

HACKATHON

on

'ATMANIRBHAR GAUSHALAS'
Where Waste can be Wealth

**GOBAR"DHAN": MAKING
GAUSHALA SELF SUSTAINABLE**



A step towards Sustainability

Koshish Sustainable Solutions Pvt. Ltd.

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**Scalable Business
Model to Transform
Gaushala in a Self-
Sustainable Enterprise**

ABOUT US

KOSHISH is an initiative by a team of young and dynamic professionals from **Indian Institute of Technology (IIT) Delhi**

We as an organization are dedicated to environmental improvements that foster a sustainable future and lead to social and economic progress in the community.

We provide Sustainable and efficient Green Energy solutions by installing up conventional and portable design Biogas Plant & Bio-CNG Projects (Natural Resources Energy) at Gaushala/Dairy.

Most of the dairy and Gaushalas have installed the biogas plants for achieving self-sustainability, where the gas can be utilized for cooking purpose and power generation.



OUR CREDENTIALS

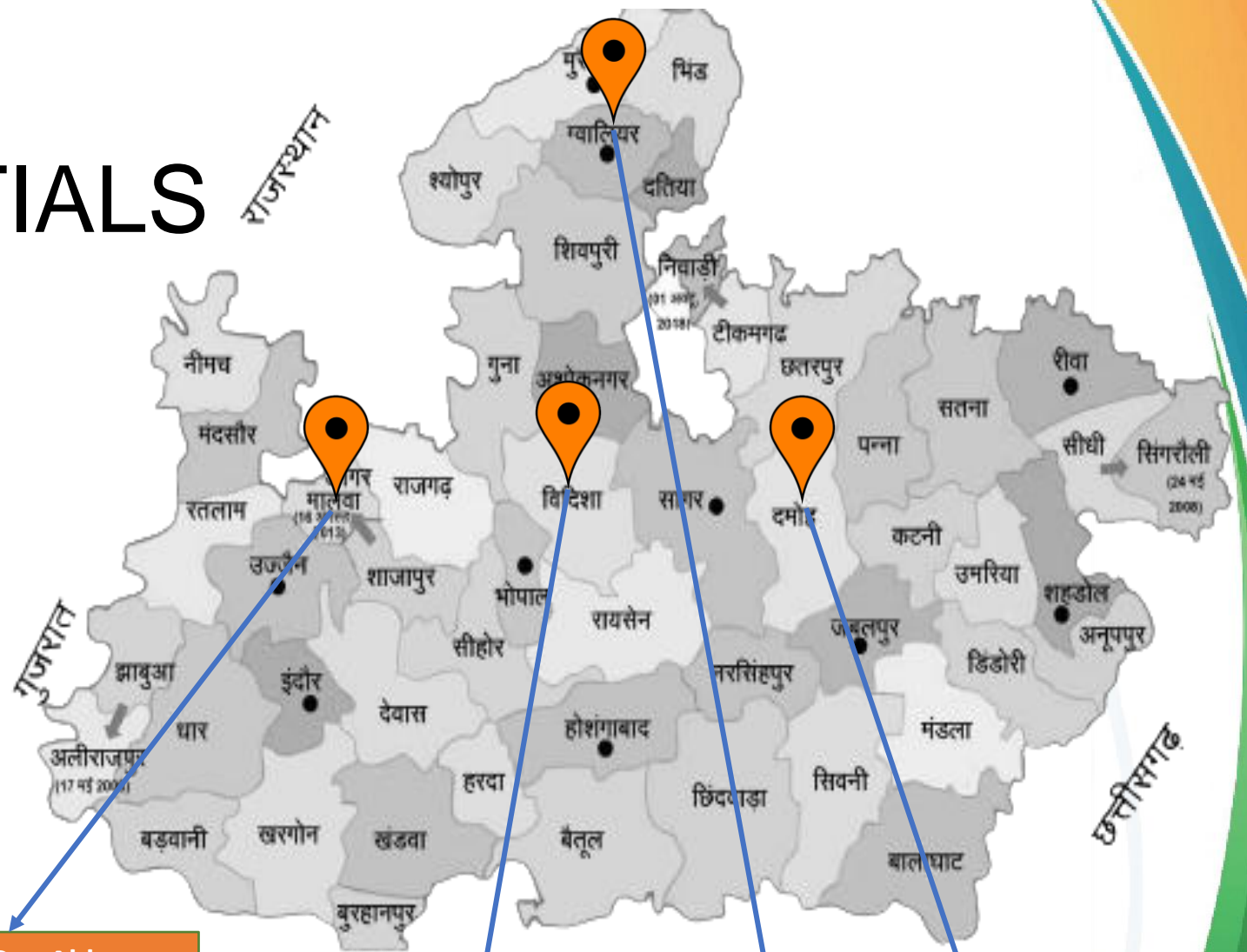
- We have successfully set up more than 40+ biogas plants of different capacities and different organic wastes viz., Cow Dung, Poultry Litter, Piggery Waste and Food Waste.
- We are one of the technical partners for implementation of Gobar-dhan Projects in different Gaushalas under Govt. of Madhya Pradesh.
- We have installed power-based plant at Kanha Upvan Mahewa phal mandi, Gorakhpur, UP and also have installed cow dung-based biogas plant at Gaushala sec-135, NOIDA, UP for cooking purpose

