



**GANGOUR**<sup>TM</sup>  
**GROUP**

# Our Vision

We will work on all those alternative sources of energy and fuel which will prove helpful in making India self-sufficient in the field of energy and fuel.

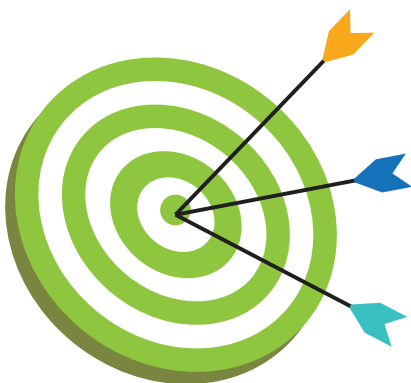
# Our mission

Gangour Group aims to meet a total of 20% of India's Green Energy and fuel demand by 2030.

# Our Company

Gangour Group is a pioneer in the field of alternative energy and fuel through its production units. Working on its strategy from the year 2021 onwards.

Getting tied up Under the first phase of its strategy by Gangour Group, through 50 companies, its alternative energy in 5 states and setting up fuel production units. CNG, PNG, bio-fertilized ethanol, green hydrogen, and other agro-based production units are the main ones. Similarly, setting up 10 production units in each district of all the states in its further stages, and aims to produce 20% of alternative energy demand.

