81	1122.07
31-Mar-44	80.03	1202.11
31-Mar-45	82.89	1285.00

TECHNO-ECONOMIC VIABILITY REPORT

91 MW DC [70 MW AC] SOLAR POWER PLANT

31-Mar-46	86.02	1371.02
31-Mar-47	88.39	1459.40
31-Mar-48	88.70	1548.10
31-Mar-49	90.20	1638.30
31-Mar-50	91.93	1730.23
31-Mar-51	93.73	1823.96
Total	1823.96	
Total Project Cost	INR 390.53 Crore	
Payback Period	6.94 Years	

Thus, the project will be having a payback period of **6.94 years** and NPV & IRR of the project is **INR 381.17 Crore & 17.62%** respectively from C.O.D to loan repayment period, which indicates worthiness of the project.

H. SENSITIVITY ANALYSIS:

Sensitivity analysis of the project with respect to 5% & 10% decrease in the revenue, 5% & 10% increase in the operating cost and 1% increment in the proposed interest rate has been shown in the below table:

Sensitivity Analysis of D.S.CR, NPV & IRR				
S. No.	Particular	Average D.S.C.R	NPV	IRR
1.	As a base case	2.80	INR 381.17 Cr.	17.62%
2.	If the projected revenue decreased by 5%	2.60	INR 329.04 Cr.	16.23%
3.	If the projected revenue decreased by 10%	2.42	INR 280.80 Cr.	15.71%
4.	If the projected operating cost increased by 5%	2.72	INR 359.81 Cr.	17.21%
5.	If the projected operating cost increased by 10%	2.64	INR 338.73 Cr.	16.80%

6.	If interest rate is increased by 1%	2.66	INR 341.20 Cr.	17.61%
----	-------------------------------------	------	----------------	--------

Observation: The proposed project is found comparatively higher sensitive with respect to the downside variation in the projected revenue, than the upside variation in the projected operational and any surge in the interest rate.

I. OTHER FINANCIAL RATIOS:

Year Ending	31- Mar-26	31- Mar-27	31- Mar-28	31- Mar-29	31- Mar-30	31- Mar-31	31- Mar-32	31- Mar-33	31- Mar-34	31- Mar-35	31- Mar-36	31- Mar-37	31- Mar-38
Revenue growth rate Y-o-Y (%)	0.00%	305.56 %	0.75%	1.21%	1.49%	1.49%	1.77%	1.21%	1.49%	1.49%	1.77%	1.21%	1.49%
Return on Capital employed (%)	4.84%	18.09%	16.59%	15.76%	15.24%	14.71%	14.20%	13.33%	12.85%	12.38%	11.95%	11.50%	10.95%
Return on Investment (%)	10.26%	42.23%	42.18%	44.33%	46.72%	49.42%	52.59%	53.60%	56.67%	59.70%	63.02%	64.15%	57.10%
Return on Net Worth	9.30%	27.69%	21.67%	18.55%	16.35%	14.75%	13.56%	12.15%	11.38%	10.71%	10.15%	9.37%	7.70%
DSCR	2.82	2.28	2.30	2.39	2.49	2.13	2.26	2.33	2.47	2.62	2.80	2.91	2.77
Fixed Asset Coverage Ratio	1.36	1.36	1.35	1.35	1.39	1.43	1.48	1.53	1.59	1.66	1.75	1.85	1.98
TOL/TNW	2.72	1.92	1.46	1.16	0.95	0.76	0.62	0.51	0.42	0.35	0.29	0.24	0.20
Debt to Equity Ratio	3.00	2.93	2.85	2.78	2.70	2.55	2.40	2.25	2.10	1.95	1.80	1.65	1.50

(Continue)

Year Ending	31- Mar-39	31- Mar-40	31- Mar-41	31- Mar-42	31- Mar-43	31- Mar-44	31- Mar-45	31- Mar-46	31- Mar-47	31- Mar-48	31- Mar-49	31- Mar-50	31- Mar-51
Revenue growth	1.49%	1.77%	1.21%	1.49%	1.49%	1.77%	1.21%	1.49%	1.49%	1.77%	1.21%	1.49%	1.49%