Kamdhenu Gau Abhyaran
85 cum; Cow Dung

Dayodaya Shri Vidhyasagar ,
85 cum; Cow Dung

Irarudham Gau Abhyaran,
85 cum; Cow Dung

Rani Ghati Gaushala, 85 cum; Cow Dung



OUR OTHER MAJOR CLIENTS

Plant Location

Indira Gandhi Delhi Technical university for women (IGDTUW), New Delhi - Food Waste Based Biogas Plant

IOCL R&D Centre , Faridabad, Haryana – Paddy Straw Based Reactor

Indian Institute of Petroleum (Revamping), Dehradun, Uttarakhand – Multiple Waste Based

TATA Tea Estate, Hathikuli, Assam – Tea Waste Based Biogas Plant

Rourkela Municipal Corporation, Odisha – Municipal Waste Based

Ryans Farms LLP, Sonapur, Guwahati, Assam – Piggery Waste Based

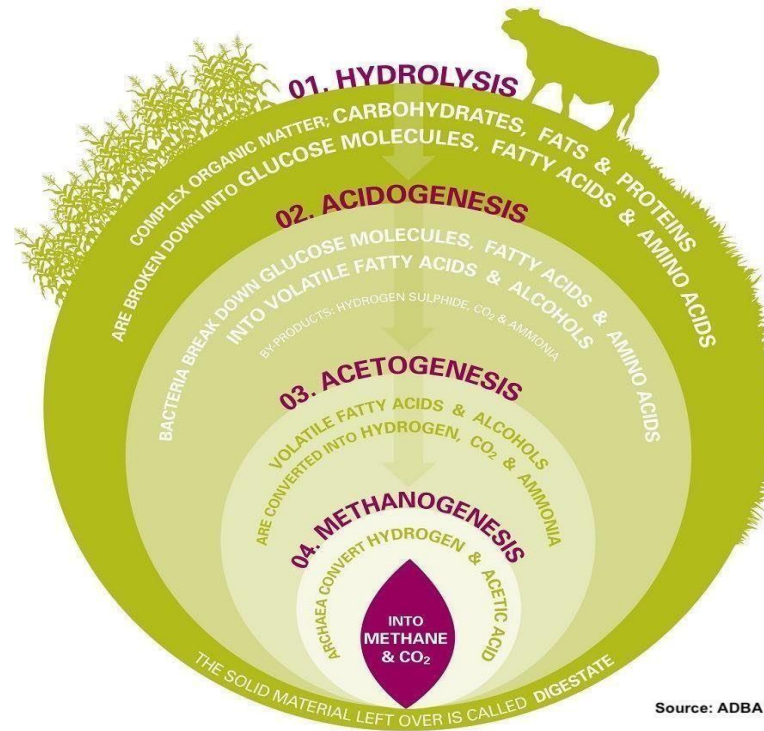
Nutrisource Farms, Dudhiasole, Mayurbhanj, Odisha – Poultry Waste Based

