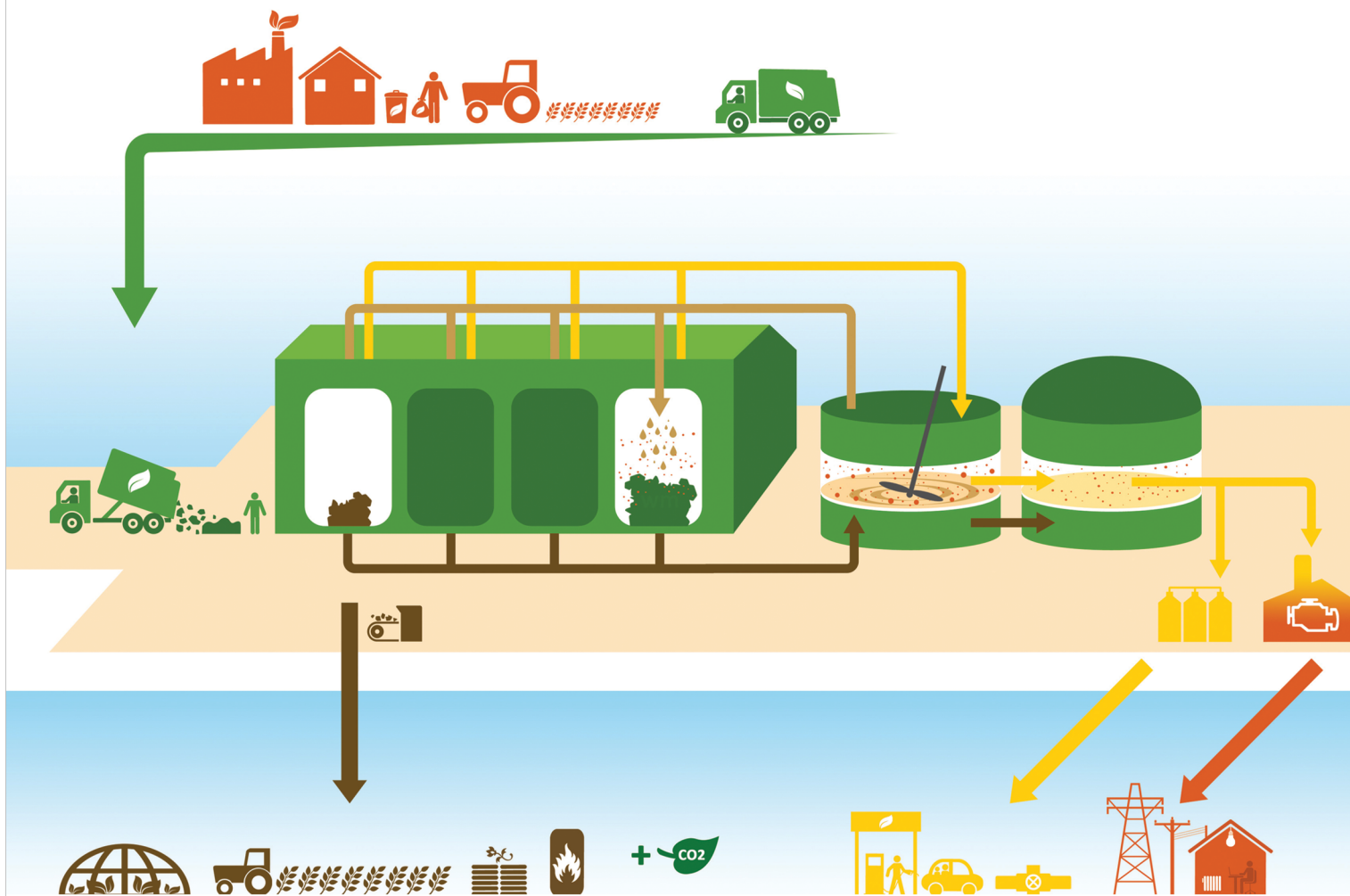




The Path towards sustainable energy sources will be long.....

BIOWASTE TO BIOCNG PROJECT



DON'T TRASH OUR FUTURE

This Document is Confidential.

Offer Ref. JOG/SJBE/2108

Date:-11/03/2023

Client: M/s. SHREE JEE BIO ENERGY (GSTIN: 05AEYFS0945L1ZB)

Co Person: Mr.Arpit ji & Mr. Vivek Ji

Techno-Commercial Proposal

**For
5000 Kg & 30 Ton Fermented
Organic Manure (Fertilizer)**

BioCNG Project

PREPARED BY

JOG WASTE TO ENERGY PVT. LTD

- ❖ Solar MW Scale Project
- ❖ ON/OFF Grid Solar Power Plant
- ❖ On Grid Solar Projects with Net Metering
- ❖ Air dryer
- ❖ PSA N2 and O2 plant
- ❖ Biogas Upgrading Plant
- ❖ Biogas Scrubber
- ❖ Biogas Project Equipments
- ❖ Biogas to Bio-CNG turn-key Projects
- ❖ Biogas to Power turn-key Projects

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Executive Summary

Shree Jee Bio Energy is looking to develop a Biogas to BioCNG project to provide Bio-CNG for fuel and vehicle use**. A proven, reliable and efficient biogas to BioCNG Project solution is required for the project. The raw biogas generated from the organic waste is to be upgraded to meet the BIS standard for Bio-CNG. The proposal is based on our standard supply and price.

Selecting a proven system with high availability and low methane loss will maximize the quantity of biomethane sales. Utilising efficient Biogas Generation & upgrading technology minimizes OPEX costs while maximizing overall project returns.

By providing our JOG Biogas to BioCNG plant to the Project, you will be harnessing the most proven and popular biogas to BioCNG Project:

- The Biogas Generation & upgrading plant includes latest 'field' feedback with all design enhancements, ensuring the solution will provide the most reliable and efficient operation to you.
- **JOG** Biogas plants set the benchmark in low specific power consumption and high methane capture rates.
- Factory assembled modular systems, facilitating easy site assembly and quick installation.

Good Site Operations is the Key to success!