TECHNO-ECONOMIC VIABILITY REPORT

91 MW DC [70 MW AC] SOLAR POWER PLANT

rate Y-o-Y (%)													
Return on Capital employed (%)	10.68%	10.44%	10.14%	9.96%	9.56%	9.40%	9.18%	8.83%	8.50%	8.07%	7.79%	7.55%	7.33%
Return on Investment (%)	59.39%	61.95%	64.15%	66.65%	67.82%	71.09%	74.04%	77.24%	79.67%	79.96%	81.53%	83.30%	85.14%
Return on Net Worth	7.41%	7.18%	6.92%	6.70%	6.39%	6.27%	6.13%	6.01%	5.84%	5.54%	5.34%	5.18%	5.03%
DSCR	2.94	3.13	3.34	3.58	2.87	3.14	3.43	3.78	0.00	0.00	0.00	0.00	0.00
ISCR	8.07	9.25	10.67	12.58	15.60	22.36	37.96	116.29	0.00	0.00	0.00	0.00	0.00
Fixed Asset Coverage Ratio	2.13	2.34	2.60	3.31	4.73	8.97							
TOL/TNW	0.17	0.14	0.11	0.09	0.06	0.04	0.02	0.00	0.00	0.00	0.00	0.00	0.00
Debt to Equity Ratio	1.35	1.20	1.05	0.90	0.68	0.45	0.23	0.00	0.00	0.00	0.00	0.00	0.00

J. BREAK-EVEN ANALYSIS:

Year Ending	31-Mar-26	31-Mar-27	31-Mar-28	31-Mar-29	31-Mar-30	31-Mar-31	31-Mar-32	31-Mar-33	31-Mar-34	31-Mar-35	31-Mar-36	31-Mar-37	31-Mar-38
Year Counter	1	2	3	4	5	6	7	8	9	10	11	12	13
Months Counter	3	12	12	12	12	12	12	12	12	12	12	12	12
Sales	33.32	135.12	136.13	137.78	139.83	141.92	144.43	146.18	148.35	150.56	153.23	155.09	157.40
Variable Expenses	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Contribution	33.32	135.12	136.13	137.78	139.83	141.92	144.43	146.18	148.35	150.56	153.23	155.09	157.40
Fixed Expenses	1.12	4.53	4.68	4.86	5.01	5.17	5.40	5.56	5.75	6.00	6.22	6.41	6.70
Profit / PBT	32.20	130.60	131.45	132.92	134.82	136.75	139.02	140.61	142.61	144.57	147.01	148.67	150.70

TECHNO-ECONOMIC VIABILITY REPORT

91 MW DC [70 MW AC] SOLAR POWER PLANT

PV RATIO	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
BEP Sales	1.12	4.53	4.68	4.86	5.01	5.17	5.40	5.56	5.75	6.00	6.22	6.41	6.70
BEP%	3.35%	3.35%	3.43%	3.53%	3.58%	3.64%	3.74%	3.81%	3.87%	3.98%	4.06%	4.13%	4.25%

(Continue)

Year Ending	31- Mar-39	31- Mar-40	31- Mar-41	31- Mar-42	31- Mar-43	31- Mar-44	31- Mar-45	31- Mar-46	31- Mar-47	31- Mar-48	31- Mar-49	31- Mar-50	31- Mar-51
Year Counter	14	15	16	17	18	19	20	21	22	23	24	25	26
Months Counter	12	12	12	12	12	12	12	12	12	12	12	12	12
Sales	159.74	162.57	164.54	166.99	169.48	172.47	174.56	177.17	179.81	182.98	185.20	187.96	190.76
Variable Expenses	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Contribution	159.74	162.57	164.54	166.99	169.48	172.47	174.56	177.17	179.81	182.98	185.20	187.96	190.76
Fixed Expenses	6.93	7.19	7.50	7.77	8.05	8.44	8.73	9.06	9.47	9.86	10.22	10.69	11.11
Profit / PBT	152.81	155.37	157.04	159.22	161.43	164.03	165.84	168.11	170.33	173.12	174.99	177.27	179.65
PV RATIO	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
BEP Sales	6.93	7.19	7.50	7.77	8.05	8.44	8.73	9.06	9.47	9.86	10.22	10.69	11.11
BEP%	4.34%	4.42%	4.56%	4.65%	4.75%	4.89%	5.00%	5.11%	5.27%	5.39%	5.52%	5.69%	5.82%

K. TERM LOAN INPUTS:

Term Loan Repayment Inputs	
Total loan amount	INR 292.90 Crore
Rate of Interest	9.50%
1st Disbursement	Dec-24

