

# BIOGAS AS A LOW COST ENTREPRENEURSHIP MODEL FOR ENERGY SECURITY

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# BIOGAS

the gas generated as a product of anaerobic digestion of organic materials has the potential of providing a devolved, sustainable energy supply for the burgeoning rural sector in developing countries



**Disposal  
and  
treatment  
of  
biological  
waste**

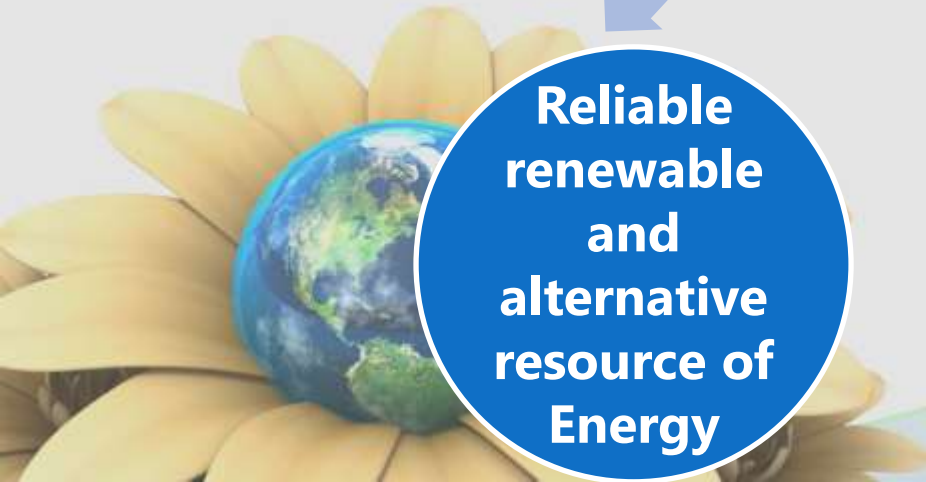
**Anaerobic  
fermentation  
- a superior  
alternative to  
composting.**

**It has a  
typical  
calorific  
value of  
21.48 MJ/m<sup>3</sup>  
or 4,800  
kcal/m<sup>3</sup>**

**Why should we  
go for biogas?**

**Reliable  
renewable  
and  
alternative  
resource of  
Energy**

**Potential  
reduction  
of green  
house gas  
emissions**



# Composition of Biogas

- Methane 50-70%
- Carbon dioxide 30-45%
- Water 0.1%
- Hydrogen sulphide 0-1%



# Common Uses of biogas

- Cooking
- Lighting
- Power generation
- **Transport Fuel**





**KVIC Model Biogas Plant**



**Deenbandhu 2m<sup>3</sup> model Family size biogas plant**



**A Pre-fabricated RCC based Krishna model fixed dome Biogas Plant**



**Sintex make Pre-fabricated HDPE material based 2m<sup>3</sup> Deenbandhu Model Biogas Plant**





# BIOGAS PLANT DESIGNS



# New Initiative for Technology Demonstration

- Demonstration of Integrated Technology Package on Biogas-Fertilizer Plants (BGFP) for Generation, Purification/ Enrichment, Bottling and Piped Distribution of Biogas.





# **SOME MEGA PROJECTS BASED ON BIOGAS POWER GENERATION TECHNOLOGY IN INDIA**

**1 MW power plant in Ludhiyana, Punjab running on  
cowdung**



# **1.89 MW POWER GENERATION PROJECT BASED ON BIOGAS PRODUCED FROM STARCH INDUSTRY LIQUID WASTE THROUGH 100% BIOGAS ENGINES**



## **8.25 MW BIOGAS BASED POWER PROJECT IN A DISTILLERY AT BANUR, DIST. PATIALA, PUNJAB**







*A 30 Tonne/ day capacity Vegetable Market based Biogas Plant at Chennai*





*A 1 MW Distillery Effluent based Biogas Plant at a Sugar Mill in West Godavari  
Andhra Pradesh*



**Medium-size KVIC model Biogas plant in village Bhicmudrak in Surat, Gujarat being used for supplying biogas through a piped network to about 120 households**



The large amount of biogas can be produced from Goushala's/ Dairies/ industries which needs to be utilized it fully apart from cooking and Lighting in a commercial way

**One of the way to utilizing biogas for solving one of  
Today's important problem  
As Fuel for automobiles /tractors**

After removal of  $\text{CO}_2$ ,  $\text{H}_2\text{S}$  and water vapor, biogas can be converted to natural gas quality for use in vehicles.