The site operations team will also be trained extensively both during and following completion of our plant commissioning services. This will ensure they understand:

- The basic theory of Biogas Generation based on CSTR technologies & upgrading based on PSA/VPSC technologies
- Practical aspects of the plant and its operation, the different parts of the plant, tuning and daily / weekly / monthly checks and activities
- The operation manuals and where to find specific product information when needed

We take delight and satisfaction in seeing our clients succeed. Working together we can provide the highest quality of maintenance, spare parts and logistics, project management and Online monitoring with full diagnostics.

JOG is very willing to work with **Shree Jee Bio Energy**, to develop a first-class solution for this CSTR Technologies based biogas Generation & upgrading project based On VPSC Technology. We welcome the opportunity to discuss developing a long-term relationship.

The JOG plant offered here is the most proven and advanced upgrading product on the market today, ensuring you the best project returns and most environmentally friendly solution available.

Based on the information provided by **Shree Jee Bio Energy**, our offer presents our JOG Biogas Generation & upgrading solution for your consideration. We have provided 'Performance and Utility' information, a Process Flow Diagram (Mass balance) based on the 12,762 m³/Day raw biogas flow requested. The Process & Function Description helps to describe the plant and its basic operation.

The proposal includes standard options and we have also included a Responsibility Matrix to help define the scope inclusions within our commercial offer.

Should your requirements change, or you need any additional information we welcome the opportunity to discuss our offering to your further needs.

Kind regards,

Sachin Patel,

Director

JOG waste to Energy Pvt Ltd



Resume



Biogas plant as main feedstock will use:

- ❖ **Total Feeding** -120 + 10 tons/day
- ❖ **(Feedstock-** Cattle Dung, Press Mud (Mix Waste), Total - 130 Ton /Day**** VS
& TS % as per your Data

Biogas plant Design Capacity will produce biogas in amount of **12762 m3 per day** (Feedstock- Cattle Dung, Press Mud) with methane content 55 – 60 %. Produced biogas will be used to generate as Fuel and valuable Fermented organic bio fertilizer (solid and liquid).

The produced BioCNG and Fermented Organic fertilizer are following : (365 days)

S No.	Product	Per Day Generation	Per Annum Generation
1	Biogas	12,762 m3 per Day	46,58,130 M3
2	BioCNG	5,000 Kg per Day	18,25,000 Kg
3	Solid bio-fertilizer	30 Ton per Day	10,950 tons
4	Liquid bio-fertilizer	100 KL per Day	36,500 KL

Biogas can be upgraded to produce Bio-CNG so as to make it usable as vehicular fuel in transportation sector to replace the Mineral CNG. Electricity can be sold to national electricity grid. Heat power will be utilized for biogas plant. Organic bio fertilizers after biogas plant are ready for use without the necessity for any storage or additional treatment. Fertilizers can be sold to local farmers as valuable commodity that replaces chemical fertilizers in more effective and ecological friendly way. As an option solid organic fertilizer can be granulated, packed and sold for export.

Biogas Generation Estimation

Biogas plant operational period:

(7 days a week, 24 hours a day)

****Working days per year- 365 days**

Production period:

Bio CNG

Material /Substrate	Quantity per day (t)	Quantity per year (t)	DM (Dry matter) (%)	DM (kg/day)	ODM (organic dry matter) (%)	ODM (kg/day)	Biogas yield (m ³ /kg ODM)	Biogas yield (m ³ /day)	Biogas yield (m ³ /year)
Press Mud	120	43,800	23	27,600	80	22,080	0.55	12,144	44,32,560
Cattle Dung	10	3,650	15	1,500	75	1,125	0.55	618	2,25,570
Total	130	47,450	-	29,100	-	-	-	12,762	46,58,130

Biogas Plant Technical Performances

Characteristics		Values	Figures
1	Quantity of feedstock	Tons / day	125 to 130
2	TS% & VS%	%	As Per Given Data
3	Biogas Plant Design Capacity	M ³ / day	14,000
4	Biogas yield(Generation)	M ³ / day	12,762
5	Methane content CH ₄	%	55-60
6	Calorific value	Cal	4500-4708
7	Number of digesters	Pcs.	2
8	Digester volume (overall)	M ³	7234
9	Number of gasholders	Pcs.	2
10	Temperature in the digester	0C	36 – 38
11	Pressure in the digester	KPa	0.5
12	Overall dimensions of the digester (diameter / height) Approx.	Mtr	32/9
13	Solid fertilizers yield (70-80% wet)	T/day	30
14	Liquid fertilizers (99% wet)	KL/day	100
Biogas To BioCNG plant characteristics			
15	Biogas Upgrading Capacity	M3/hr	700
16	Methane	%	>95-96
17	Booster Compressor	M3/hr	350-400
18	Electrical power Connected Load (Biogas Project)	KW	440
19	Total Electrical power Running Load	kW	345

Working principal

Biogas plant working principle

The technology of organic materials conversion is made by means of biochemical decomposition (hydrolysis) of high-molecular compounds into low-molecular organic compounds (organic acids, salts, and alcohols).

Organic compounds + H₂O → C₅H₇NO₂ + HCO₃

Further conversion of obtained dissolved compounds like organic acids and alcohols (C₅H₇NO₂, HCO₃) into gases - CH₄, CO₂.
$$C_5H_7NO_2 + HCO_3 + H_2O \rightarrow CH_4 + CO_2 + NH_4$$

Biological process of consecutive (phasic) conversion of organic compounds can take place in anaerobic environment i.e., in oxygen-free tank (biological reactor- anaerobic digester). At the first stage of fermentation substrate hydrolysis take place under acidogenic bacteria influence. At second stage elementary organic compounds come through hydrolysis oxidation by means of heteroacidogenic bacteria with production of acetate, carbon dioxide and free hydrogen the other part of organic compounds including acetate forms C1 compounds (elementary organic acids). Produced substances are the feed stock for methanogenic bacteria of third type. This stage flows in two processes of A and B type the character o which depends on caused by different bacteria type. These two types of bacteria convert the compound obtained during the first and second stages into methane CH₄, water H₂O and carbon dioxide CO₂.