Mrittika Greens LLP, Jhargram, West Bengal – Poultry Waste Based

Biogas and Bio-manure Production Unit

Bio methanation is the process of conversion of organic matter in the substrate to Biomethane (commonly referred to as biogas) and effluent (good Quality manure) by microbial action in the absence of air, known as "anaerobic digestion,"

Biogas is environment friendly and has various applications in cooking, heating etc. and also can be used for the production of electricity and Bio-CNG.



The composition of biogas

Gases	Composition
Methane	55-60%
Carbon Dioxide	35-40%
Hydrogen Sulphide	~ 500 ppm

BIOGAS SLURRY



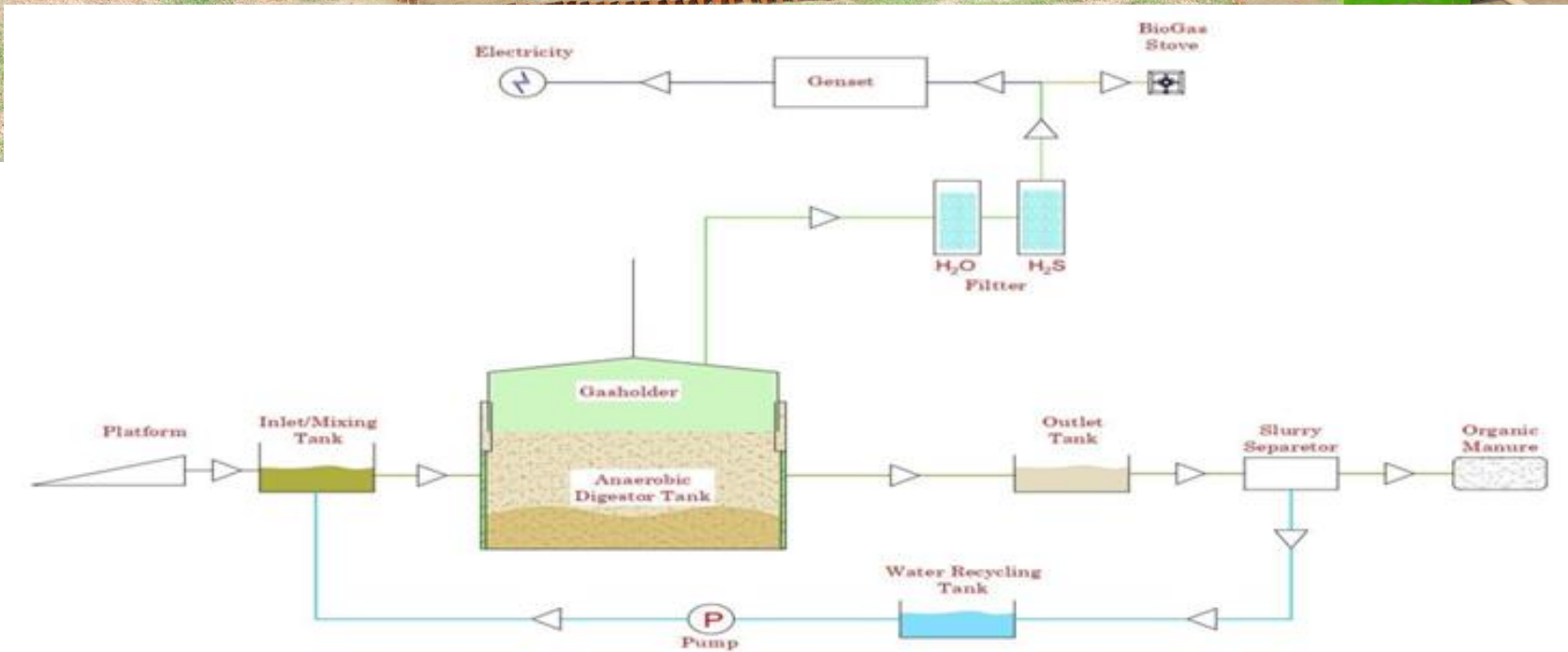
- The biogas system also produces the digester slurry, which is a sub-product, is very much rich in N, P, and K, it is considered the richest organic fertilizer. Slurry may be considered as a good quality organic fertilizer for sustainable agriculture.