# Need for the Biogas Refining and Bottling

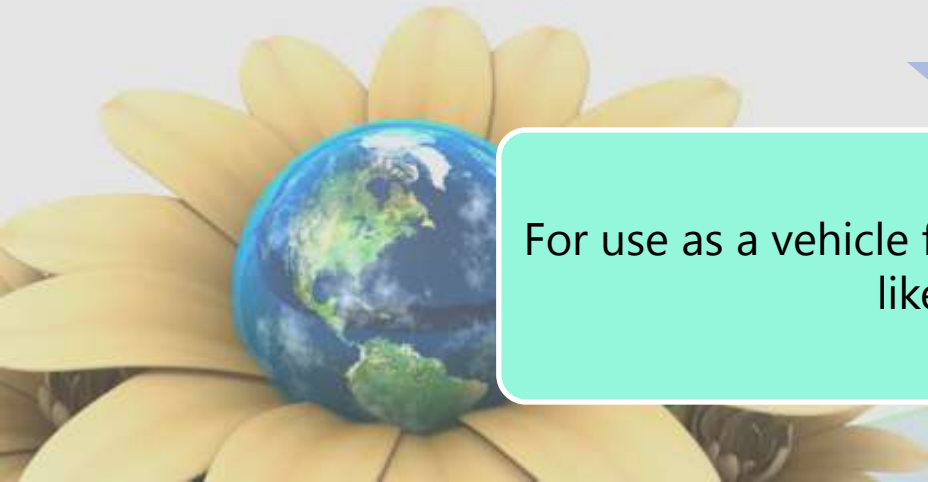
For complete utilization of biogas- to enhance the calorific value of biogas, Before bottling, it should enriched in methane content from 55 % to 98 %; similar to CNG.



For commercialization- application as cooking fuel and vehicle fuel



For use as a vehicle fuel, it should be bottled like CNG.





# Upgraded Biogas Bottle Transportation



# BHILWARA Gaushala



Biogas Purification and  
Bottling plant  
Bhilwara, Rajasthan





# Biogas upgrading for running a car at IIT Delhi



# **Biogas Based Entrepreneurial Avenue Options**





**In rural areas of developing economies many entrepreneurial avenues in the biogas sector are available in :**

- 1) Goshalas,
- 2) Poultry Farms
- 3) Dairy farms
- 4) Cluster of households in villages



# In the developing countries the following biogas enterprenurial options are possible

Cluster of households in villages

## ***Centralized waste collection system***

people put all their wastes- animal dung and human waste, agricultural wastes in a centralized collection place.