Methanogenic bacteria are more particular to living environment to be compared to acidogenic bacteria. They require complete anaerobic environment and need longer reproduction period. The speed and scale of anaerobic fermentation depend on bacteria metabolic activity.

That is why the biogas plant chemical process includes hydrolysis stage, oxidation, and mechanization stage. For that kind of substrate these processes take place in the same reactor.

Technological process of biogas production

Feed stock in quantity of 125–130 tons per day and every day transported to biogas plant area and discharged to preliminary/ Feed Mixer tank. Substrates are loaded to preliminary/ Feed Mixer tank by portions of 25–35 tons with interval 4–6 hours. In preliminary tank substrate humidity is increased up to 90%.

Substrate pipelines are equipped with valves “M” that switch substrate flow and directs to each digester. All valves are controlled by Manual Or automatic system. In digesters substrate is heated up to temperature 36–38 °C. Heating system is installed on the walls of the digesters; thus, constant temperature sustains on whole digesting period. Digester operating regime is mesophilic. Heated substrate in digester is mixed periodically (10–15 minutes in hour) by Side Entry/ submersible agitators. Average time of digestion is 28–30 days. Biogas goes up and gathers in gasholder. Gas holder UV protective film protects gasholder from precipitation and damage by foreign objects. Weather protective film is fixed firmly by special system under air pressure from air blower. To protect gasholder from overpressure digesters are equipped by safety valves, which starts working at pressure 5mbar and bleeds biogas to atmosphere. Sulphur is removed from biogas by addition of a special component.

Biogas then goes through gas pipeline to Roots Blower, where the pressure is raised up to 0.8 bar to meet Upgradation Plant requirements. Biogas is supplied to Biogas Upgradation plant, where it is used as fuel for vehicles and Industries Purpose.

The digested substrate from each digester goes to digested substrate tank and then by pump is pumped to separator where it is separated to solid and liquid bio-fertilizer. Solid bio-fertilizer discharged to the separation area and transported for storage; liquid filtrate is directed to filtrate tank from where is pumped to lagoon by pump.

Biogas plant Main equipment scope

Sr No	Equipment	Descriptions	Qty
1	Weighbridge - 40 Ton		
	<ul style="list-style-type: none">Design, fabrication, supply, installation, testing & commissioning of Fully Welded Modular Type Weighbridge of 40 tons, Indicator, Load Cells, Platform, LED display, suitable software.The job shall be undertaken on turnkey basis covering mechanical, Electrical & electronic works including supply of all required material for electrical works including earthing.Making of approach ramps to weighbridge shall also be included in the Scope.		
	TECHNICAL SPECIFICATION OF WEIGHBRIDGE STRUCTURE The platform of the Weighbridge is of robust construction and is designed to withstand dynamic loads and side loads. The structure will be constructed of rolled steel sections & plates and strong enough to withstand full load without undue deflection. Longitudinal and lateral stoppers are provided to restrain the movement of the platform in the horizontal plane. The top of the platform is covered with anti-skid strips of adequate strength, rigidity and sufficiently strong to carry the maximum load. The structure is designed for an overload capacity of 150% and the deflection is <span 450 at its full load.		
WEIGHBRIDGE STRUCTURE DETAILS			
Type of Platform	Fully Welded Modular Type Weighbridge		
Platform Size	7.5 X 3.0 Meter		
Main U-Beam	300 mm X 140 mm - U Beam – 04 NOS		
Cross Support	16 mm Thick Plate Between Two Main Long Beam		
Top Plate	08 mm Top Plate with anti-skid strips		
Foundation Frame	100 mm X 50 mm Long Frame with Fully Welded 350 mm X 350 mm X 16 mm Plane Plate		
Border Frame	100 mm X 50 mm - Both Side Heavy Duty Frame with Side Wall Mounting		
Load Cells MS Plates	150 mm X 150 mm X 16 mm - Load Cell Top & Bottom Plate		
Guide Rail	Round Pipe Based Side Frame - Ø 100 mm - Both Side		
Fasteners	As per Required & IS Standard		
Paint	2 coat of ant-corrosive primer and 2 Coat Enamel Paint		
Material	All Material will be IS 2062 Standard		
Computer with printer	1 Nos.		
Civil Work	Foundation with weighbridge Room		
We Make U Beam Type Weighbridge From HT-350 Grade Steel			
Approved By Weights & Measure Department			

No.	Equipment	Descriptions	Qty
2	Pumping Equipment and Grinder with Motor		
2.1	Substrate supply pumps (2 No.) (1W+1S)–50 m3/hr Separator Supply Pump (1 No.)–40 m3/hr Progressing cavity screw pumps capacity approx. 50 m3/h Corresponding to dynamic viscosity of media 500–1000 cps), Differential Pressure – 2–4 bar , Rotational Speed – 158 rpm Power – 10 HP		3 Nos.
2.2	Grinder with strainer –50 m3/hr Grinder is used for Pump protection from solid foreign objects. It designed specifically for the efficient maceration; it is very effective in capturing irregular shaped objects. The layback cutter shafts are set at an angle to the incoming flow.	Material of Construction :- Routing Parts:SS304 Shaft Sealing :mech. seal (Cast Iron) Arrangement: Mechanical seal Housing / End Cover: – Cast Iron, All Rotating Inlet and Outlet Size: DN 150 PN 16	1 No.
MATERIAL		PUMP CONSTRUCTION	
Pump Housing	Cast Iron	Suction Flange	DN150, PN16
Rotating Parts	SS304	Discharge Flange	DN150, PN16
Rotor	SS 304	Suction Orientation	Vertical
Stator	S62L	Discharge Orientation	Horizontal
Shaft Seal	Gland Packing (w) Flushing.Prov	Joint Type	B Joint
Seal Plan	02	CIP Size/Orientation	No/No
SM Pin Joint Seal	S65L	Counter Piece–SMS/TCL	No
O " Rings	S65L	Inspection Port	NO
Lantern	Cast Iron	Specific Standards	Not applicable
Base Plate	Mild steel		Not applicable

