BrenStone International Pvt. Ltd., Gurgaon

Executive Summary for 250 KLPD Grain Based Ethanol Distillery
India / 2023

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PRODUCT OVERVIEW

PRODUCTS:

This project is for the manufacture of :

- **Fuel ethanol – 250KL per day**
- **Its by-products like:**
  a) **CO_2 – 50 MT per day**
  b) **DDGS – 70 MT per day**
  c) **Captive power generation – 3MW**

RAW MATERIALS:

The project will be based on waste / damaged grains like broken rice, maize, etc. For utilization of their starch to manufacture bio-ethanol / ENA and other constituents like protein & fiber to produce value added cattle feed.

ETHANOL:

Ethanol is a clear, colorless liquid with a characteristic, agreeable odour. In dilute aqueous solution, it has a somewhat sweet flavor, but in more concentrated solutions it has a burning taste. Ethanol melts at -114.1°C, boils at 78.5°C, and has a typical density of 0.789 g/ml at 20°C. Enzyme from yeast, changes the simple sugars into ethanol and carbon dioxide. Starches from potatoes, corn, rice, wheat, and other grains would be used in the production of ethanol by fermentation

CLIENTELE:

- Fuel ethanol is supplied to IOC, HPCL & BPCL for mixing in petrol. This is not supplied to the refineries, rather delivered to their depots.
- Ddgs is supplied to cattle feed / fish feed / poultry feed industry
- CO2 is supplied to breweries / beverages / automobile industry etc.

BRIEF DESCRIPTION OF NATURE OF PRODUCT

The major product, ethanol is a bio-fuel synthesized from agricultural feed stocks like corn, broken rice, etc. And used in blending with petroleum for transportation. Blending ethanol with petroleum reduces the amount of crude oil imports from other countries.

Bio-fuels are also cleaner burning fuels as their combustion results in no particulate matter generation. Bio-energy industry across the world has the potential to make significant contributions to meet the world's energy needs. In india, bio-energy can contribute towards achieving the country's energy security and help reduce the dependence on fossil fuels.

This proposed project is for manufacturing fuel ethanol by using agricultural products such as broken rice, maize, sorghum grain, and other starch based cereals.

DEMAND SUPPLY GAP

The government of India, through the ministry of petroleum & natural gas vide its notification dated 04.06.2018, released 'the gazette of India: extraordinary, the national policy on biofuels-2018. As per policy guidelines, an indicative target of blending of ethanol in petrol & diesel is proposed to 20% & 5% respectively by 2030. But, ministry of consumer affairs & public distribution, department of food & public distribution vide their notification dated 14.01.2021, prepone the 20% blending of ethanol with petrol by 2025. Hence, to promote the manufacturing of ethanol, ministry declared, incentive scheme for set up distilleries for producing ethanol from feed stocks such as cereals (rice, wheat, barley, corn etc.)

This project is to produce ethanol by using broken rice, maize (corn), millets, damaged food grains (not fit for human consumption) etc. As raw material. As such, there is tremendous scope for the product of the company at a better price.

Ministry of consumer affairs & public distribution, department of food & public distribution vide their notification dated 14.01.2021, informed that in the current ethanol supply year 2020-2021, about 325 cr litres ethanol is likely to be supplied to omcs to achieve 8.5% blending. The ministry reported that it is likely that 10% blending target will be achieved by 2022 with supply of 400 cr litres ethanol.

The ministry also informed that to achieve the 20% blending by 2025 & to meet the requirement of chemicals & other sectors, about 1200 cr litres of alcohol/ethanol would be required, out of which 900cr litres would be required to achieve 20% blending & 300 cr litres would be the requirement of chemicals & other sectors.

Ethanol Supplies for the year 2020-2021 (Estimated)	Ethanol supplies for the year 2021-2022 (Estimated)	Ethanol demand for the year 2024-2025 (Projected)	Deficit in 2024-2025 over the year 2021-2022
332 Crore Liters	400 Crore Liters	900 Crore Liters	500 Crore Liters

In 2020-2021, OMC psus had increased the blending to 8.5%, from around 2% in 2014-2015.
The low blending, currently as opposed ebp program, are primarily on account of the shortage of ethanol at various locations across the country. Even in states where blending has taken off in full swing, like UP and Uttarakhand, it has been seen that ethanol supply has not been adequate to meet demand. The petroleum industry however looks very committed to the use of ethanol as fuel, as it is expected

To benefit the farmers as well as the oil industry in the long run. Ethanol can be produced from sugar cane, wheat, corn, beet, sweet sorghum etc. It is one of the best tools to fight vehicular pollution as it contains 35% oxygen that helps complete combustion of fuel and thus reduces harmful tailpipe.