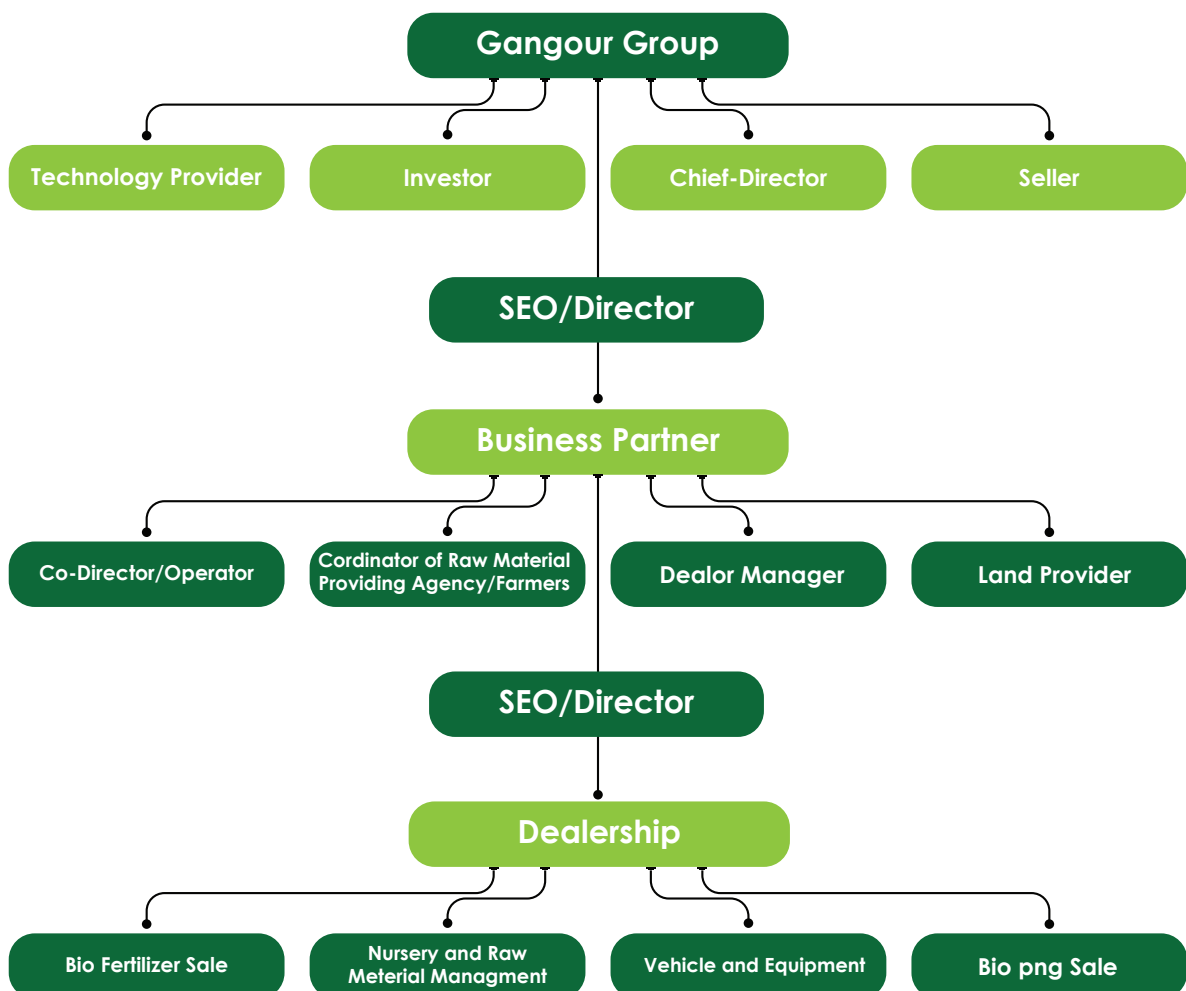


# Our Project

- We aim to set up production units in each district through 10 Business partners.
- The availability of land for the production unit will be ensured through the Business partner.
- The Business partner will play the role of Co-director in the operation of the production units.
- We will fulfill the Demand & supply chain through the entrepreneurs of the district.

## Project Specification

The outline of the operation project was determined in such a way, in which the responsibilities of project construction, technical route, and supply have been separated. The distribution of responsibilities was done in such a way that if one responsibility gets interrupted, the entire chain continues to run smoothly.



# Description

**A) Technology Provider** - Gangour Group ensures technical availability through experienced technical experts. Our technical experts are highly experienced in manufacturing and operating various production units. With the acquisition of new technologies from our technical experts each day, we are constantly improving.

Furthermore, we intend to have pollution free factories. With the help of our technical team within the next five years, it is possible that we will get a new type of technology that enables us to create different kinds of power and fuels from the same biomass.

**B) Investor** - Gangour Group through its co-investors aims to invest 500 crores within the coming 5 years in the field of green fuel and energy. By increasing it step by step by 2030, we will be able to achieve the target of producing 20% of the demand for green fuel and energy. By 2030 we will capture 20% of the entire green energy and fuel sector.

**C) Chief Director/Operator** - The Gangour Group through its associate companies will lead the operations of this project. Senior Executives/Directors, and Business Partners will join as Co-Director/operator.

Authorized Dealers will be appointed for the demand and supply chain to operate the entire project.

**D) Seller** - Gangour Group will understand the demands of the market and develop new products accordingly. Products will be sold through our Satat Scheme in collaboration with Big companies such as BPCL, HPCL, GELL, IOCL. We will also expand our own sales channels such as domestic gas sales, organic fertilizer sales, industrial Sales etc.





# Business Partner

Production units will be developed by the Business partner Gangour Group through 10 Business partners in a district. The Business partner will be an entrepreneur with a business background. However, a production unit or another business chain will be developed by the Gangour Group in the future. Preference will always be given to the Business partner. The Business Partner will be the vision and Mission achiever of the Gangour Group. The responsibility will be allocated to the Business Partner which is as follows. For which the Business partner will be given a fixed share in the company.

**A) Co-Director/Operator** - Business Partner as a Co-Director/Operator will Ensure an Uninterrupted supply of raw materials will manage the dealers and monitor the process of the plant.

**B) Coordinator of Raw material providing agency/farmer** - The Business Partner will develop a range of dealer & distributors, For an uninterrupted supply of raw materials, and will ensure the supply of Raw Materials by entering into an agreement with The Farmer's Organization like fpo committee/ union etc.

**C) Dealor Manager** - The Business partner will develop a chain for better dealor management, for which he will appoint dealors. After the appointment, as a Co-partner and Operator, the distribution of the entire project will be handled by Co-Partner.

**D) Land Provider** - The Business partner will provide the desired land for project development, which is 5 acres, predetermined. For the availability of land, the Business partner will be given a separate partnership by the company.

# Senior Executive officer/Director

The Business Partner will be selected by the Senior Executive Officer appointed by the Gangour Group. Also, it will be monitored and checked. Senior executive officer based on whose progress report he will be appointed to the post of director. Which will further work with the Business partner of the Gangour Group.

