



RAJ PROCESS
EQUIPMENTS AND SYSTEMS PVT. LTD.

Compressed BIO-GAS (CBG)



**Cost effective
practical solution**



**High calorific
value than CNG**




**Sulphur rich
fertilizer biproduct**



**Low opex
solution**



Bio-CNG



World-Class Equipment With Best -In-Class Technology

RAJ Process Equipment & System Pvt. Ltd., established in 2003, is a rapidly growing engineering company specializing in process equipment & systems. We offer design, engineering, manufacturing, & export services, including turnkey projects. Our expertise includes Distillery, Dehydration Technology, Evaporators, Condensate Polishing Units, Spray Dryers, Rotary Dryers, Granulation Plants, Powder Handling Systems, & more. We have a reputation for delivering optimal solutions to various industries across Asia and beyond. Our focus on Technology, Service, and Customer Satisfaction drives our Success.

Compressed Bio-Gas (CBG)

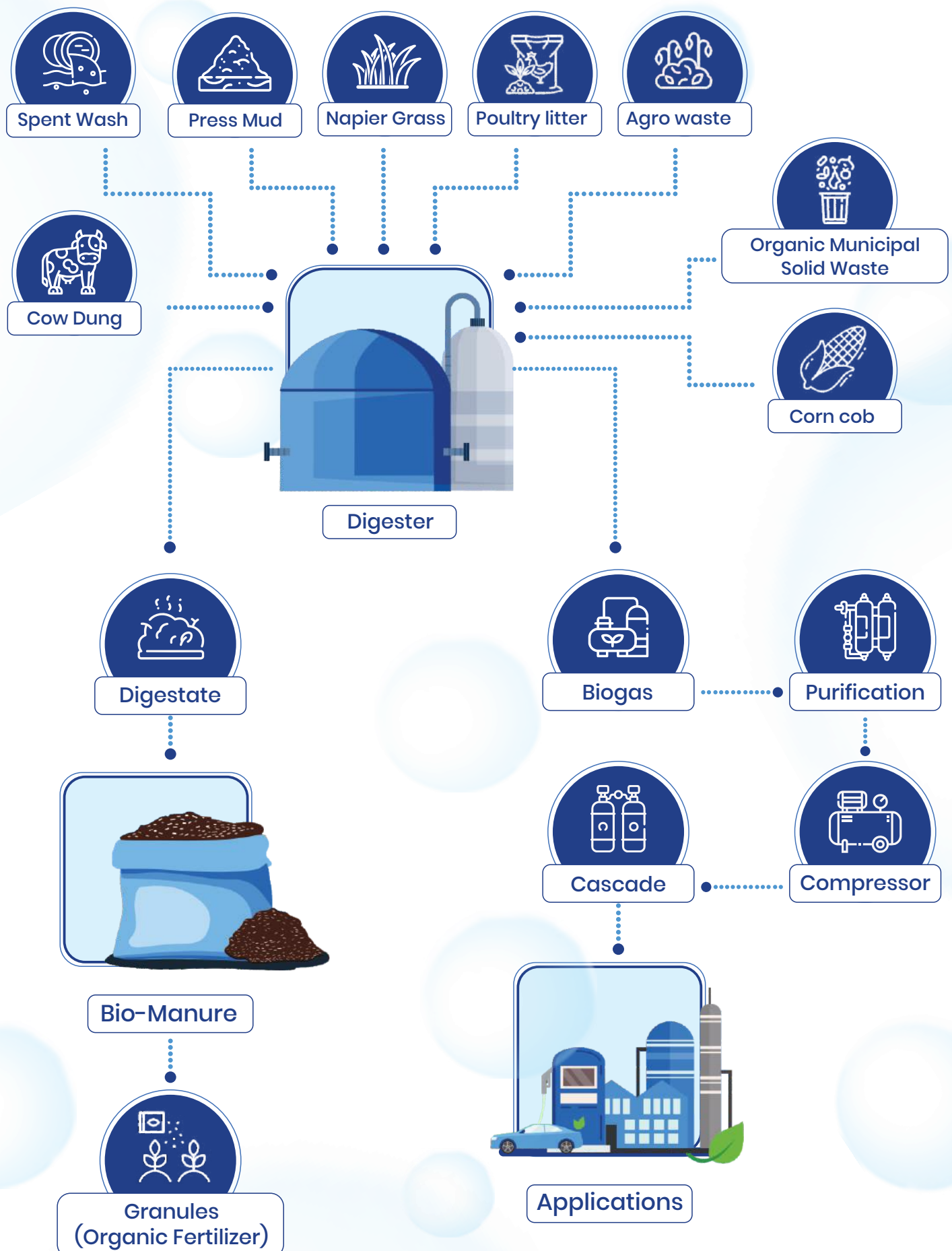
The world is rapidly moving towards sustainable and renewable sources of energy, and compressed biogas (CBG) seems to be the fuel of the future. CBG is a clean and green energy source produced from the effluents such as Spent wash, press mud, Napier grass and decomposition of organic waste.

