

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

BIOWASTE TO BIOCNG PROJECT





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Client: M/s. NARUMA INDUSTRIES PVT LTD (GSTIN:05AAICN2846A1ZT)

Co Person: Mr.Vanshaj ji & Mr. Rishab 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

M/s. Naruma Industries Pvt Ltd 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/VPSA 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 **Naruma Industries Pvt Ltd**, to develop a first-class solution for this CSTR Technologies based biogas Generation & upgrading project based On VPSA 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 **Naruma Industries Pvt Ltd**,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 **14,100 m3 per day** and **Biogas Generation (12,700 m3 per Day-consider 90 % of the design capacity)** (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 (m3/kg ODM)	Biogas yield (m³/day)	Biogas yield (m³/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	TE T⁷⁵ EN	1,125	0.55	618	2,25,570
Total	130	47,450	-	29,100	trash our	futu r e	-	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	14,100
4	Biogas yield (Generation)	M ³ / day	12,700
5	Methane content CH4	%	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	00	36 - 38
11	Pressure in the digester	KPa	0.5
12	Overall dimensions of the digester (diameter / height) Approx.	urfMtrure	32/9
13	Solid fertilizers yield (70-80% wet)	T/day	30
14	Liquid fertilizers (99% wet)	KL/day	100
	Biogas To BioCNG plant char	acteristics	
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	500
19	Total Electrical power Running Load	kW	380

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.C5H7NO2 + HCO3 + H2O \rightarrow CH4+CO2+NH4

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	Equ	ipment	Descriptions	Qty			
1	Weighbridge - 50 Ton						
	Design, fabrication, supply, installation, testing & commissioning of Fully						
	Welded Mod	Welded Modular Type Weighbridge of 50 tons, Indicator, Load Cells,					
	Platform, LED	atform, LED display, suitable software.					
	• The job shal	• The job shall be undertaken on turnkey basis covering mechanical,					
	Electrical & e	lectronic works including s	supply of all required mater	rial for			
	electrical wo	ks including earthing.					
	Making of ap	proach ramps to weighbri	dae shall also be included	in the			
	Scope.		5				
		FICATION OF WEIGHBRID	GE STRUCTURE				
	The platform of	the Weighbridge is of rob	ust construction and is des	signed			
	to withstand d	vnamic loads and side	loads. The structure w	/ill be			
	constructed of	rolled steel sections &	plates and strong enou	ah to			
	withstand full l	ad without undue defle	ection Longitudinal and L	ateral			
	stoppers are pr	ovided to restrain the m	ovement of the platform	in the			
	borizontal plane	The top of the platform i	s covered with anti-skid st	rips of			
		the top of the platforms	v strong to carry the may	rimum			
	laged. The structure is designed for an every such and the structure is designed for an every such and the structure is designed.						
	deflection is con	bad. The structure is designed for an overload capacity of 150% and the					
	aeriection is <span 450="" at="" full="" its="" load.<="" td="">						
	latform		e DETAILS				
Platform	Size	10 0 X 3 0 Meter					
Main LI-B	Size	$300 \text{ mm} \times 140 \text{ mm} - 11 \text{ Begm} - 04 \text{ NOS}$					
Cross Su	pport	16 mm Thick Plate Betwee	en Two Main Lona Beam				
Top Plate)	08 mm Top Plate with an	ti-skid strips				
Foundati	on Frame	100 mm X 50 mm Long Fr	ame with Fully Welded 350	mm X			
		350 mm X 16 mm Plane F	late				
Border Fr	ame	100 mm X 50 mm - Both	Side Heavy Duty Frame witl	n Side Wall			
		Mounting					
Load Cel	ls MS Plates	150 mm X 150 mm X 16 mm - Load Cell Top & Bottom Plate					
Guide Ra	iil	Round Pipe Based Side Frame - Ø 100 mm - Both Side					
Fastener	s	As per Required & IS Star	dard				
Paint		2 coat of ant-corrosive primer and 2 Coat Enamel Paint					
Material		All Material will be IS 2062	2 Standard				
We Make	e U Beam Type We	eighbridge From HT-350 G	rade Steel				
Approved By Weights & Measure Department							