# Dealership :

After we commence work on each production unit, we will make arrangements for the availability of raw material and the transportation of finished goods and other equipments like harvester, loader, weighbridge etc. through authorized dealerships. The allocation of this Dealership will be done through a tender process, for which only authorized dealers will be eligible. Once the tender is received, the authorized dealer will carry out the allotted work, which is as follows:

## **Bio Fertilizer Sales:**

We are establishing a production unit for bio CNG, bio PNG, and bio-fertilizers. The bio-fertilizers produced will be in liquid and solid forms, with a minimum daily production of 15 tons of solid and 35 kilo liters of liquid. These will be sold to farmers through authorized dealerships. This will provide farmers with freedom from chemical farming and promote business development in rural areas.

## **Bio PNG/CNG Sales:**

We are establishing a unit for the production of bio CNG, bio PNG, and bio-fertilizers. The bio CNG and PNG produced will be sold and transported to industrial units, commercial institutions, hotels, etc. and oil marketing companies under Satat Policy (IOCL, BPCL, HPCL etc.) through authorized dealers. This will promote entrepreneurship among young people in rural areas.

## **Vehicle/Equipment:**

We will establish an industrial unit. To ensure the availability of raw materials, which will be napier. We will appoint authorized dealerships for napier cutting and transportation and delivery of finished products to sales centers, through dealerships.

## **Nursery:**

We will encourage farmers to ensure the availability of raw materials and purchase of raw materials. All relevant tasks related to purchasing raw materials will be arranged through authorized dealers.

# Green Fuel/Biofuel-

Biofuel is a fuel that is produced over a short time span from biomass, rather than by the very slow natural processes involved in the formation of fossil fuels, such as oil. However, since biomass can be used as a fuel directly, some people use the words biomass and biofuel interchangeably.

## **The benefits of biofuel companies include:**

- Reduction in greenhouse gas emissions
- Reduction in air pollution
- Reduction in dependence on fossil fuel
- Reduction in the use of nonrenewable resources

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## Needs

**The need for biofuel is increasing every day because it is environmental friendly, sustainable and renewable source of energy.**

- It also reduces greenhouse gas emissions which in turn helps in maintaining the environment for future generations to come.
- Biofuel company provides a solution for the rising energy demand in the world by providing clean energy sources with less impact on climate change than fossil fuels



# Introduction

## Bio CNG

Entrepreneurs working in a renewable energy sector need to be aware of CNG as it is supported by government, environment friendly and is widely used.

Bio Gas - mixture of several gases- it breaks down oxygen and absorbs methane and carbon dioxide by dissolving it.

The primary raw material for Bio Gas is agricultural waste, municipal waste, green waste, plant material, food waste, sewage resources which is abundant in India.

It can be converted in various renewable automobile fuels such as bio-CNG, syngas, gasoline, and liquefied biogas.

On the other hand, Bio-CNG a compressed biogas with high methane content can be a promising candidate as vehicle fuel, which can easily replace conventional fuel to resolve this problem.

Methane as a gas serves as fuel and CNG in the highest amount.

Biogas is produced by anaerobic digestion with methanogen or anaerobic organisms. which digest material inside a closed system, or fermentation of biodegradable materials.

This closed system is called an anaerobic digester, biogas digester or a bioreactor. Biogas is primarily methane ( $\text{CH}_4$ ) and carbon dioxide ( $\text{CO}_2$ ) and may have small amounts of hydrogen sulfide ( $\text{H}_2\text{S}$ ), moisture and siloxanes.

The gases methane, hydrogen, and carbon monoxide ( $\text{CO}$ ) can be combusted or oxidized with oxygen.

Government has started a program called SATAT, its an initiative for converting raw waste to produce fuel replacing LPG for various purpose like cooking and heating.

Biogas is produced by anaerobic digestion with methanogen or anaerobic organisms. which digest material inside a closed system, or fermentation of biodegradable materials.

This energy release allows biogas to be used as a fuel; it can be used for any heating purpose, such as cooking.

It can also be used in a gas engine to convert the energy in the gas into electricity.

Biogas can be compressed after removal of Carbon dioxide, the same way as natural gas is compressed to CNG, and used to power motor vehicles.

In the United Kingdom, for example, biogas is estimated to have the potential to replace around 17% of vehicle fuel.

It qualifies for renewable energy subsidies in some parts of the world.

Bio gas keeps the environment clean, it is called BIOGAS methane.

Biogas can be cleaned and upgraded to natural gas standards, when it becomes bio- methane.

Biogas is considered to be a renewable resource because its production-and-use cycle is continuous, and it generates no net carbon dioxide.