TECHNO-ECONOMIC VIABILITY REPORT

91 MW DC [70 MW AC] SOLAR POWER PLANT

IDC Start & End Month	Dec-24 to March-26
IDC Period (construction period)	13 Month
Commencement /Operation Start	January 2026
Moratorium Start & End Month (only interest to pay)	Jan 2026 to March 2026
Moratorium Period after COD	3 Month
Repayment Start	April-26
Repayment End	March-2046
Repayment Period	20 Years

(INR Crore)

Year Ending	31- Mar-25	31- Dec-25	31- Mar-26	31- Mar-27	31- Mar-28	31- Mar-29	31- Mar-30	31- Mar-31	31- Mar-32	31- Mar-33	31- Mar-34	31- Mar-35	31- Mar-36	31- Mar-37
Year Counter	0	0	1	2	3	4	5	6	7	8	9	10	11	12
Months Counter	4	9	3	12	12	12	12	12	12	12	12	12	12	12
Opening Bal	0.00	87.87	292.90	292.90	285.58	278.25	270.93	263.61	248.96	234.32	219.67	205.03	190.38	175.74
Disbursement of loan	87.87	205.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Repayment	0.00	0.00	0.00	7.32	7.32	7.32	7.32	14.64	14.64	14.64	14.64	14.64	14.64	14.64
Closing Principal o/s	87.87	292.90	292.90	285.58	278.25	270.93	263.61	248.96	234.32	219.67	205.03	190.38	175.74	161.09
Interest	1.39	12.41	6.96	27.48	26.78	26.09	25.39	24.35	22.96	21.56	20.17	18.78	17.39	16.00
IDC	1.39	12.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TL Interest	0.00	0.00	6.96	27.48	26.78	26.09	25.39	24.35	22.96	21.56	20.17	18.78	17.39	16.00

TECHNO-ECONOMIC VIABILITY REPORT

91 MW DC [70 MW AC] SOLAR POWER PLANT

(Continue)

Year Ending	31- Mar-38	31- Mar-39	31- Mar-40	31- Mar-41	31- Mar-42	31- Mar-43	31- Mar-44	31- Mar-45	31- Mar-46	31- Mar-47	31- Mar-48	31- Mar-49	31- Mar-50	31- Mar-51
Year Counter	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Months Counter	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Opening Bal	161.09	146.45	131.80	117.16	102.51	87.87	65.90	43.93	21.97	0.00	0.00	0.00	0.00	0.00
Disbursement	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Repayment	14.64	14.64	14.64	14.64	14.64	21.97	21.97	21.97	21.97	0.00	0.00	0.00	0.00	0.00
Closing Principal o/s	146.45	131.80	117.16	102.51	87.87	65.90	43.93	21.97	0.00	0.00	0.00	0.00	0.00	0.00
Interest	14.61	13.22	11.83	10.43	9.04	7.30	5.22	3.13	1.04	0.00	0.00	0.00	0.00	0.00
IDC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TL Interest	14.61	13.22	11.83	10.43	9.04	7.30	5.22	3.13	1.04	0.00	0.00	0.00	0.00	0.00

L. DEPRECIATION SCHEDULE (STRAIGHT LINE METHOD):

Particulars (INR Crore)	Life Years	Amount	IDC & Cont. & Pre-Operative	Total Cost	SLM Rate
Plant & Machinery	25	364.91	25.62	390.53	6.33%
Total Project Cost		364.91	25.62	390.53	

(INR Crore)

Depreciation Schedule as per Company's Act, 2013													
Year Ending	31- Mar-26	31- Mar-27	31- Mar-28	31- Mar-29	31- Mar-30	31- Mar-31	31- Mar-32	31- Mar-33	31- Mar-34	31- Mar-35	31- Mar-36	31- Mar-37	31- Mar-38

TECHNO-ECONOMIC VIABILITY REPORT

91 MW DC [70 MW AC] SOLAR POWER PLANT

Plant & Machinery	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53
SLM Depreciation Plant & Machinery	2.61	10.60	10.63	10.60	10.60	10.60	10.63	10.60	10.60	10.60	10.63	10.60	10.60
Total SLM Depreciation	2.61	10.60	10.63	10.60	10.60	10.60	10.63	10.60	10.60	10.60	10.63	10.60	10.60

(Continue)