No	Equipment	Descriptions	Qty
3	Mixing Equipment		
3.1	Agitator for Mixing Pit (Feed Mixing Tank)		2 Nos.
	Mixing Pit Dimension	10.0 Mtr x 4.0 Mtr	
	Rating - 15 HP/VARIABLE RPM Max 30rpm/TOP mounted type (1 No.) Motor 15HP 1450rpm, SC Ind, 3PH, 50 Hz., 415v, IP55, CI F, VI, Make: CGL/BBL, Gearbox: Inline helical Gear Box Bonfiglioli/helicon, Couplings Flexible, Impeller Type :Wide Hydrofoil Lantern support CS Epoxy coated.	Mounting flange to suitable support MS structure epoxy painted, Shaft sealing gland packing Shaft AISI304, Impeller AISI304, mixed flow axial and radial, bolted, dynamically balanced.	
4	Digester Electrical and Mechanical Package Side Entry Type Agitator in CSTR Based Digester for Stirring		2 x 6 Nos.
	Digester Dimension	32 Mtr x 9 Mtr	2 Digester
	<ul style="list-style-type: none"> Digester Tank-RCC with MS railing Centre column-RCC, inspection platforms, man hole, heating pipes, inspection windows Side entry Mixers with 3-phase-motor 415 V, 50 Hz, Insulation class F individual weather-proof enclosures with soft starter, main switch, manual-/ automatic-selection switch, ON/OFF- switch Heating Setup for heat distribution inside digester at mesophilic range, for connection with external heat source Double-Membrane Gas-Storage Roof system with air blower (1W + 1S), deflation flap, over-/under pressure valve, gas level indicator All connection nozzle for gas and slurry inlet and outlet, Agitator openings All design and structural engineering for Digester tank 		

	<p>Rating – 20 HP/380 RPM/AISI304 03 Nos. & 15 HP/380 RPM/AISI304 3 Nos.</p> <p>Over load protection, Motor 1450rpm, SC Ind, 3PH, 50 Hz., 415v, IP55, CI F, VI, Make:CGL/BBL protection class IP55/Insulation class F with Gear Box or Belt Pully Arrangement , Couplings Flexible, Lantern support CS Epoxy coated. Shaft & Impeller :SS 304 (Graphite Teflon ring)</p> <p>Bearing : Spherical Roller SKF</p> <p>Impeller :Axial Flow</p> <p>Blade: Hydrofoil</p> <p>Nozzle : 600 NB</p> <p>Shaft length 1.5 to 2 meter</p>	<p>Mounting flange to suit tank flange, Shaft AISI304, Shaft sealing Stuffing box with gland packing, Impeller AISI304, Axial flow type, bolted, Balancing Dynamic.</p> <p>HRTTime:28–30 Days</p> <p>Temperature:36–38 °C</p>
4.1	Heating Arrangement For Digester	For 2Digester
	<ul style="list-style-type: none"> • Circulation pump • Three-way electric valve for temperature regulation with electric drive • Thermometer • Heat Exchanger <p>Temperature controlled by a circulating Hot water Piping Network, connect the heater to the heating jacket using Piping Network. Set the heater to the appropriate temperature for mesophilic (36–40 °C) digestion.</p> <p>Piping has to be made SS or HDPE, rust proof structure, of appropriate Diameter, conforming the relevant BIS Standards.</p>	<p>Heater Range: 4 x 36 KW</p> <p>Circulation Pump Q =10 m3/hr (2 No)</p> <p>Piping Network</p> <p>Arrangement with Clamp and Related Other Accessories</p>

5	Equipment /Machinery For Fertilizer Tank	1 Set
	<p>Civil Work (10 Mtr x 5 Mtr) with Below listed equipment for fertiliser tank</p> <ul style="list-style-type: none"> • Top Entry Agitator • Pump for slurry Transfer • Auto Valves • Manual Valves • Flanges • Wall Mounting Flanges • Fitting Material of Flanges 	

6	Double membrane Balloon	2 Set
	<p>Double membrane Balloon and its accessories,</p> <p>Imported Membrane fabric for inner and outer balloon,</p> <p>Pressure Safety valve for air.</p> <p>Pressure and vacuum Safety valve for biogas.</p> <p>Air blower with hose pipe.</p> <p>All accessories. Like pressure gauge, nrv, fittings, and mounting hose.</p> <p>All companion flanges.</p> <p>Gas level indicator.</p>	<p>TYPE: Double membrane</p> <ul style="list-style-type: none"> • Dimension: As per Digester • Diameter 32 Mtr. • shape conical • PVC Coated Fabric • Fire Retardant, temperature resistant up to 50 deg c. • UV protected • 1100 gsm +/- 50 gsm • Fabric: Fire Behavior B1 Grade

7	Horizontal Solid liquid separator	2 set
	<p>Our Horizontal solids-liquid separating machine based on screw conveyor technology. Separation Performing by both mechanical compression and gravity, the Separator is designed to separate the liquid portion from the solid portion of a wide range of materials. The separated solid portion and liquid portion can both be simply and economically handled.</p> <ul style="list-style-type: none"> • Slide Valve and levers system for separation level adjustment • Set of hoses for connection to pipeline of Subtract supply and Filtrate discharge 	<p>Make: Italy, Model: Q=65 5.5 KW</p> <p>Simple in operation and cost-saving in spare parts Durable, high performance self-cleaning screen basket Suitable for continuous duty Modular screw design and manufacturing Various types of diaphragm outlet, Polymer screws, basket sizes</p>
	<p>INCLUDING</p> <ul style="list-style-type: none"> • Loading hopper in SS304 • Body in SS304 • Techno polymer Diaphragm Pressor • Support frame in hot dip galvanized steel • Solid Plug shelf support • Modular Screw in techno polymer SINT EC 90 & SS304 Screen in SS304 0.5mm • Round Filter Element 	

8	700 m3/hr Catalyst Tower Based H2S removal System	1 Set
	<p>A bio Catalyst scrubber consists of a Tower Based gas scrubber. In the gas scrubber, to be removed components are absorbed from the gas stream by the Activated Carbon.</p> <p>Shape : Cylindrical</p> <p>Desiccant Activated Carbon</p> <p>MOC Internal parts :S.S 316</p> <p>MOC shell :C.S./HDPE</p>	