As the organic material grows, it is converted and used. It then regrows in a continually repeating cycle.

From a carbon perspective, as much carbon dioxide is absorbed from the atmosphere in the growth of the primary bio-resource as is released, when the material is ultimately converted to energy.

**Composition of BIO-CNG** - when it purifies, methane- 92-98%, carbon dioxide 2-8% and nitrogen, 0-3%.

# Reason of growth of bio CNG



- Biogas is a clean gaseous fuel that can be used for cooking and lighting.
- Chemical fertilizers can be avoided since the digested slurry produced by biogas plants can be used as enhanced bio-manure.
- Because toilets may be linked directly to biogas plants, biogas is beneficial to both the environment and sanitation.
- Most countries have produced millions of employees as a result of these biogas facilities, particularly in garbage collection and biogas generation. In India, for example, the biogas plant business employs more than 10 million people in rural areas each year.

- It provides green energy to the local grid in the form of power and heat.
- Biogas is a non-hazardous recirculation of organic waste from industry and households.
- Because of the low cost of setup and the availability of waste materials, biogas could be especially beneficial in rural or disadvantaged locations.
- Waste collection and management improve significantly in areas with biogas plants. More people are becoming interested in rubbish collection in order to earn a living. This has the effect of improving the general cleanliness and hygiene of the areas.
- The method of producing biogas produces enhanced organic manure, which is an excellent addition or replacement for artificial fertilisers.



# SATAT program



SATAT' scheme on Compressed Bio Gas (CBG) encourages entrepreneurs to set up CBG plants, produce & supply CBG to Oil Marketing Companies (OMCs) for sale as automotive & industrial fuels.

## **A Step Towards a Sustainable Future**

1. Developmental effort to benefit vehicle-users as well as farmers and entrepreneurs.
2. Efficient tackling of urban air pollution due to farm stubble-burning and carbon emissions.
3. Reduce dependency on crude oil imports and realise PM's vision of enhancing farmers' income, rural employment and entrepreneurship
4. Efficient treatment and disposal of municipal solid waste
5. Promotion of organic farming by using Fermented Organic Manure (FOM) produced from CBG plants





# Market for Bio CNG

- India's nationally determined contribution as part of the Paris Agreement include a commitment to achieving 40 percent cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030.
- (Union Environment Industry, 2015) reports increase in installed capacity of biomass energy from 4.4 GW to 10 GW by 2022.
- Presently, there are seventeen Bio-CNG plants operational in India, with a combined capacity of 46,178 kg per day. These plants are spread over nine states, of which Maharashtra leads in terms of the largest capacity as well as the highest number of plants.



# Why to choose this industry?

- Bio CNG is going to be the most efficient fuel that can be replaced in the place of petrol and diesel.
- It lowers down the dependency for fuel from other countries.
- It is the future as at present, around 12 million vehicles are already powered by natural gas throughout the world.
- More companies and municipalities are joining the CNG movement every day.
- Bio-CNG also holds great promise for efficient municipal solid waste.



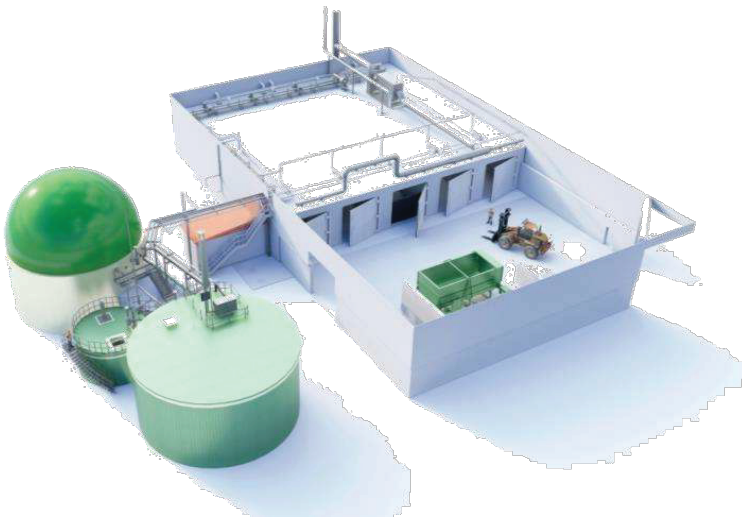
- It can tackle the problem of polluted urban air due to farm stubble- burning and carbon emissions.
- The Bio-CNG process also produces enriched organic manure which can be used as fertilizer.
- If all goes well, the country will have 5,000 Bio CNG plants by 2030.
- Going by the policy initiative Sustainable Alternative Towards Affordable Transportation (SATAT), introduced in October 2018 to promote CBG, these plants will produce 15 million tonnes of enough to reduce the country's CNG bill by 40 per cent.
- To ensure a sustained interest from the industry, the government has promised to purchase gas produced by CBG manufacturers at the same rate as CNG and is offering easy loans to entrepreneurs.
- Once the plants are set up and farmers have a market to sell crop stubble, they will stop setting fire to their farms which will reduce the air pollution to a large extent.
- The income of farmers can also multiply manifold if they utilize the stubble in CNG-making.