Year Ending	31- Mar-39	31- Mar-40	31- Mar-41	31- Mar-42	31- Mar-43	31- Mar-44	31- Mar-45	31- Mar-46	31- Mar-47	31- Mar-48	31- Mar-49	31- Mar-50	31- Mar-51
Plant & Machinery	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53	390.53
SLM Depreciation Plant & Machinery	10.60	10.63	10.60	10.60	10.60	10.63	10.60	10.60	10.60	10.63	10.60	10.60	10.60
Total SLM Depreciation	10.60	10.63	10.60	10.60	10.60	10.63	10.60	10.60	10.60	10.63	10.60	10.60	10.60

2. KEY ASSUMPTIONS & BASIS:

S. No.	Item	Assumptions and Basis																				
1.	General	<p>a. The projections of the firm are done for the period from FY 2026 to FY 2035, 9 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 October 2025.</p> <p>b. We have considered both Revenue & cost based model (top to bottom approach) while making the future financial projections.</p> <p>c. Revenue modelling has been done based on the quantity of the proposed production as per the letter of intent (LOI) with the OMC (IOCL) and pricing circular of Compressed Bio Gas under SATAT scheme CO/AE&SD/01 dated 20th May 2022.</p> <p>d. Expense modelling has been done based on the required resources and current market inputs such as cost, supply etc. and few expenses projected as % of sales as per the best practice of the industry.</p> <p>e. The plant is assumed to be operational for 350 days for 24 hours annually, while operation days are 182 in FY 2026 due to implementation period till September 2025.</p>																				
2.	Revenue Build up	<p>a. Company will be generating the revenue by selling 6TPD Bio-CNG to IOCL as per LOI with OMC dated 3rd Nov 2023 (Ref: IndianOil/SATAT/01/3589) and 24 TPD fermented organic solid manure/fertilizer as its by-products. Below table shows the Revenue of the company @ 100% capacity:</p> <table><tr><th colspan="4">Revenue @100% capacity</th></tr><tr><th>Products</th><th>Unit Price</th><th>Annual Quantity</th><th>Amount (INR)</th></tr><tr><td>Bio-CNG</td><td>62.86 INR/Kg</td><td>21,00,000 kg</td><td>13,20,06,000</td></tr><tr><td>Bio Fertilizer</td><td>6.00 INR/Kg</td><td>84,00,000 kg</td><td>5,04,00,000</td></tr><tr><td colspan="3">Total Revenue (INR)</td><td>18,24,06,000</td></tr></table>	Revenue @100% capacity				Products	Unit Price	Annual Quantity	Amount (INR)	Bio-CNG	62.86 INR/Kg	21,00,000 kg	13,20,06,000	Bio Fertilizer	6.00 INR/Kg	84,00,000 kg	5,04,00,000	Total Revenue (INR)			18,24,06,000
Revenue @100% capacity																						
Products	Unit Price	Annual Quantity	Amount (INR)																			
Bio-CNG	62.86 INR/Kg	21,00,000 kg	13,20,06,000																			
Bio Fertilizer	6.00 INR/Kg	84,00,000 kg	5,04,00,000																			
Total Revenue (INR)			18,24,06,000																			

		<p>b. Thus the company is expected to generate INR 18.24 Crore annual revenue. In the initial year there are 182 operating days and projected revenue of the company is 9.49 Cr. which is expected to increase up to INR 28.30 Crore till FY 2035.</p> <p>c. Revenue of the Company is expected to grow at the rate of 5% Y-o-Y basis from FY 2028, since selling price are assumed to be inflated @5% during the forecasted period.</p> <p>d. Further, Company has paid a GST of INR 3.98 Crore to commission the proposed plant, which has been adjusted as GST input from FY 2026 to FY 2030 and considered as other income for the company.</p>								
3.	Pricing (Average Price Per Unit)	<p>a. Proposed selling price per unit of CBG and by-products are shown in the below table:</p> <table><tr><th colspan="2">Selling price per unit</th></tr><tr><th>Products</th><th>Unit prices</th></tr><tr><td>Selling price of Bio-CNG</td><td>INR 62.86 per kg</td></tr><tr><td>Selling price of solid organic fertilizer</td><td>INR 7.00 per kg</td></tr></table> <p>b. Company has already signed a LOI with Indian Oil Corporation Ltd dated 3rd Nov 2023 (Ref: IndianOil/SATAT/01/3589). However signing commercial agreement between IOCL & company is in the process and Retail outlet for procurement will be allocated before C.O.D.</p> <p>c. As informed by the client, company has planned to sell its Bio CNG at two Retail Outlets of IOCL at Panipat and Yamuna Nagar in Haryana. The current retail selling price of CNG at OMC outlets in Panipat and Yamuna Nagar is around INR 80.40 per kg on 28th May 2024. (https://www.v3cars.com/haryana/cng-price-in-yamunanagar), however the procurement price of Bio-CNG at Indian Oil as per the SATAT Scheme falls under the slab of INR 62.86 per kg without GST. Kindly refer “Section F” of the report for</p>	Selling price per unit		Products	Unit prices	Selling price of Bio-CNG	INR 62.86 per kg	Selling price of solid organic fertilizer	INR 7.00 per kg
Selling price per unit										
Products	Unit prices									
Selling price of Bio-CNG	INR 62.86 per kg									
Selling price of solid organic fertilizer	INR 7.00 per kg									