9	700 m3/hr biogas Upgradation systems with 350 m3 hr	1
	<p>Upgradation of Biogas by Low pressure swing adsorption, using energizer for better separation rate was evaluated to produce fuel grade methane. Three different adsorbents were employed to evaluate the process performance with equilibrium- and kinetic-based adsorbents.</p> <ul style="list-style-type: none"> • Sand Filter • Roots Blower with FLP Motor(1W +1S) • Vacuum Pump with FLP Motor(1W +1S) • Double effective Heat exchanger with moisture separator • Biogas Dryer • Cooling tower • 30 m3 surge tank • Four Towers system, inter connected piping and valves & Actuated change over valves • Mol sieve and Activated alumina and ceramic ball • 40 m3 surge Tank • Instrumentation package • Control panel PLC base with RS 485 	<p>Capacity : 700 m3/hr Pressure: 150 mmWC to 0.8 Bar CH4 Purity : >95% H2S: <10 ppm Other: Balance Output Pressure: 0.3-0.4 Bar</p>

10	350 m3 hr Recovery Unit & Accessories (2 tower System)(Methane Loss < 2 %)	1
	<p>Methane recovery means the exhaust gas which evacuated from the adsorption vessels having 10 to 15% methane on average its 12% methane in the exhaust stream that is too much so, we collect this gas in a gas tank and passing through the methane recovery system and maintain the out let same or better than biogas and recycled to blower suction. Connecting equipment as per below.</p>	<p>Capacity : 350 m3/hr CH4 Purity : >55-60% H2S: Nil Other: Balance Output Pressure: 0.2-0.3 Bar</p>

	<ul style="list-style-type: none"> • Roots Blower with FLP Motor • Vacuum Roots Blower with FLP Motor • Heat exchanger with moisture separator • Biogas Dryer • Two Towers system, inter connected piping and valves & Actuated change over valves • 15 m3 surge Tank, • Instrumentation package • Control panel PLC base with RS 485 	
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11	Booster compressor (400 m3/hr)	1
	<p>Capacity: 400 m3/hr</p> <p>Make: Imported Make</p> <p>Number of stages:5</p> <p>Drive: V Belt</p> <p>Oil lubricated, Air Cooled cylinder with fins on surface</p> <p>Inter connecting piping from first stage to outlet separator last stage</p> <p>Crankcase with mechanical seal</p> <p>All others specification as per company std</p>	<p>Inlet Condition</p> <p>Gas condition at inlet**: BIO METHANE</p> <p>Capacity:400 m3/hr</p> <p>Suction Pressure :1.05 to 1.3 Bar</p> <p>Suction Temperature:40°C</p> <p>Discharge Condition</p> <p>Discharge temperature: Ambient + 15°C</p> <p>Discharge Pressure: 250 Bara</p>
12	B-CNG Filling station For Cylinder Filling	1 set
	<p>Filling station SS material of 2 Nos. Cylinders cascade each</p> <ul style="list-style-type: none"> • Pressure gauge • safety valve • isolation valve • NRV • Header stand • High Pressure Flow meter with • ESD system <p>Gas leak and fire detection system, High Pressure filling Hose WP 5000 Psi, and quick-release hose coupling with top-hat sealing, for 345 Bar (5000 Psi) max working pressure, incl. Mass Flow Meter</p>	

13	Automation Elements	Package
	<ul style="list-style-type: none"> • Ph Online sensor • Pressure sensor • Thermo Sensor for temperature monitoring inside digester, incl. signal • transmitter & cable connection clamp for 4-20 mAmp signal • Level sensor • Isolation valves • On/Off Valves • sensor cables from field instrument to control room • Feedback signal (Audio visible alarm) for balloon air blower and on/off valve 	Qty as per requirement

14	Electrical , Instrumentation and control system
	<ul style="list-style-type: none"> • All internal electrical and instrument cable and cable tray, Junction box, Whole project distribution panel and panel, field start stop switch boards. OR as per site requirement. • Cabling & wiring for biogas generation, Purification and compressor plant, incl. sensor cables, from PLC Building onwards, for the biogas generation plant. • Programmable Logic Controller (PLC) for The biogas generation plant, standardized & modularized design, integrating Consumers / actuators / sensors / auto-switches as per requirement, installed inside control panel room (which is not included, and to be constructed in clients responsibility) • Ensure pump switch-on/switch-off in tolerable liquid level range with connection cable • Thermometer for temperature monitoring inside digester • Substrate Flow meter for online and continuous measurement of the volumetric flow rate of biogas substrate flow, flange connection

15	Electrical & Electronics Requirements	1 Set
	<ul style="list-style-type: none"> Electrical distribution panel Grid Transformer/LBS/HTMC for Plant All Cables, UPS /DG Set FOR Backup Power 10 kVA All Earthing 	

16	BioCNG Cascade		
	40 Cylinder Cascade @ 260 Kgf/cm² Cylinder Cascade Assembling, Testing & Inspection of Cylinder Bank, Fabrication of Structure in M.S of CNG Cascade of 3000 Ltrs W.C. having 40 Cylinders <ul style="list-style-type: none"> Tubing & Fittings: SS 316 Bank: Single Bank Pressure Gauge: 0-400 bar 4" dial (1 pressure gauge) Manifold: Brass Bull Nose : Brass Filling arrangement : NZS probe suitable Frame : Square pipe 	Specification :- Water Capacity- 75.0 Ltrs per Cylinder Cascade Water Capacity- 3000.0 Ltrs <ul style="list-style-type: none"> Working pressure of 250 Kgf/cm² <ul style="list-style-type: none"> OD- 267 mm Dim-3.2 x1.85 x1.90Mtr Cascade Weight-5.0 Ton Approx. Note: All cylinders are Hydro static Tested	5 Nos.