No.		Equipment		Description	s	Qty
2	Pumping Equipment and Grinder with Motor					
2.1	Substrate supply pumps (2 No.) (1W+1S)-50 m3/hr					3
	Separator	Supply Pump (1 No.)-40	m3/	hr		Nos.
	Progressing Correspond Differential Rotational S Power - 10 F	g cavity screw pumps ca ding to dynamic viscosity Pressure - 2-4 bar, Speed - 158 rpm I P	paci 1 of r	ity approx. 50 m3 / nedia 500-1000	/h cps),	
2.2	Grinder wit	h strainer -50	Ma	iterial of		1
	m3/hr Grinder is u protection f objects. It d specifically maceration in capturing objects. The shafts are s the incomin	sed for Pump from solid foreign lesigned for the efficient n; it is very effective g irregular shaped e layback cutter set at an angle to ng flow.	Co Roi Sha sea Arr Me Ho Ca Inle DN	nstruction :- uting Parts:SS304 aft Sealing :mech al (Cast Iron) angement: chanical seal using / End Cove st Iron, All Rotatin et and Outlet S 150 PN 16	n. er: - ng Size:	No.
	MA	TERIAL	PUMP CONSTRUCTION		N	
Pump Hou	using	Cast Iron	Suc	ction Flange	DN150, PI	N16
Rotating F	Parts	SS304	Dis	charge Flange	DN150, PI	N16
Stator		S62L	Dis	ction Orientation charge entation	Horizonte	al
Shaft Sea	I	Gland Packing (w) Flushing.Prov	Joi	nt Type	B Joint	
Seal Plan		02	CIP	Size/Orientation	No/No	
SM Pin Joint Seal		S65L	Co SM	unter Piece- S/TCL	No	
O " Rings		\$65L	Ins	pection Port	NO	
Lantern		Cast Iron	Spe	ecific Standards	Not appl	icable
Base Plate	9	Mild steel			Not appl	icable



Νο	Equipment	Descriptions	Qty			
3	Mixing Equipment					
3.1	Agitator for Mixing Pit (Feed Mixing	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, V1,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 I Side Entry Type Agitator in CSTR Bas Stirring	Package sed Digester for	2 x 6 Nos.			
	Digester Dimension don't tras	32 Mtr x 9 Mtr	2 Digester			
	 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 					



	Rating - 20 HP/380 RPM/AISI304 03 Nos. & 15 HP/380 RPM/AISI304 3 Nos. Over load protection, Motor 1450rpm, SC Ind, 3PH, 50 Hz., 415v, IP55, CI F, V1, Make:CGL/BBL protection class IP55/Insulation	Mounting flange to sui Shaft AISI304, Shaft se box with gland pack AISI304, Axial flow Balancing Dynamic. HRTTime:28-30 Days Temperature:36-38 °C	it tank flange, ealing Stuffing king, Impeller type, bolted,
	class F with Gear Box or Belt Pully Arrangement , Couplings Flexible, Lantern support CS Epoxy coated. Shaft & Impeller :SS 304 (Graphite Teflon ring) Bearing : Spherical Roller SKF Impeller :Axial Flow Blade: Hydrofoil Nozzle : 600 NB	Temperature.30-38 C	
4.1	Shaft length 1.5 to 2 meter Heating Arrangement For Digester		For
			2Digester
	 Circulation pump Three-way electric valve for temperature regulation with electric drive Thermometer Heat Exchanger 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. Piping has to be made SS or HDPE, rust proof structure, of appropriate Diameter, conforming the relevant BIS Standards. 	Heater Range: 4 x 36 KW Circulation Pump Q =10 m3/hr (2 No) Piping Network Arrangement with Clam and Related Other Accessories	ν ηρ