The process of producing CBG involves the collection of organic waste and the conversion of this waste into biogas through anaerobic digestion. This biogas is then compressed to increase its density and stored for future use.

Overall, the adoption of CBG as a fuel of the future is a step in the right direction towards a cleaner, greener, and more sustainable future.



Process Flow Diagram Of Compressed Bio-Gas Unit



Process Description

Biogas is produced through the anaerobic digestion of organic waste materials. In this process, bacteria break down the organic matter in an oxygen-free environment, generating a mixture of gases, primarily methane (CH₄) and carbon dioxide (Co₂), along with small amounts of hydrogen sulfide (H₂S) and moisture.

The raw biogas is then purified to remove impurities and non-methane components. The purification process typically includes desulfurization to remove H₂S, CO₂ removal through Raj Process Hybrid Biochemical Technology. This purified biogas, rich in methane (up to 96-98%), is known as Bio-CNG or Compressed Biogas (CBG). The final product can be used as a renewable fuel for vehicles or injected into natural gas grids. The process is eco-friendly, contributing to waste management and reducing greenhouse gas emissions, while producing a clean, sustainable energy source.



Biogas & CBG production efficiency of different organic feed stocks

Feedstock	Feedstock Requirement	CBG Production
Agriculture residue	20-25 kg	1 kg
Press mud	25-30 kg	
Sewage sludge	20-30 kg	
Bagasse	20-25 kg	
Municipal solid waste	25-35 kg	
Cow dung	50-70 kg	
Chicken litter	25-35 kg	
Forest residue	20-25 kg	
Napier grass	18-20 kg	



Process



Biogas generation

The reactors employed for this purpose adhere to a Continuous Stirred Tank Reactor (CSTR) configuration, characterized by their operational dynamics. These reactors function optimally under mesophilic temperatures, which are moderate and conducive to the efficient biogas generation process. This strategic alignment enhances the overall efficiency and performance of the system, leading to the successful conversion of organic waste into valuable biogas while maintaining operational robustness.

Biogas cleaning process

This cutting-edge Indian technology elevates biogas purity beyond 96% methane gas, adhering to government standards. The weather-resistant absorber columns efficiently eliminate H_2S and CO_2 . The interconnected upgradation sections maintain uniform gas pressure via a central gas holder, backed by safety valves and sensors tied to a PLC for comprehensive safety.

The process begins with raw biogas from digesters treating organic waste. An innovative biochemical method, including an aerobic reactor, absorber, and sulphur recovery unit, converts H_2S -containing gases to elemental sulphur.

The resulting biogas, with reduced H_2S at 200 ppm, undergoes further refining through a low-pressure compressor unit. Real-time monitoring is facilitated by online H_2S analyzers, enhancing control, and accuracy.

CO_2 removal from biogas employs a packed column with soft water as solvent under 7.5 kg/cm^2 pressure, reducing CO_2 to $<4\%$. A closed-loop system regenerates soft water, minimizing chilling costs. Moisture removal follows via a Dryer Unit. Dry methane, free of H_2S and CO_2 , is achieved through a two-vessel molecular sieve dryer. Biogas then enters a $6-7 \text{ kg/cm}^2$ buffer vessel with pressure control and PRV for closed-loop gas recycling, before advancing to the high-pressure compressor.

Cascade Filling

Cascade filling is a method to efficiently fill gas cylinders. The CBG is to be compressed at 250 Bar and supplied through Cascades.



Case Study

Raj Group, in collaboration with M/s. Jakraya Sugars Ltd., achieved a significant milestone by developing one of Asia's largest biogas upgradation plants at Watwate, Solapur, Maharashtra. This pioneering project involves the conversion of biogas to pure methane, making it a standout venture.

The project's scale is impressive, featuring a 20 TPD BioCNG plant dedicated to biogas upgradation. This process utilizes spent wash and organic waste from the sugar industry to produce high-quality biogas. Notably, this venture stands as the first of its kind, a remarkable partnership between Raj Group and a large cooperative society. The plant effectively purifies and enriches approximately 48,000 m3/day of biogas from both spent wash and press mud, yielding around 20,000 kg of CNG grade fuel, also referred to as CBG (compressed biogas).