17	Waste Shredder	1 set
	Output Capacity/ Throughput: 5 Tons Shredding Application: Shredding of MSW (Organic waste) Raw Material: Input MSW (Mix waste)	Country of Origin: India Model: 1 TPH Type: Horizontal Twin Shafts Shredder Machine

18	Solid Fertilizer Packaging and bagging System	1 set
	<p>Here are some of the major features of packaging plant are Enlisted below:</p> <ul style="list-style-type: none"> • Speedy weighing and filling of bags • Bag counter facility • One operator can handle a machine with two of three spouts • Lower power consumption • Proper in-built device for fine weight adjustment. • Bag Filling Machine Cap 100 kg • Weight set on digital display • Material-compost organic manure • Moisture -30-40 % • Machines Size -2500 x 1200 mm • Machines height -2.5 meter • Machines pack -50 bag / hour • Top of machines our hopper cap. 90-100 kg • All fabricated Parts M.S. & Contact parts MS • One labor for bag clamp & same for stitching • Inclined compost loading conveyor with hopper • Use to drop compost in machines height • Stitching machines stand • To fit REVO make handy stitching machines • Height adjustable by mechanical screw jack • Air compressor 	

19	Product gas Biogas analyzer –Combined stationary measuring device		1 set
	Type	Combined stationary	
	Make	Imported	
	Measuring port	4 ports	
	Measuring ranges and sensors		
	Methane	0.0 – 100 % vol.	Infrared sensor
	Oxygen	0.0 – 25 % vol.	Electro-chemical sensor
	Hydrogen sulphide	0 – 5000 ppm	Electro-chemical sensor
	Carbon dioxide	0.0 – 50 or 100 % vol.	Electro-chemical sensor
	Moisture Analyzer (Dew Point meter)		
	Range	+ 20 to – 110 deg C	
	With resolution 1 deg C, Make of analyzer with sensor: – GE Sensing Germany		

20	Lab equipments for testing slurry and gas chemical parameter		1 set
	<ul style="list-style-type: none"> • Hot air oven (up to 200 Deg C) • Digital Ph meter • Desiccator • Soil testing kit • Weight Balance • Muffle Furnace up to 1100 Deg C • Analyzer calibration kit • Ch4 and co2 cylinder • Biogas sample collection kit 		

21	Annual operational spare for smooth operation of the plant		1 set
	<ul style="list-style-type: none"> • Mol sieve for top-up (125 Kg) • Activated alumina and ceramic ball • Ball valve (2 set) • Control valve (2 set) • Gasket set • Pump stator (1 set) • Safety valve • Solenoid valve (2 set) • Oil for side entry agitator • Gate valve (1 set) • Electrical items • Nut and bolts • Pressure gauge • Activated carbon (1000 kg) 		

- Balloon Fabric repair kit
- Belt for Blower, vacuum pump, agitator etc.
- RTD etc.

22	Single Girder EOT crane (Flame Proof)	
Sr. No	Parameter	10 MT X 12 Meter Span
	Type of Crane	Single Girder E.O.T Crane (7.5 Ton)
1.	Qty	1 No.
2.	Control	Pendent Operated
3.	Indoor/Outdoor	Indoor
4.	Height Of Lift	7 Meter.
5.	Class of Duty	II as per IS:3177/1999
6.	Lifting Capacity MT	
7.	MH	10
8.	AH	NA
9.	Span in M	12 Meter approx.
10.	Speed (MPM) MH	2.0-3.0
11.	CT	10-12
12.	LT	12-15
13.	Power Supply	415V, 3Ph, 50Hz+-3%
14.	Control Voltage	110V
15.	MH Motor	
16.	Type	Sq. Cage Crane duty motor
17.	HP	10 HP
18.	No Off	1
19.	CT Motor	
20.	Type	Sq. Cage Crane duty motor
21.	HP	1.0 HP with VFD
22.	No Off	1
23.	LT Motor	
24.	Type	Sq. Cage Crane duty motor
25.	HP	1.0 HP with VFD

26.	No Off	2
Limit Switches		
Hoist- MH		1 No. Rotary type to prevent over hoisting & over lowering
CT		Optional at extra cost, Mechanical stopper provided
LT		Optional at extra cost
Brake Type		
MH		AC Electromagnetic Disc/ Hydraulic Thrustor brake
AH		NA
CT		Optional at extra cost
LT		Optional at extra cost
Gear Boxes		PBL/ STD
MH Wire Rope		
Size & No. of falls		Dia. 14 mm / 4 Falls
Type		Fiber Core
Construction		6X36
Rope Drum		M.S Fabricated and Stress Relieved
Wheels		Machined from forged steel and duly hardened, supported on self-aligning roller bearing, enclosed in L Type housing
Ambient Temperature (In deg C)		45
Special Features		NA
Couplings		Gear Couplings
Bridge Construction		Standard joist/ Plate Box Girder having anti vibration design, robust in construction
Buffers		Rubber buffers
CT Cable Festooning		Festoon type trailing cable with festoon trolley & track
Hooks		Only forged hooks, duly proof load, Ultrasonically and chemically tested shall be used.

Liquid, Gas piping system for conveying substrates and Liquids & gas		1 set
	Piping has to be made HDPE, rust proof structure, of appropriate Diameter, conforming the relevant BIS Standards	
	Material of Pipe	HDPE
	Our Scope: Supply and fittings / Jointing / Laying / Installation / Unloading / Staking charges at site	



23	Civil Work		
	Admin Office	120	SQMT
	Shed for Filling header with cylinder cascade	160	SQMT
	Way Bridge cum Security Room	16	SQMT
	Gate	2	No.
	Boundary (Total Length 800Mtr.)	800	Mtr.
	Internal Road 8 Mtr Wide) Length-730 Mtr	5,840	SQMT
	Feed Preparation Platform with Pump	350	SQMT
	Feed Mixing Tank (2 x300 CUM)	600	CUMT
	Machinery Shed (Purification and Compressor)	519	SQMT
	Main Digester (Dia 32 Mtr. Height 9Mtr)	7,234	CUMT
	Main Digester (Dia 32 Mtr. Height 9Mtr)	7,234	CUMT
	Underground Water/ Slurry Storage	100	CUMT
	Solid Liquid Separator Platform	36	SQMT
	Fertilizer Shed with Packing	816	SQMT
	Digested Slurry Tank	400	CUMT
	Lagoon	1000	SQMT
	Technical room/panel room + Lab Area + Security Office	76	SQMT
	Staff Room with Kitchen, Bathroom (3 BHK House)	144	SQMT
	Labours Rooms	60	SQMT
	Toilet Block + parking	20	SQMT
	Other Foundation work as per project civil work requirements		
	Other Building services as per project requirement		