# Raw Material

## NAPIER GRASS to CBG

Automotive grade fuel under SATAT



### NAPIER GRASS

Biogas Potential	m3/t	HRT	Disadvantage
Cow Dung	54	45	Difficult to gather, no control on long term cost.
Poultry	80	45	Difficult to gather, smell and quantity limitations.
Fresh Grass	110	45	Can be used, but not specifically developed for gas yield, hence less proteins.
Paddy Straw	120	45	Seasonal and fire risk on storage. High yield when fresh, then declines, High H2S in gas, Sludge formation in digester bottom, needs digester cleaning hence production loss, 2 <sup>nd</sup> best choice after Napier. High digestate output need separate line of business to take care of fertiliser sales.
<u>Press-mud</u>	60	18	
Municipal SW	45	45	Plastic and glass mix, low yield. Un predictable content.
Napier as is	95	40	High HRT time, not fully digested.
<b>Napier with Gangour</b>	 140	30	High yield, low digestate, Digestate goes back to Napier field as fertiliser.

We Work with Napier Grass

# Characteristics of Napier

There are different types of Napier available in the agricultural market which is give at most production in least area. The assessment of the production is done by many Scientist, Scientific Labs, Authorized Institutes etc., in which minimum production per acre is 250 ton per year is assessed. It is fastest growing crop according to the production. By planting this crop it is continue to use after 5 to 7 years. It takes less amount of water, fertilizer and energy as compared to the other crops, to which farmer's get more profit. No need to buy seed frequently for the new plantation. It is harvest process farming. Therefore no expenses for farmer's to buy seeds. Crop harvesting is done 4 or more than 4 times per year, by which farmer's monthly income is fulfilled by three months or less than it.

Napier grass is our main raw material for the production unit due to which our production unit get seamless desired supplies.



## WHY OUR COMPANY?

### BioCNG ene to end Green with Napier Grass

**Grass** - from farmers - doubles their normal Income.

**Grass** - occupies barren land, locks carbon & releases oxygen.

**Grass** - Sustainable Input source, round the year, no dependency, any climate/ soil



## Improving Rural Economy

- Farmers will get an opportunity to sell the stubble/organic wastes to the Bio CNG plants.
- It will enhance the rural economy.
- Due to the establishment of bio CNG plants, there will be improvements in the rural area.
- It will play a crucial role in rural development.

## Improving Climatic Conditions

- It will play a crucial role in sustainable development and eco-friendly environment.
- Petrol and CNG imports from other countries will be reduced.
- Establishment of this plant will help in carbon footprint reduction.
- More control over waste management.
- It will support Clean India Mission.



# Process

## Napier Grass Harvesting



Harvesting is not dependant on manual labour, nor it is practical to manage, Our Company uses tractor mounted harvesting attachments to harvest the grass from dealers. During cultivation the planning phase ensures that tractor would move around in the field (on a fixed path). Napier being highly invasive and draught resistant and pest resistant the external threats are minimum.

The Harvested grass is further reducing to 3-5mm sized pieces before mixing with water to feed them into the predigesting tanks.

Continuous improvement in the verity of grass is expected, as it is also a fodder for cows. Higher the protein higher the milk yield, same is true for the methane, Higher the proteins higher the methane generation.

## Sourcing the Grass

The Sourcing will happen within 10-20km distance from the plant.

The Grass yields are 180 - 200 ton/acre/year

With safety buffer 150 - 200 Acre of fields are required to get the target volume.

## Comparative Economics for Farmer:

Average famer earning per Acre: 2 to 2.5 lac Rs./Acre per annum.