***The waste is mixed and shredded then put in the biogas digesters***



***Raw biogas is then purified- Bottled and filled in cascade of cylinders for transportation in rural areas.***

Can be used for cooking or filling in the vehicle cylinders for transport,

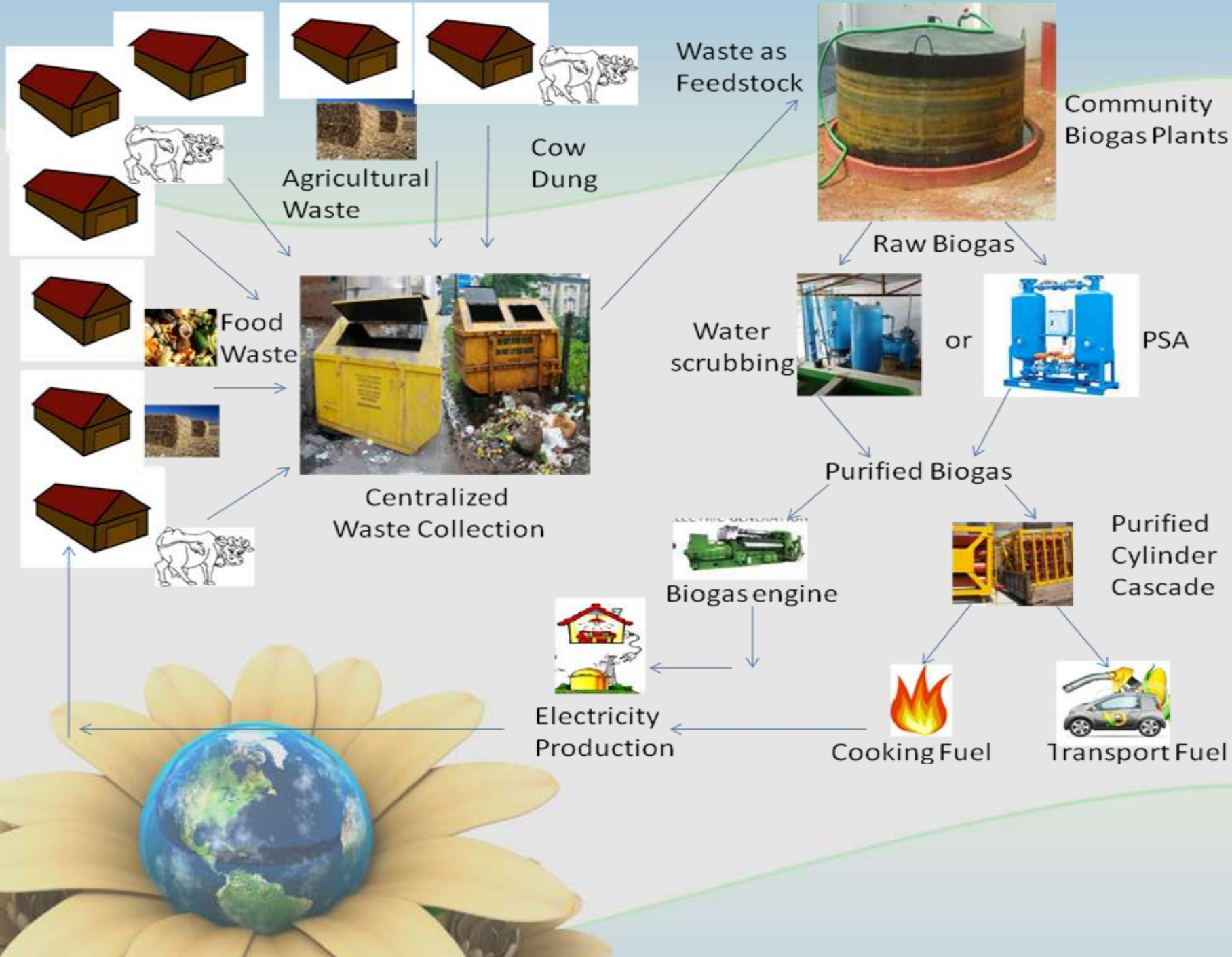
Can be used for generating power using 100 % biogas engines

# Mobile biogas upgrading unit

- Upgradation unit is attached to a vehicle mounted on a trolley. This unit can cater to more than one biogas plants in a cluster.
- The trolley mounted machine with the help of a vehicle can be transported to the digesters located at different locations and raw biogas is filled up in the storage vessel.
- The raw biogas can be upgraded by these mobile units and can fill up CNG cylinders for storage at high pressure and transported to the required place with ease, causing an uninterrupted supply of upgraded biogas







# GOBAR BANK



85 M<sup>3</sup>/Day Digester



BIOGAS PLANT :  
Manufactured and commissioned by:  
*Excell electricals pvt. ltd.*  
Vashier, Valsad

## Community Biogas Plant (CBP)



# Vermi- Compost Unit





# Economic viability of 200 m<sup>3</sup>/day biogas production and 20m<sup>3</sup>/hr upgrading plant

## Biogas Plant

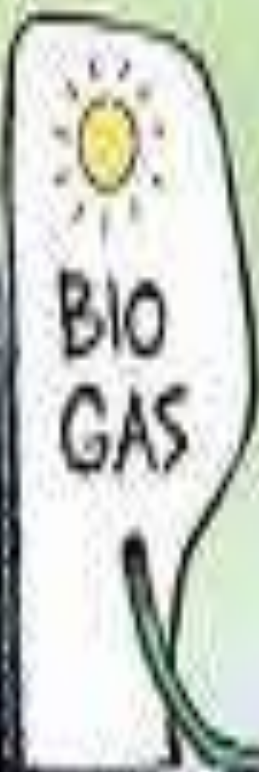
- Waste Required : ~5 Tons Cattle Dung
- Cattle Required : 350
- Water requirement in Biogas Plant: ~ 5 Tons
- Biogas Production : 200 Nm<sup>3</sup>/Day

*Cost: Rs. 2 million*





**THINK!!!**



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