Scope of Supply

Sr.No.	Scope of Supply	E – Party responsible for EXECUTION		
		JOG	Client	Comments
1.	Substrate supply pump (1W+1S) (screw pumps), Separator Supply Pump capacity approx.50 m3/hr@2-4 bar (1W+1S)	E		
2.	Grinder rota cutter (1 No.) Q=50 m3/hr	E		
3.	Agitator for Mixing Pit (Tank) 2 Nos. Rating - 15 HP/RPM-Variable / AISI304	E		
4.	Side Entry Type Agitator in CSTR Based Digester for Stirring (2 Digester x 6 Nos.=Total 12 Nos.) Rating - 20 HP (3 Nos.) and 15 HP (3 Nos.)/250 RPM/AISI304	E		
5.	Double membrane Balloon JOG Type: JOG Membrane Mounted on Digester Tank- 2 No	E		
6.	Horizontal Solid liquid separator- 2 Set	E		
7.	Heating Arrangement For Digester- 2 Set	E		
8.	Biogas flow transmitter	E		
9.	Laboratory and analytical equipments and testing for different parameters	E		

10.	Sand Filter	E		
11.	One Catalyst Tower based H ₂ S Removal system (H ₂ S ≤ 2500 ppm).	E		
12.	One Filter Separator	E		use after H ₂ S Removal System
13.	700 m³/hr biogas Upgradation system with Accessories	E		
14.	350 m³/Hr CH ₄ Recovery System for Methane Loss <2 %	E		
15.	400 m³/hr Biogas Booster compressors for Providing 250 Bar pressure at outlet.	E		
16.	B-CNG Filling station For Cylinder Filling (1 Set)	E		
17.	Liquid, Gas piping system for conveying substrates and Liquids & gas	E		
18.	Automation Elements	E		Any other Automation that may be required are by client or need to be priced as extra's
19.	40 Nos. Cylinder Cascade – 5 Nos.	E		
20.	Fertiliser Packing system	E		
21.	Annual operational spare for smooth operation	E		
22.	Clearing, Forwarding, handling and freight cost etc.	E		

23.	Electrical Equipment & instrumentation			Supplied loose, to be installed in client control/electrical room (safe zone)
	Control Panel PLC base with RS 485 connectivity option to DCS with SCADA Connectivity.	E		
	All Type of electrical works as per mentions above like cable ,transformer ,HTMC,LBS etc.	E		
	Compressor Control Panel	E		Supplied loose, to be installed in client control/electrical room (safe zone)
	Power Supply & External Cabling (off skid)		E	JOG to provide cable schedule for the off skid and interconnecting cabling that is your supply and site run
24.	Product Gas Analysers (1 Set)			
	Online gas Monitoring system with Analyser for H2S, CO2, CH4, O2.	E		
	Online dew point meter.	E		
	Other		E	Any other instruments that may be required are by client or need to be priced as extra's

25.	Consultancy	E		
	Consultancy for Design and engineering, civil work, Digester Data; designs& Dreawing,General data ,Layout plan, Summarized plan of pipelines and networks, Equipment Comparison and selection	E		
	Long Term Technical support and Operation service with training	E		
	Consultancy for Detailed Project Report, PESO approval, Training etc.	E		We are not liable for delay in work due to Govt. procedural delay, For any Technical Discussion at Petroleum Safety office Will attend client only
26.	Other Most- All civil work for project(Mixing Pit, Digester, Digested Slurry Tank, Solid Liquid separator & shredder Platform, Upgradation , Compressor ,Storage Tank etc)	E		
	Travelling, Lodging and Boarding arrangements for our team ,Equipment Lifting and shifting		E	

Exclusion (Client Scope)

A.	All Electrical and Instrument/power cabling outside the battery limit.
B.	Pre- dispatch inspection including costs thereof shall be in the scope of client.
C.	Transportation, Unloading, & shifting of all equipment's to respective foundation.
D.	Additional Consultancy services
E.	Statutory approvals & operating permits.
F.	Any other item not specifically mentioned above.
G.	If Erection & commissioning is Jog Waste to Energy Scope
	Travelling, Lodging, and Boarding arrangements for engineers are client scope. Skilled and un skilled labour shall also in client scope.
	Lifting and shifting equipment required at the time of erection and commissioning is client scope.

Price schedule with commercial Terms & conditions

Price schedule: Price schedule corresponding to scope & terms & conditions defined in Details Technical Requirements.

Sr No.	Description	Qty	Price	Total
1.	Weighbridge	1 Set	11,25,000/-	11,25,000/-
2.	Pumping Equipment and Grinder with Piping arrangement for feeding	As above Mention	65,25,000/-	65,25,000/-
3.	Equipment/Machinery for Feed Mixing Tank	2 Nos.	35,14,000/-	70,28,000/-
4.	Digester Mechanical & Electrical Equipment Package <ul style="list-style-type: none"> • All Mixing Equipment (Side Entry Type Agitator in CSTR Based Digester for Stirring) • Heating Arrangement for Digester • Liquid, Gas piping system for conveying substrates and Liquids & gas from Digester up to 30 Mtr • Inspection Window (sight glass) • Other Digester Accessories • All digester connection nozzles 	2 Digester	1,75,25,000/-	3,50,50,000/-
5.	Fertilizer tank machinery <ul style="list-style-type: none"> • Top entry agitator • Pump for slurry transfer • All type of piping and valve arrangement • Other fitting accessories 	1 Set	20,50,000/-	20,50,000/-
6.	Double membrane Balloon JOG Type: JOG Membrane Mounted on Digester Tank (Dia - 32 mtr)	2 set	41,40,000/-	82,80,000/-