- The biogas slurry with *Bacillus megatherium* var *phosphaticum* can produce **Phosphate Rich Organic Manure (PROM)**. PROM is an excellent and less expensive substitute to synthetic phosphatic fertilizers such as DAP.

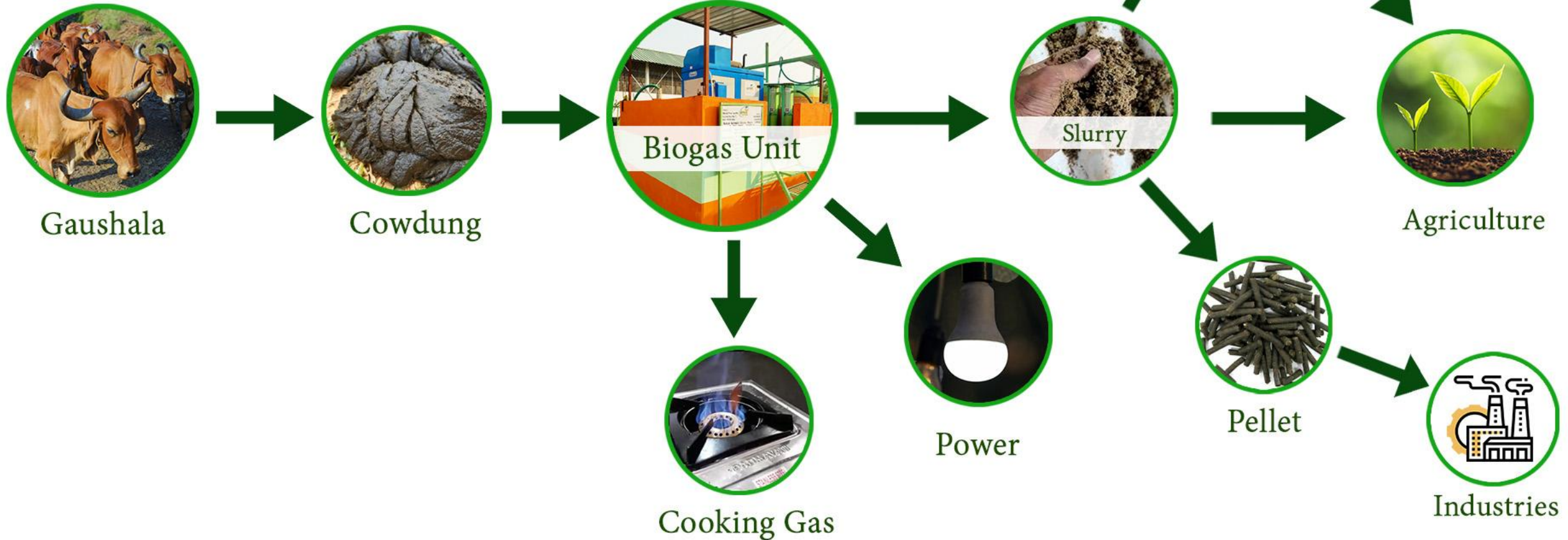
- The produced slurry can be used as a raw material in the manufacturing of biomass pellets (green coal) and green coal can be used in power plants for co-firing . As **Ministry of Power (MoP)** has also advised coal based thermal power plants to **use 5-10% blend of biomass pellets**.