		<p>detailed proposed pricing arrangements.</p> <p>d. As per the shared agreement with Chandigarh based facilitator M/s Sevozone Energies & Fertilizers Pvt Ltd (related party) for sale/handling of Bio-fertilizer produced at the proposed unit, ~ 20 TPD Bio fertilizer will be selling out at an agreed price of INR 8-10 per kg.</p> <p>e. As per the shared agreement dated 15th July 2024 with M/s Anagram Development and farmers producers Private Ltd (FPO) for sale/handling of Bio-fertilizer produced at the proposed unit, Bio fertilizer will be selling out at an agreed price of INR 6.00 per kg which is reasonable and competitive rate of the market. For reference, IPL Rohana CBG Plant is selling FOM @ INR 10 per kg in 30 kg bags at present.</p> <p>f. An escalation factor of 5% has been considered in the prices of the sellable products during the forecasted periods considering the micro and macro-economic factors.</p>
4.	Capacity Utilization	<p>a. The proposed CBG generating plant will be commissioned with a Design capacity of 14,500 M3/Day which can generate ~6 TPD Bio CNG per day, company has proposed to operate the plant at 100% of the designed capacity to generate 6000 Kg Bio-CNG per day as per letter of Intent (LOI) with Indian Oil under SATAT scheme.</p>
5.	Capital Expenditure	<p>a. As per the sale deed executed on 19th June 2024, promoters of the Company has purchased a 5.048 Acre (2.043 Hectare) agricultural land at Khata No, 208, 42, 226 Khasra No. 161/1, 160, 157 Village-Reda Harsana, Tehsil - Un, District- Shamli U.P 247778. Total cost of the land would be INR ~4.34 Crore including INR 10 lakhs for Change of land use (CLU) and other charges.</p> <p>b. The estimated cost of the Building & Civil works is ~INR 810.69 lakhs including applicable GST and 10% EPC consultant cost as per</p>

		<p>the signed agreement. Cost of the Building & Civil works has been considered on the basis of shared details/EPC contract provided to us by the client. As a TEV consultant we have checked major unit cost considered in EPC contract which we found in permissible range.</p> <p>c. As per shared EPC contract provided by the client, the estimated cost for plant & machinery will be ~INR 1713.76 lakhs including applicable GST and 10% EPC fees. ~45% of TPC is the cost Plant & Machinery. The estimated cost of the Plant & Machinery has been provided to us by the client as per EPC agreement. However, as a TEV consultant, the cost of major plant & machinery has been verified by us independently, which we found reasonable & in the permissible range although the cost may change as per specifications & brand.</p> <p>d. The cost of Electrical, Instrumentation, PLC, data collection is INR 279.20 lakhs including GST & 10% EPC fess. Tentative cost of Off-site Facilities and office equipment is INR 63.51 lakhs including applicable GST. We found that the costs are in the line with prevailing market standard.</p> <p>e. As per the data/information provided by the client, applicable Interest during Construction (IDC) is 11.50%. As per the proposed Loan repayment schedule, company is required to pay INR 2.42 Crore as IDC from September 2024 to September 2025 (13 months).</p> <p>f. Preliminary & Pre-Operative Expenses has been considered based on the estimate of company's resources involvement as INR 2.40 Crore. However, we have not recieved any invoices/bills against these tentative costs considered. We recommend that the bank/financial institutions advice the company to submit actual cost based on the final quotations/invoices/bills. This will help validate the assertion of different costs considered by the client.</p>
--	--	---