5	Equipment /Machinery For Fertilizer Tank	1 Set			
	Civil Work (10 Mtr x 5 Mtr) with Below listed equipment for fertiliser tank				
	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	
	Double membrane Balloon and	TYPE: Double	
	its accessories,	membrane	
	Imported Membrane fabric for	• Dimension: As per	
	inner and outer balloon, WASTE	Digester	
	Pressure Safety valve for air.	 Diameter 32 Mtr. 	
	Propute and vacuum Safety	shape conical	
	Pressure and vacuum salety	PVC Coated Fabric	
	vulve for blogus.	 Fire Retardant, 	
	Air blower with hose pipe.	temperature resistant	
	All accessories. Like pressure	up to 50 deg c.	
	gauge, nrv, fittings, and	UV protected	
	mounting hose.	• 1100 gsm +/- 50 gsm	
	All companion flanges.	• Fabric: Fire Behavior B1	
	Gas level indicator.	Grade	
7	Horizontal Solid liquid separator		2 set
	Our Horizontal solids-liquid separating	g Make: Italy,	1



machine based on screw conveyor	Model: 0=65				
technology. Separation Performing by	5.5 KW				
 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. Slide Valve and levers system for separation level adjustment Set of hoses for connection to 	5.5 KW 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				
pipeline of Subtract supply and					
Filtrate discharge					
INCLUDING					
Loading hopper in SS304					
Body in SS304					
 Techno polymer Diaphragm Pressor 					
 Support frame in hot dip galvanized 	steel				
Solid Plug shelf support	Solid Plug shelf support				
Modular Screw in techno polymer SI	Modular Screw in techno polymer SINT EC 90 & SS304 Screen in SS304				
0.5mm WASTET	OENERGY				
Round Filter Element don't tras	h our future				

8	700 m3/hr Catalyst Tower Based H2S removal System	1 Set		
	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.			
	Shape : Cylindrical			
	Desiccant Activated Carbon			
	MOC Internal parts :S.S 316			
	MOC shell :C.S./HDPE			



9	700 m3/hr biogas Upgradation systems with 350 m3				
	hr				
	Upgradation of Biogas by Low pressure	Capacity: 700 m3/hr			
	swing adsorption, using energizer for	Pressure: 150 mmWC to 0.8			
	better separation rate was evaluated	Bar			
	to produce fuel grade methane. Three	CH4 Purity: >95%			
	different adsorbents were employed to	H2S: <10 ppm			
	evaluate the process performance with	Other: Balance			
	equilibrium- and kinetic-based	Output Pressure:			
	adsorbents.	0.3-0.4 Bar			
	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 WASTETO	ENERGY			
	• 40 m3 surge Tank				
	Instrumentation package	ourrature			
	 Control panel PLC base with RS 485 				

10	350 m3 hr Recovery Unit & Accessories				
	(2 tower System) <mark>(Methane Loss < 2 %)</mark>				
	Methane recovery means the exhaust	Capacity: 350 m3/hr	1		
	gas which evacuated from the	CH4 Purity : >55-60%			
	adsorption vessels having 10 to 15% H2S: Nil				
	methane on average its 12% methane in	Other: Balance			
	the exhaust stream that is too much so, Output Pressure:				
	we collect this gas in a gas tank and 0.2-0.3 Bar				
	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.				



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

11	Booster compressor (400 m3/hr)	1	
	Capacity: 400 m3/hr	Inlet Condition	I
	Make: Imported Make Number of stages:5 Drive: V Belt Oil lubricated, Air Cooled cylinder with fins on surface Inter connecting piping from first stage to outlet separator last stage Crankcase with mechanical seal	Gas condition at inlet**: Bl Capacity:400 m3/hr Suction Pressure :1.05 to 1.3 Suction Temperature:40°C Discharge Condition Discharge temperature: A 15°C Discharge Pressure: 250 Bara	O METHANE
	company std		
12	B-CNG Filling station For Cylinder	Filling	1 set
	Filling station SS material of 2 Nos Pressure gauge safety valve isolation valve NRV Header stand High Pressure Flow meter with ESD system Gas leak and fire detection system, Hi Psi, and quick-release hose coupling (5000 Psi) max working pressure inclusion	gh Pressure filling Hose WP with top-hat sealing, for 34	h 5000 5 Bar



13	Automation Elements	Package
	Ph Online sensor	Qty as per
	Pressure sensor	requirement
	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 filed instrument to control room 	
	 Feedback signal (Audio visible alarm) for balloon air blower and on/off valve 	