7.	Horizontal Solid liquid separator	2 set	35,50,000/-	71,00,000/-
8.	Catalyst Tower Based H₂S Removal System (700 m³/hr)	1 Set	29,50,000/-	29,50,000/-
9.	700 M³ /hr Biogas Up gradation Plant as per given scope of supply 4 Tower Based systems With all electrical, instrumentation, controls and HMI PLC System.	1 set	2,35,00,000/-	2,35,00,000/-
10.	350 M³/hr Recovery System - (Methane CH ₄ loss < 2 %) as per given scope of supply 2 Tower Based systems	1 set	85,50,000/-	85,50,000/-
11.	400 m³/hr Biogas Booster compressor Up to 250 bars High pressure piping and fitting with accessories, High pressure line up to compressor to cascade.	1 set	1,50,00,000/-	1,50,00,000/-
12.	BIOCNG Filling Station	1 set	7,50,000/-	7,50,000/-
13.	Automation Elements	Package	55,21,000/-	55,21,000/-
14.	Electrical, Instrumentation & Control Panel Electrical Equipment- PLC Control panel, Power panel, Cable for all these from field to panel room	1 set	70,65,000/-	70,65,000/-
15.	Electrical and Electronic Requirement <ul style="list-style-type: none"> • Distribution panel • Transformer • Cables & Earthing • Other Electrical Accessories 	1 set	65,20,000/-	65,20,000/-
16.	40 Cylinder cascade	5 Nos.	18,50,000/-	92,50,000/-
17.	Waste Shredder	1 Set	6,50,000/-	6,50,000/-

18.	Solid Fertilizer Packaging & Bagging System	1 Set	32,50,000/-	32,50,000/-
19.	Product Gas Analyzers Online gas Monitoring system with Analyzer for H ₂ S, CH ₄ , O ₂ , Co ₂ Online dew point meter	1 set	10,50,000/-	10,50,000/-
20.	Laboratory Equipment	1 set	5,00,000/-	5,00,000/-
21.	Annual operational spare for smooth operation of plant	Lum Sum	10,80,000/-	10,80,000/-
22.	EOT single Grider crane flame proof as per PESO for CNG cascade loading and unloading	1 Set	20,50,000/-	20,50,000/-
23.	All Civil Work-Building, Digester, Shed, Road etc. (Mixing Pit, Digester, Digested Slurry Tank Solid Liquid separator and shredder Platform, H ₂ S and Moisture Removal System shed and other plant and machinery shed, all foundation, control room etc) As per detailed mention in Proposals	1 set	6,74,84,300/-	6,74,84,300/-
24.	Clearing, Forwarding, Handling & freight cost etc.	Lum Sum	20,42,746/-	20,42,746/-
Total (INR)				22,43,71,046/-
GST-12 % (Sr No.1 to 24)				2,69,24,526/-
Sub Total (Total + GST 12%)				25,12,95,572/-
In Word- Twenty-Five Crore Twelve Lakh Ninety-Five Thousand Five Hundred Seventy-Two Rupees and Zero Paisa Only				

Commercial Terms & conditions

- I. **Price basis:**
The prices offered are on Ex-works supplier or sub-contractor works basis and packing & forwarding, taxes, duties, levies, freight, insurance etc.
- II. **Packing & forwarding:**
GST Tax – Extra (GST-12 %)
- III. **Transit & storage insurance:**
Insurance shall be arranged by the JOG, Email intimation from official email address for arranging insurance shall be given by us on dispatch of the consignment from our works.
- IV. **Delivery:**
8-9 months from date of clear, signed purchase order with advance and drawing approvals.
- V. **Installation and commissioning:**
Up to 1-2 Months after receipt of material at site depending on site readiness
- VI. **Acceptance:**
The Purchase Order will be accepted by us on the basis our valid quotation. However, the delivery time will be subject to confirmation, depending on the shop load at the time of the receipt of the Purchase Order. The delivery time quoted in the offer is not automatically binding on us but the one in our Order Acceptance would be.
- VII. **Payment terms:**
 - a) 30% – Net Order Value as advance with clear signed purchase order.
 - b) 10 % after dawning approval.
 - c) 55 % Net Order Value with all taxes, duties & levies upon inspection of goods at our facilities against Performa invoice before dispatch on pro rata basis.
 - d) 5 % after installation and commissioning and trail production.
- VIII. **Cancellation of Contract:**
As this system is made to order, in no event, order once placed cannot be cancelled. In the event of cancellation of order from customer, the advance shall be not refunded and customer shall indemnify JOG Waste to Energy against any consequential loss.

IX. Validity:

This quotation is open for acceptance for a period of 45 days from the date of this quotation. Thereafter, prices are subjected for approval from us. The product prices will remain firm until completion of delivery, if the technically and commercially clear purchase order is received within the validity period together with the advance.

X. Warranty:

12 months from date of commissioning or 18 months from date of supply for all proven manufacturing defects related to workmanship, and not related to operational errors. Warranty shall not be applicable if installation and commissioning is not done as per standard procedure prescribed by JOG Waste to Energy Pvt. Ltd. After any warranty repair, the replaced parts shall have a warranty period of the leftover part of the original warranty.

XI. Force Majeure Conditions:

The delivery indicated is subject to delay that could arise due to our principal/ supplier for reasons beyond their control, covered under the force majeure conditions like strikes, lockouts, fire, accidents to our suppliers works or at site or during transit, war, labour disturbances, natural calamities, acts of Government or law which affects the production schedule of our suppliers or ours.

XII. Liability:

JOG's total liability, of whatsoever nature, arising out of its product in the Warranty period, is restricted to Ex-works price of the product only, as paid by the customer. No liability, of whatsoever nature, will lie with us after the Warrantee period.

XIII. Arbitration and Law Applicable:

Any dispute whatsoever arising out of the contract unless amicably settled shall be referred to two arbitrators residing in Ahmedabad, India, each holding a responsible position in a firm or a company which is a Member of the Gujarat Chamber of Commerce and Industry, one to be appointed by each party to the dispute, unless otherwise agreed, the contract shall be governed by Law of Ahmedabad Jurisdiction.