		<p>g. Contingency cost of INR 0.57 Crore has been considered based on general assumption and professional experience (~2% of hard cost).</p> <p>h. Hence, INR 6.49 Crore per ton including land, GST, transportation IDC, pre-operative and preliminary expenses etc. will be the capex for this proposed plant, which we found in the line with industrial and sectoral benchmarks.</p> <p>As per Ministry of New and Renewable energy, the approx. CAPEX of installing a 5 TPD capacity CBG plant is estimated between INR 20-25 crore and ~75 80% of the CAPEX cost is for purchasing plant machinery.</p> <p>https://cdn.cseindia.org/attachments/0.11235300_1687759489_cse---overview-and-current-status-of--cbq-in-india.pdf</p>
6.	Expenses	<p>a. As per the agreement with M/s. Anagram Development and Farmer Producer Company Limited (FPO) on 15th July 2024 shared by the client, FPO will supply 100 ton per day Agriculture Residual/Napier grass and 40-50 ton per day Sugarcane press mud. However, Sugarcane press mud supply is depending on the availability and requirement of Company.</p> <p>b. As per the agreement, rate of chopped Napier grass has been considered as INR 100 per quintals i.e. INR 1.00 per kg. Escalation of 5% is considered during forecasted period.</p> <p>c. As per information provided by the client, estimated annual consumption of the power will be 5,884 Kwh per day. Applicable tariff in Uttara Pradesh is INR 8 per Kwh. An escalation rate of 5% is assumed on it.</p> <p>d. As per the data/information provided by the client, ~28 employees will be deployed initially based on the requirement. 10% escalation rate has been considered on the salary & wages of</p>

		<p>the proposed manpower.</p> <p>e. As per informed by the client, Packaging cost of FOM is considered as INR 20 per 50 kg bag i.e. 0.40 per kg for projected period.</p> <p>f. Transportation cost has been considered as 3% of the total revenue after assessing the distance of proposed IOCL's RO from the project location. Marketing & Selling & Distribution expenses has been considered as 1.50% of the revenue.</p> <p>g. Maintenance of the plant has been considered as per the industrial trends as shown in the below table:</p> <table><tr><th colspan="2">Maintenance on Plant (% of Gross Block)</th></tr><tr><td>Civil</td><td>0.50%</td></tr><tr><td>P&M</td><td>0.50%</td></tr><tr><td>Electricity Infrastructure</td><td>0.50%</td></tr><tr><td>Vehicles</td><td>0.25%</td></tr><tr><td>Office equipment</td><td>0.25%</td></tr></table> <p>h. Plant and Administrative Overhead Expenses and Insurance Expenses are considered as 1.50% of revenue and 0.25% of net block respectively during the projected period.</p> <p>i. Other manufacturing expenses are considered as 1.50% of Revenue.</p>	Maintenance on Plant (% of Gross Block)		Civil	0.50%	P&M	0.50%	Electricity Infrastructure	0.50%	Vehicles	0.25%	Office equipment	0.25%
Maintenance on Plant (% of Gross Block)														
Civil	0.50%													
P&M	0.50%													
Electricity Infrastructure	0.50%													
Vehicles	0.25%													
Office equipment	0.25%													
7.	Term Loan	<p>a. The project is proposed to be funded through a term loan of INR 27.25 crores and promoter's margin of INR 11.67 crores.</p> <p>b. Interest rate has been considered as 11% on the term loan.</p> <p>c. Further, as per the working capital assessment, the working capital will require as INR 2.06 Crore, which will be funded through WC loan of INR 1.50 Cr. and promoter's margin of INR 52 lakhs (~25% of required WC).</p>												

Key Findings:

1. Average DSCR, EBIDTA margin, EBIT margin is 2.60, 56.60%, and 48.53% respectively during the estimated period.
2. D.S.C.R of the proposed Bio CBG plant is found highly sensitive with respect to any downside fluctuation in the projected revenue.
3. The company is having a positive NPV and IRR of INR 16.14 Crore and 26.10% respectively from C.OD to loan repayment period while it may vary with changes in the assumptions & micro and macro-economic trends considered as on date.
4. The proposed project is having a payback period of 4.49 years.
5. Based on the above key financial ratios of the proposed Project during the forecasted period shows that the project appears financially viable if the promoters of the project are able to maintain assumed capacity utilization, revenue and can contain cost as assumed above in the calculation.

PART N

CONCLUSION

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

As per financial projections for the estimated period, **Average DSCR, EBITDA Margin and EBIT Margin** of the project are **2.60, 56.60% and 48.53%** 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 **4.49 Years** in the line with sectoral trends.