14	Electrical , Instrumentation and control system			
	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. don't trash our future			
	• 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
	 Electrical distribution panel Grid Transformer/LBS/HTMC for Plant All Cables, UPS /DG Set FOR Backup Power 10 kVA All Earthing 	

16	BioCNG Cascade			
16	BioCNG Cascade 40 Cylinder Cascade @ 260 Kgf/cm ² 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 • Tubing & Fittings: SS 316 • Bank: Single Bank • Pressure Gauge:	Specification :- Water Capacity-75.0 Ltrs per Cylinder Cascade Water Capacity- 3000.0 Ltrs • Working pressure of 250 Kgf/cm ² • OD- 267 mm • Dim-3.2 x1.85 x1.90Mtr • Cascade Weight-5.0 Ton	5 Nos.	
	 Pressure Gauge: 0-400 bar 4" dial (1 pressure gauge) Manifold: Brass Bull Nose : Brass Filling arrangement : NZS probe suitable Frame : Square pipe 	Approx. Note: All cylinders are Hydro static Tested		



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

18	Solid Fertilizer Packaging and bagging System1 set					
	Here are some of the major features of packaging plant are Enlisted					
	below:					
	Speedy weighing and filling of bagsBag 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 O ENERGY 					
	 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	stationary	l set			
	measuring device					
	Туре		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 – 5	0 or 100 % vol.	Electro-chemical sensor		
	Moisture Analyzer (Dew Point meter)					
	Range		+ 20 to – 110 de	eg C		
With resolution 1 deg C,						
Make of analyzer with sensor: - GE Sensing Germany				ermany		

20	Lab equipments for testing slurry and gas chemical	1 set			
	parameter				
	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 A STETO ENEDGY				
	Ch4 and co2 cylinder				
	Biogas sample collection kit				

21	Annual operational spare for smooth operation of the	1 set
	plant	
	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.	МН	10			
8.	АН	NA			
9.	Span in M	12 Meter approx.			
10.	Speed (MPM) MH	2.0-3.0			
11.	СТ	10-12 STE TO ENERGY			
12.	LT	12-15 don't trash our future			
13.	Power Supply	415V, 3Ph, 50Hz+-3%			
14.	Control Voltage	110V			
15.	MH Motor				
16.	Туре	Sq. Cage Crane duty motor			
17.	HP	10 HP			
18.	No Off	1			
19.	CT Motor				
20.	Туре	Sq. Cage Crane duty motor			
21.	HP	1.0 HP with VFD			
22.	No Off	1			
23.	LT Motor				
24.	Туре	Sq. Cage Crane duty motor			
25.	HP	1.0 HP with VFD			



26. No Off	2	
Limit Switches		
	1 No. Rotary type to prevent over	
Hoist- MH	hoisting & over lowering	
СТ	Optional at extra cost, Mechanical stopper provided	
LT	Optional at extra cost	
Brake Type		
MH	AC Electromagnetic Disc/ Hydraulic Thrustor brake	
АН	NA	
СТ	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	
Туре	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)	45on't trash our future	
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				
	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 / U			
	Staking charges at site			





23	Civil Work			
	Admin Office	225	SQMT	
	Shed for Filling header with cylinder cascade	320	SQMT	
	Way Bridge cum Security Room	16	SQMT	
	Gate	3	No.	
	Boundary (Total Length 700Mtr.)	700	Mtr.	
	Internal Road 6 + 2 (Open Space) Mtr Wide) Length-625 Mtr	5,000	SQMT	
	Feed Preparation Platform with Pump	350	SQMT	
	Feed Mixing Tank (2 x300 CUM)	600	CUMT	
	Machinery Shed (Purification and Compressor)	610	SQMT	
	Main Digester (Dia 32 Mtr.)	7,234	CUMT	
	Main Digester (Dia 32 Mtr.)	7,234	CUMT	
	Underground Water/ Slurry Storage	100	CUMT	
	Solid Liquid Separator Platform	TO E24 ERG	SQMT	
	Fertilizer Shed with Packing On't tra	ish o ₆₀₀ futu	SQMT	
	Digested Slurry Tank	400	CUMT	
	Lagoon	552	SQMT	
	Technical room/panel room + Lab Area + Security Office	91	SQMT	
	Staff Room with Kitchen, Bathroom (3 BHK House)	225	SQMT	
	Labours Rooms	165	SQMT	
	Toilet Block + parking	20	SQMT	
	Toilet Block + parking	20	SQMT	
	Other Foundation work as per project	civil work require	ments	
	Other Building services as per project requirement			