Plant Nutrients	Digested Slurry (%)
Nitrogen	1.5-2.0
Phosphorus	1.0
Potash	1.0



Various options from utilizing cattle dung in a biogas plant.



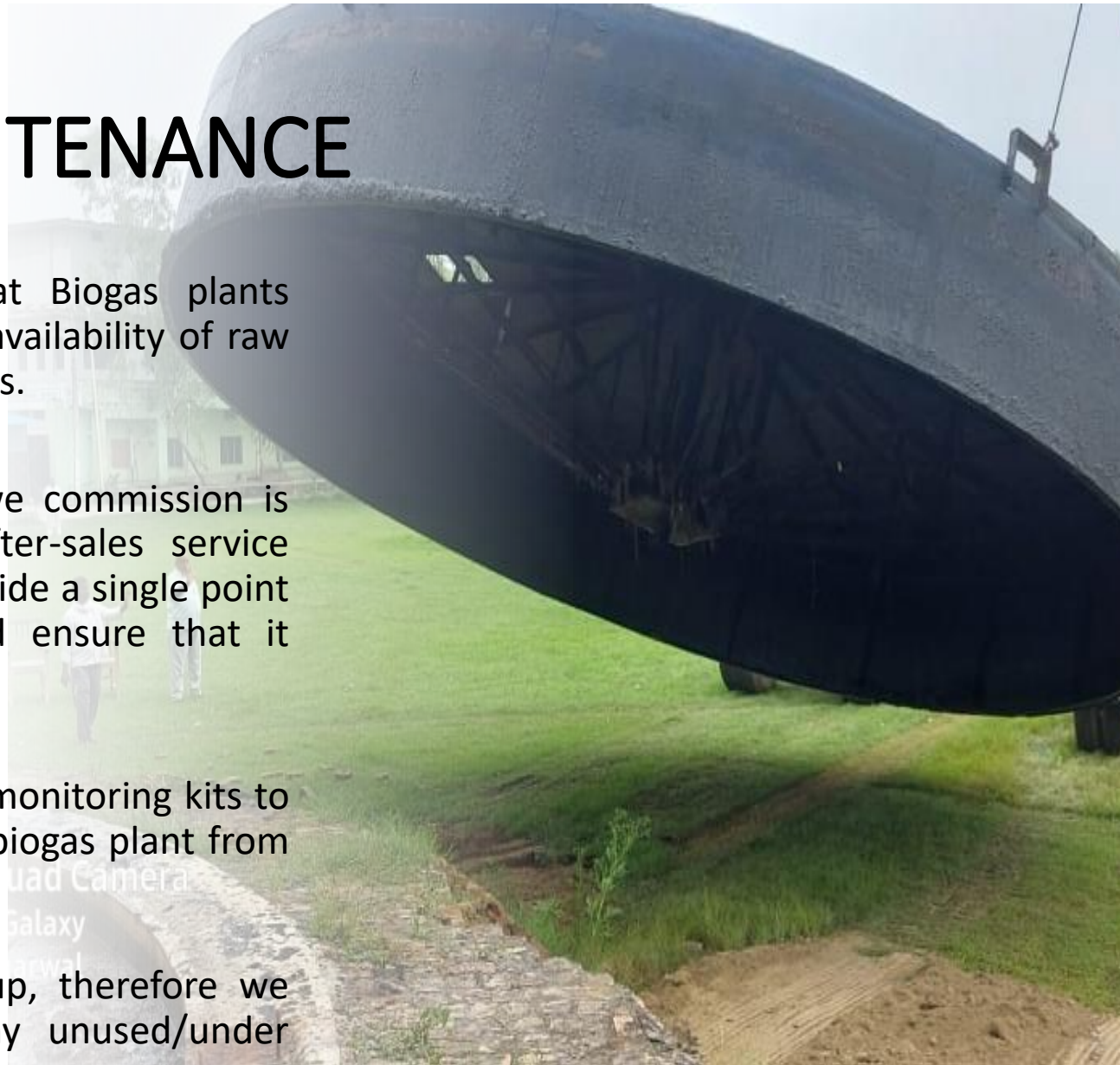
SALIENT FEATURES

- Koshish has developed a biodigester that can digest any biodegradable waste and many different biodegradable wastes can be fed in the same digester.
- Koshish has introduced agitator technology in the digester, to avoid scum formation, which may lead to creating dead zones and releasing the trapped gas in the anaerobic digester.
- In most of the conventional plants, the gasholder is generally made of MS material, and MS has the property of corrosion which gets deteriorated in the long run; thus Koshish has developed an FRP gasholder with an MS skeleton structure.
- Koshish has also developed its own biogas filtering unit to remove the impurities present in raw biogas.



OPERATION & MAINTENANCE

- There is a general perception that Biogas plants doesn't work, that maybe due to non-availability of raw materials or due to some technical issues.
- To ensure that each biogas plant we commission is operational, we provide the best after-sales service possible. Following installation, we provide a single point of contact (OPC) for each plant and ensure that it remains operational..
- In addition, we have installs remote monitoring kits to monitor the proper functioning of the biogas plant from our office.
- We have complete technical back-up, therefore we accept take challenge to revamp any unused/under capacity plant of any size.





GAUSHALA

- In India cows in their late lactation, with reduced production and competing with other cows for the costly feed, are often abandoned to the streets. Sheltering of these old, abandoned, unproductive, infertile and infirm cows in shelters, referred to as “Gaushalas” is a traditional practice in India
- **Madhya Pradesh stands second in cattle population in India.**
- **Nearly 1135 Gaushalas are functioning in Madhya Pradesh**

GAUSHALA

As per data there is approximately 5-6 lakhs of cattle's being sheltered in different Gaushalas of Madhya Pradesh, based on this data the following is calculated

Registered Gaushala in MP