Features Of This Project



Competitive pricing



Renewable energy source

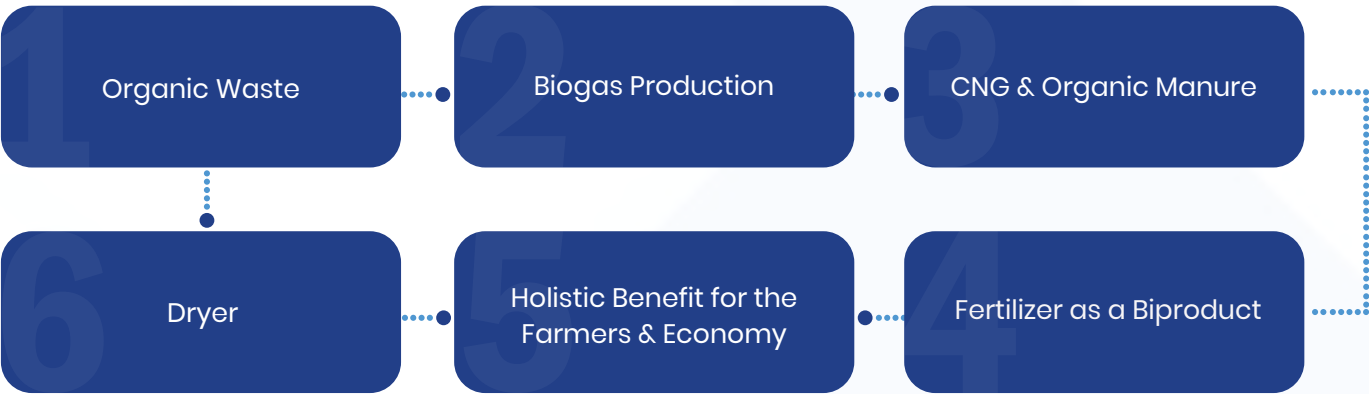


Alternative to fossil fuels



Waste to wealth

A Sustainable Cycle



Infrastructure That We Have

We are one of the leading process equipment manufacturer from India. We have supplied our products and Services in India as well as in abroad. Our company is Certified with ISO 9001-2015, ISO14001:2015, BS OHSAS 18001:2007, ASME 'U' Stamp, 'S' Stamp, National Board 'R' Stamp.



Corporate Office

Sadanand Business Center, Sr.No. 140/1, 14th Floor,
Baner, Pune - 411 045 Maharashtra, India



Unit I

Plot No. 166 & 167, Sector No.7. PCNTDA Bhosari,
Pune - 411 026 (India)



Unit II

Sr. No. 373, Village Kharabwadi, Chakan,
Tal - Khed, Dist - Pune (India)



Unit III

Plot No. -14, SEZ, Village - Nimgaon, Tal - Khed,
Dist - Pune - 410505 (India)



Unit IV

Gat No. 530, Alp Ahire, Tal - Khandala,
Dist - Satara - 412802 (India)



Unit V

Gat No. 118/2, R, A/P- Wasuli, Tal - Khed,
Dist - Pune - 410501 (India)

Our Other Offerings

Turn- key Plants

- Distillery Plant – Molasses & Grain Based
- Zero Liquid Discharge Plant
- CBG Plant
- Guar Gum
- Starch and Glucose
- Detergent Powder Plant
- Nutraceutical Powder Plant
- Fruit and Vegetable Processing

Boilers

- Multi Fuel Package Boiler with External Furnace
- Multi Fuel Package Boiler with Integral Furnace
- Oil Fired Boilers/ Waste Heat Recovery Boilers
- Captive Plant High Capacity Boilers
- Turnkey Co-Generation Power Plant
- Thermic Fluid Heater And Hot Water Boiler

Evaporators

- Falling Film Evaporator
- Forced Circulation Evaporator
- Integrated and Hybrid Evaporator
- Standalone Evaporator
- MVR Based Evaporator
- Solvent Stripper
- ATFE

Mixers

- Cone Screw Mixer (Nauta Mixer)
- Ribbon Blender
- Paddle Mixer
- Continuous High Speed Mixer
- Double Cone Blender
- Plough Shear Mixer
- Conical Blender
- Conche Mixer

Dryers

- Spray Dryer
- Rotary Dryer
- Spin Flash Dryer
- Flash Dryer
- Rotary Vacuum Dryer
- Paddle Dryer
- Continuous Fluid Bed Dryer
- Steam Tube Bundle Dryer
- Cone Screw Dryer
- ATFD

Process Equipments

- Heat Exchanger
- Reactors
- Dust Collection System
- Wet Scrubber
- Bag Filter
- Screw Conveyor
- Pressure Vessel
- Silos



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