The proposed Bio-CNG generating facility is having a positive **NPV and IRR** as **INR 16.14 Crore and 26.10%** respectively from C.O.D till loan repayment period as the industry is expectedly growing at a CAGR of 6.34% during the forecasted period. While it is not avoidable that the future projections may change in the upcoming years due to various factors impacting the operation, managerial, financial efficiency and economies of scale of the project.

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

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

Declaration	<p>i. The undersigned does not have any direct/indirect interest in the above property/project/Company.</p> <p>ii. The information furnished herein is true and correct to the best of our knowledge, logical and scientific assumptions.</p> <p>iii. This TEV Report is carried out by our Financial Analyst team on the request from M/s Superior Agro Ventures Private Limited.</p> <p>iv. Meeting of Financial projections will be subject to the market & economy stability factors, judicious business operations and proper & timely implementation of the project and putting proper plan for achieving high productivity, efficiency and achieving cost saving benefits to increase profitability.</p> <p>v. We have submitted TEV report to M/s Superior Agro Ventures Private Limited.</p>
Number of Pages in the Report	97
Enclosed Documents	Disclaimer & Remarks 92-95
Place	Noida
Date	25 th July 2024

FOR ON BEHALF OF M/S. R.K. ASSOCIATES VALUER & TECHNO ENGINEERING CONSULTANTS PVT. LTD.		
SURVEYED BY	PREPARED BY	REVIEWED BY
Mr. Sachin Pandey	Mr. Gaurav Kumar	Mr. Rachit Gupta

PART O

DISCLAIMER | REMARKS

1. No employee or member of R.K Associates has any direct/ indirect interest in the Project.
2. This report is prepared based on the copies of the documents/ information which the Bank/ Company has provided to us out of the standard checklist of documents sought from them and further based on our assumptions and limiting conditions. The client/owner and its management/representatives warranted to us that the information they supplied was complete, accurate and true and correct to the best of their knowledge. All such information provided to us has been relied upon in good faith and we have assumed that it is true and correct in all respect. I/We shall not be liable for any loss, damages, cost or expenses arising from fraudulent acts, misrepresentations, or wilful default on part of the owner, company, its directors, employee, representative or agents. Verification or cross checking of the documents provided to us from the originals or from any Govt. departments/ Record of Registrar has not been done at our end since this is beyond the scope of our work. If at any time in future, it is found or came to our knowledge that misrepresentation of facts or incomplete or distorted information has been provided to us then this report shall automatically become null & void.
3. Legal aspects for e.g. investigation of title, ownership rights, lien, charge, mortgage, lease, sanctioned maps, verification of documents, etc. have not been done at our end and same has to be taken care by legal expert/ Advocate. It is assumed that the concerned Lender/ Financial Institution has satisfied them with the authenticity of the documents, information given to us and for which the legal verification has been already taken and cleared by the competent Advocate before requesting for this report. I/ We assume no responsibility for the legal matters including, but not limited to, legal or title concerns.
4. This report is a general analysis of the project based on the scope mentioned in the report. This is not an Audit report, Design document, DPR or Techno feasibility study. All the information gathered is based on the facts seen on the site during survey, verbal discussion & documentary evidence provided by the client and is believed that information given by the company is true best of their knowledge.
5. This Techno Economic-Viability study is prepared based on certain futuristic assumption which are intra dependent on economic, market and sectorial growth condition in future and socio-economic, socio-political condition at macro and micro level.

6. Meeting of assumption and financial ratio will entirely depend on the sincerity and efforts of the company, promoters and its key managerial performance.
7. All observations mentioned in the report is only based on the visual observation and the documents/ data/ information provided by the client. No mechanical/ technical tests, measurements or any design review have been performed or carried out from our side during Project assessment.
8. This report has been diligently prepared by our techno-financial team to the best of their ability. However, it's important to note that the recommendations provided in this Total Economic Viability (TEV) assessment do not imply an endorsement, validation, or certification of the accuracy or completeness of the disclosed information by the involved stakeholders. Furthermore, we do not claim or endorse that the opinions presented herein are the sole best course of action for decision-makers to follow. There may exist additional approaches and inputs that have not been covered within this report or fall outside the scope of this report.
9. Bank/FII should **ONLY** take this report as an Advisory document from the Financial/ Chartered Engineering firm and its specifically advised to the creditor to cross verifies the original documents for the facts mentioned in the report which can be availed from the borrowing company directly.
10. In case of any default in loans or the credit facility extended to the borrowing company, R.K Associates shall not be held responsible for whatsoever reason may be and any request for seeking any explanation from the employee/s of R.K Associates will not be entertained at any instance or situation.
11. The documents, information, data provided to us during the course of this assessment by the client are reviewed only up to the extent required in relation to the scope of the work. No document has been reviewed beyond the scope of the work.
12. This report only contains general assessment & opinion as per the scope of work evaluated as per the information given in the copy of documents, information, data provided to us and/ and confirmed by the owner/ owner representative to us at site which has been relied upon in good faith. It doesn't contain any other recommendations of any sort including but not limited to express of any opinion on the suitability or otherwise of entering into any transaction with the borrower.