Gaushalas with range of cows	No. s
Gaushalas with <100 cattle	285
Gaushalas with 100-250 cattle	1200
Gaushalas with 250-500 Cattle	200
Gaushalas with 500-1000 cattle	66
Gaushalas with > 1000 cattle	11

Number of Cattles	50550
Cow Dung available per day (kg)	1516500
Biogas Plant Capacity (cum)	60660
Biogas generated per day (kg)	27000
Power Generation per day (kw)	90990

Collectable dung from each cow is 3kgs

Based on this data, we can setup biogas plants by combining a cluster of gaushalas to produce good amount of gas and better utilization of the same for power consumption or CBG production.

CLUSTER PLANTS

Sl. No.	Particulars	Details
1.	The capacity of the biogas plant (cum)	60
2.	Waste required for the proposed plant (kg)	1500
3.	Biogas production per day (kg)	24
4.	Power generated per day (kwh)	90
5.	Bio-manure produced per day (kg)	240
6.	Cost of the plant (Lakhs)	25-30

1.	Power Production from the biogas per annum (kwh)	31500
2.	Annual savings from power per annum @ Rs.8/ kWh (Lakhs)	2.52
3.	Annual savings from cooking gas per annum @ Rs.75/ kg (Lakhs)	6.30
4.	Annual Savings from sale of Manure @ 3/kg (Lakhs)	2.52

Productivity from Gaushala having 100-500 Cows

Gaushala's with around 500 cows - If the same plant is built for a cluster of 5-10 gaushala's the productivity will be more and the produced gas can be supplied for mid-day meal cooking purpose. Produced bio-fertilizer could sold to farmers for Natural Farming in both solid and liquid form.

SELF RELIANT PLANTS

Sl. No.	Particulars	Details
1.	The capacity of the biogas plant (cum)	120
2.	Waste required for the proposed plant (kg)	3000
3.	Biogas production per day (kg)	48
4.	Power generated per day (kwh)	180
5.	Bio-manure produced per day (kg)	480
6.	Cost of the plant (Lakhs)	50-55
1.	Power Production from the biogas per annum (kwh)	63000
2.	Annual savings from power per annum @ Rs.8/ kWh (Lakhs)	5.04
3.	Annual savings from cooking gas per annum @ Rs.75/ kg (Lakhs)	12.60
4.	Annual Savings from sale of Manure @ 3/kg (Lakhs)	5.04

Productivity from Gaushala having 500-1000 Cows

Gaushala's with around 1000 cows, can become self-sufficient, as the gas and the power generated can be utilized by the gaushala employees.