Scope of Supply

Cr No	Scope of Supply	E – Party responsible for EXECUTION		
51.110.		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 H2S Removal system (H2S <= 2500 ppm).	E	
12.	One Filter Separator	Е	use after H2S Removal System
13.	700 m3/hr biogas Upgradation system with Accessories	E	
14.	350 m3/Hr CH4 Recovery System <mark>for</mark> Methane Loss <3-4 %	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.	Е	
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.
В.	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	8,25,000/-	8,25,000/-
2.	Pumping Equipment and Grinder with Piping arrangement for feeding	As above Mention	75,25,000/-	75,25,000/-
3.	Equipment/Machinery for Feed Mixing Tank	2 Nos.	35,14,000/-	70,28,000/-
4.	 Digester Mechanical & Electrical Equipment Package 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 connection nozzles 	Digester	IERGY 1,80,00,000/-	3,60,00,000/-
5.	 Fertilizer tank machinery Top entry agitator Pump for slurry transfer All type of piping and valve arrangement Other fitting accessories 	1 Set	35,50,000/-	71,00,000/-
6.	JOG Type: JOG Membrane Mounted on Digester Tank (Dia - 32 mtr)	2 set	45,50,000/-	91,00,000/-



7.	Horizontal Solid liquid separator	2 set	31,00,000/-	62,00,000/-
8.	Catalyst Tower Based H2S Removal System (700 m3/hr)	1 Set	65,50,000/-	65,50,000/-
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	2,40,00,000/-	2,40,00,000/-
10.	350 M3/hr Recovery System - (Methane CH4 loss < 2 %) as per given scope of supply 2 Tower Based systems	l 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.	l set	1,45,00,000/-	1,45,00,000/-
12.	BIOCNG Filling Station	l set	9,50,000/-	9,50,000/-
13.	Automation Elements	Package	78,21,000/-	78,21,000/-
14.	Electrical, Instrumentation & Control Panel Electrical Equipment- PLC Control panel, Power panel, Cable for all these from field to panel room	TE TO E	NERGY 81,65,000/-	81,65,000/-
15.	Electrical and Electronic Requirement • Distribution panel • Transformer • Cables & Earthing • Other Electrical Accessories	1 set	85,20,000/-	85,20,000/-
16.	40 Cylinder cascade	5 Nos.	18,50,000/-	92,50,000/-
17.	Solid Fertilizer Packaging & Bagging System	1 Set	71,50,000/-	71,50,000/-



18.	Liquid Fertilizer Packaging & Bagging System	1 Set	51,50,000/-	51,50,000/-		
19.	Product Gas Analyzers Online gas Monitoring system with Analyzer for H2S, CH4, O2, Co2 Online dew point meter	l set	10,50,000/-	10,50,000/-		
20.	Laboratory Equipment	l set	7,00,000/-	7,00,000/-		
21.	Annual operational spare for smooth operation of plant	Lum Sum	25,80,000/-	25,80,000/-		
22.	All Civil Work-Building, Digester, Shed, Road etc. (Mixing Pit, Digester, Digested Slurry Tank Solid Liquid separator and shredder Platform, H2S and Moisture Removal System shed and other plant and machinery shed, all foundation, control room etc) As per detailed mention in Proposals	l set TE TO E	7,25,84,000/- NERGY	7,25,84,000/-		
23.	Fire Fitting Equipment as per above scope of supply	Lum Sum	41,00,000/-	41,00,000/-		
24.	Clearing, Forwarding, Handling & freight cost etc.	Lum Sum	27,42,700/-	27,42,700/-		
	25,81,40,000/-					
	3,09,76,800/-					
	28,91,16,800/-					
In Word- Twenty-eight crore ninety-one lakh sixteen thousand eight hundred 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:

9-10 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) 25% Net Order Value as advance with clear signed purchase order.
- b) 15 % 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:

don't trash our future

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.