13. We have relied on data from third party, external sources & information available on public domain also to conclude this report. These sources are believed to be reliable and therefore, we assume no liability for the truth or accuracy of any data, opinions or estimates furnished by others that have been used in this analysis. Where we have relied on data, opinions or estimates from external sources, reasonable care has been taken to ensure that such data has been correctly extracted from those sources and /or reproduced in its proper form and context, however still we can't vouch its authenticity, correctness or accuracy.
14. This Report is prepared by our competent technical team which includes Engineers and financial experts & analysts.
15. This is just an opinion report and doesn't hold any binding on anyone. It is requested from the concerned Financial Institution which is using this report for taking financial decision on the project that they should consider all the different associated relevant & related factors also before taking any business decision based on the content of this report.
16. All Pages of the report including annexure are signed and stamped from our office. In case any paper in the report is without stamp & signature then this should not be considered a valid paper issued from this office.
17. Though adequate care has been taken while preparing this report as per its scope, but still we can't rule out typing, human errors, over sightedness of any information or any other mistakes. Therefore, the concerned organization is advised to satisfy themselves that the report is complete & satisfactory in all respect. Intimation regarding any discrepancy shall be brought into our notice immediately. If no intimation is received within **15 (Fifteen) days** in writing from the date of issuance of the report, to rectify these timely, then it shall be considered that the report is complete in all respect and has been accepted by the client up to their satisfaction & use and further to which R.K Associates shall not be held responsible in any manner.
18. Defect Liability Period is **15 DAYS**. We request the concerned authorized reader of this report to check the contents, data and calculations in the report within this period and intimate us in writing if any corrections are required or in case of any other concern with the contents or opinion mentioned in the report. Corrections only related to typographical, calculation, spelling mistakes, incorrect data/ figures/ statement will be entertained within the defect liability period. Any new changes for any additional information in already approved

- report will be regarded as additional work for which additional fees may be charged. No request for any illegitimate change in regard to any facts & figures will be entertained.
19. R.K Associates encourages its customers to give feedback or inform concerns over its services through proper channel at valuers@rkassociates.org in writing within **15 days** of report delivery. After this period no concern/ complaint/ proceedings in connection with the Techno- Economic Viability Study Services will be entertained due to possible change in situation and condition of the subject Project.
 20. Our Data retention policy is of **ONE YEAR**. After this period, we remove all the concerned records related to the assignment from our repository. No clarification or query can be answered after this period due to unavailability of the data.
 21. This Techno Economic Viability Study report is governed by our (1) Internal Policies, Processes & Standard Operating Procedures, (2) Information/ Data/ Inputs given to us by the client and (3) Information/ Data/ Facts given to us by our field/ office technical team. Management of R.K Associates never gives acceptance to any unethical or unprofessional practice which may affect fair, correct & impartial assessment and which is against any prevailing law. In case of any indication of any negligence, default, incorrect, misleading, misrepresentation or distortion of facts in the report then it is the responsibility of the user of this report to immediately or at least within the defect liability period bring all such act into notice of R.K Associates management so that corrective measures can be taken instantly.
 22. R.K Associates never releases any report doing alterations or modifications from pen. In case any information/ figure of this report is found altered with pen then this report will automatically become **null & void**.
 23. If this report is prepared for the matter under litigation in any Indian court, no official or employee of R.K Associates will be under any obligation to give in person appearance in the court as a testimony. For any explanation or clarification, only written reply can be submitted on payment of charges by the plaintiff or respondent which will be 10% of the original fees charged where minimum charges will be Rs. 15,000/.

EXTRACTS OF IMPORTANT STATUTORY APPROVALS PROVIDED BY THE CLIENT