If the same plant is built for a cluster of 5-10 gaushala's a community-based plant can be installed and produced could be distributed among the villagers.

Productivity from Gaushala having 10000 Cows for Power Generation and Bio-Manure Production



1.	Power Production from the biogas per annum@Rs.8/kWh (Lakhs)	42.00
3.	Annual savings from bio-manure per annum @ Rs.3/ kg (Lakhs)	42.00

Sl. No.	Particulars	Details
1.	The capacity of the biogas plant (cum)	1000
2.	Waste required for the proposed plant (tons)	25
3.	Biogas production per day (kg)	400
4.	Power generated per day (kWh)	1500
5.	Bio-manure produced per day (Wet Manure in tons)	40
6.	Bio-manure produced per day (Dry Manure in tons)	4
6.	Cost of the plant (In Lakh Rupees)	300 - 310

Productivity from Gaushala having 10000 Cows for CBG and Bio-Manure Production

Sl. No.	Particulars	Details
1.	The capacity of the biogas plant (cum)	1000
2.	Waste required for the proposed plant (tons)	25
3.	Biogas production per day (kg)	400
4.	Bio-manure produced per day (Wet Manure in tons)	40
5.	Bio-manure produced per day (Dry Manure in tons)	4
6.	Cost of the plant (In Lakh Rupees)	350 - 360



2.	Annual savings from sale of CBG @ Rs.55/ kg(Lakhs)	77.00
3.	Annual savings from bio-manure per annum @ Rs.3/ kg (Lakhs)	42.00



BIO SLURRY TO PROM

- **Phosphate Rich Organic Manure** is a type of fertilizer used as an alternative to di ammonium phosphate (DAP) and single super phosphate.
- Phosphate Rich Organic Manure (PROM) is a value-added product produced by co-compositing high-grade rock phosphate in fine size with biogas slurry of Cow Dung, Poultry litter, food waste, organic matter collected from various sources etc. Phosphate Solubilizing Bacteria (PSB) is added to improve the efficiency.



PROM PREPARATION



PROM - BENEFITS

- Contains three nutrients
 - Phosphorous – 10%
 - Organic carbon – 7.9%
 - Nitrogen – 0.5%
- Acts as alternative to DAP and makes soil soft and enriched with nutrients for long time.
- Provides micro-nutrients like cobalt, copper, zinc along with primary nutrients.
- PROM is very effective as phosphatic fertilizer even in saline soils where DAP completely failed.
- The use of PROM will reduce the cost of fertilization to the farmers and will also result into the conservation of phosphate mineral, a non-renewable resource due to the high residual effect.

Particulars	Amount (In Lakh)
Mixture/blender	
PSB Culture	Approx. 25.30
Polisher/Finisher	
Granular Machine	

Slurry added with rock phosphate and PSB Culture could be easily sold @ Rs. 10-13/kg.

SELF-RELIANT GAUSHALA

Based on the above data, we can conclude that setting up a biogas plant for gas and power production or CBG production will eventually generate revenue for the gaushala.

In addition to that the bio-slurry which is rich in N, P, K can as such be utilized as organic fertilizers or it can be further processed as PROM, which can be sold as an alternative to DAP.

The bio-slurry can also be processed into pellets (green coal), which can be used in industries for burning purposes.

Based on the number of cattle's and proximity of the gaushalas we can utilize the cow dung in not only making gaushala self-reliant but can help a community to become self-reliant and also help in generating revenue.

Various State Govt. has taken initiative by introducing GOBAR-DHAN project for utilizing the cow dung to make the gaushala sustainable.



Thank You

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