## Comparison:

Sugarcane : 40 ton per 13 month crop at Rs. 2800 per ton = 1, 03,000/year/acre

Napier : 200 ton (minimum) per 12 month crop at Rs. 1000 per ton = 2,00,000/- (minimum) year/acre with continuous cash flow, with least maintenance.

## Transporting the Grass

Pre-shredded grass will be transported to the plant on daily basis on suitable tractors and trucks by the dealers.



## Pre Treatment

The Bio Gas plant will have pre-digestion tanks holding the grass. The syrup with fine strands of lignin will be pumped into the digester. The Digester will be fed with doses of "Ferric Compound" to suppress the formation of H<sub>2</sub>S\*. Most other feed stocks do not need pre-treatment stage

## Digestion

The stages of acidogenesis and methanogenesis will start, as a part of natural biodegradation cycle. 45 days of Hydraulic retention time is maintained. The HRT is managed by controlling the quantity of feeding. Our company uses continuously stirred reactor type digesters.

## Gas Generation

Methanogenic bacteria work on the sugars and glucose and release methane, Carbon dioxide and small quantity of H<sub>2</sub>S. Please note that H<sub>2</sub>S generation itself is suppressed at this stage though entirely not avoided. The Bio gas gets stored in the top space of the digester. Once filled it flows out of the pipelines.

**Biogas will have the following mixture before Purification. Below data is for a 15000kg/day**

Gas Mix	Min SCM	Max SCM	Average SCM	Min %	Max %
Methane	18615	22000	20308	55.0%	65.0%
CO <sub>2</sub>	13200	10831	12015	39.0%	32.0%
Oxygen	338	406	372	1.0%	1.2%
Nitrogen	846	677	762	2.5%	2.0%
Moisture	846	1185	1015	2.5%	3.5%
H <sub>2</sub> S	12	14	13	0.0%	0.0%

## Agitation

Agitation of the content inside the bio-digester is a critical and energy consuming activity. Also agitators are generally expensive and maintenance seeking units. **Our technology does not use regular agitators.**

We use recirculation of digestate, designed using computerised flow engineering models. The pumps and the metal parts do not come in contact with the rust prone biogas slurry. Even if there is maintenance, nothing needs to stop. Even the break down maintenance can happen in isolation to the normal process.

## Bio-Gas to Purified Methane

The pipelines coming out of the digesters carry the bio gas. Raw biogas is collected and stored in balloons. They act as a buffer for the purification unit.

The Bio gas is pass through a scrubbing unit to collect any H<sub>2</sub>S (50-350ppm), this process will bring down the H<sub>2</sub>S to 10-15ppm, which is an acceptable limit. Next the Gas is passed through drying unit. Dried gas passes through PSA stage of final purification.

The PSA system absorbs H<sub>2</sub>S if any, Moisture if any and mainly the CO<sub>2</sub>. The CO<sub>2</sub> can be further purified and used for welding and other industrial applications or be left to the air without guilt. The process is locking more carbon than it releases.

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The Pure methane coming out of the purification system is stored in receiver tanks and Balloons, which act as intermittent storage and buffer for the next compression stage.

## **Compression**

The typical usage pressure in the factory and house hold burners and equipment is 1.2bar at max, but storing uncompressed methane takes huge space. Also any Gas Grid pipeline injection would require us to raise the pressure above the pipeline pressure. Typically the grid pipeline pressure varies from 20-30bar, we can pressurise the gas as suitable for a given case. The CNG bunk supply (Retail Outlet) happens at 200bar pressure in cascades.

One can use mechanical reciprocating compressor or hydraulic compressor. Energy savings to to be the main goal at this stage. We have available supply chain. The advantage with the Hydraulic based compressor is higher life, continuous duty cycle and significant reduction in power consumption. A slightly higher investment on a better technology proves to save a lot of money in-terms of maintenance and power cost.

## **Demonstration**

The entire concept of Gas using Napier grass or even the bio-CNG itself is a sunrise sector in India. BS6 emission norms have come applicable only since March 2020. Oil marketing companies and automobile companies are switching to CNG/BioCNG engines. There are very few plants running to full capacity in Indian market.

Grass to gas is a proven technology in Germany, US and Thailand. More than 4000 bio-methane plants are running on grass in Europe. Our technology is at par with yields found in Europe and us, which are 10% yield from the feed stock.

Our own plant will reach their full capacity within 5 years.

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