ALTERNATIVE SCENARIO CONSIDERED BY THE GOI, WHILE CONSIDERING EBP *

In addition, an ethanol demand modelling exercise was done by CSTEP (centre for study of science, technology & policy) using their long-term simulation model called sustainable alternative futures for India (SAFARI). The SAFARI model estimates India's energy demand and emissions up to 2050 under various scenarios. It is driven by socioeconomic parameters like population and GDP, as well as development goals like food, housing, healthcare and education infrastructure, transport, and power for all. Given the inherent uncertainties in projections for the future and with electric vehicle revolution on the horizon, different scenarios have been considered. To estimate the demand for petrol and consequently ethanol, three scenarios for electric mobility uptake have been considered.

Conservative (low evs) – negligible uptake of electric mobility up to 2030.

Business-as-usual (bau, medium evs) – medium uptake of electric mobility; around 15% of car passenger-kilometres (p-kms) and 30% of two-wheeler and three-wheeler p-kms are assumed to be electric by 2030.

Low carbon (high ev uptake) – 30% of car p-kms and 80% of two-wheeler and three-wheeler p-kms are assumed to be electric by 2030.

Source: roadmap for ethanol blending in India 2020-2025, report of the expert committee, Niti Ayog / ministry of petroleum & natural gas

EXPERT COMMITTEE ON ETHANOL BLENDING

Indian government had set up an expert group headed by the executive director of the centre for high technology for examining various options of blending ethanol with petrol at terminals/depots. Considering the logistical and financial advantages, this group had recommended blending of ethanol with petrol at supply locations (terminals / depots) of oil companies. In view of the above, government vide the gazette notification of 3rd september, 2002 no. P-45018/28/2000- c.C had mandated that with effect from 1-1-2003, 5% ethanol-doped petrol will be supplied in following nine states and four contiguous union territories of andhra pradesh, gujarat, haryana, karnataka, maharashtra, punjab, tamil nadu, uttar pradesh, Pondicherry, daman & diu, goa, dadra and nagar haveli & chandigarh. This was the beginning of ethanol implementation in 1st phase.

Government of india further announced to implement the ethanol programme in 2nd phase. This was intended to supply ethanol bended gasoline across the country effective the year 2006 and in 3rd phase switching over from the existing 5% to 10% blending of ethanol in selected states.

Now, the goi is chasing the stiff target of blending 20% by 2025 and it has pulled out all stops to ensure the private sector is geared up to produce 1200 crore liters of ethanol. The GOI is supporting the industry in a big way, a prime example can be seen from the fact that it has done away with the mandatory public hearing for environmental approval for ethanol-only producing distilleries.

SELECTION OF LOCATION FOR SETTING UP THE DISTILLERY

For oil marketing depots located in a state, omcs prefer to buy from the same state to avoid additional freight cost burden. Omcs had floated their statewise requirements, on 17.09.21, and many players had expressed their interest in setting up ethanol distilleries. The below mentioned states had received surplus offers: Madhya Pradesh , West Bengal , Bihar , Assam, Odisha , Punjab

The following states had least number of interests and hence these states offer best locational advantages:

Rajasthan , Andhra Pradesh , Tamil Nadu (but water availability is a huge issue and hence not advisable)

NEW UPCOMING GRAIN ETHANOL PRODUCTION IN RAJASTHAN & ANDHRA PRADESH

- KBK biotech Pvt. Ltd, AP
- Kribhco , AP
- Carya chemicals & fertilizers Pvt ltd, Rajasthan
- Express digital payment services Pvt ltd, Rajasthan
- Orple green fuels ltd, Rajasthan

- Rajasthan is the among the most preferred location, as of date, as only 3 new distilleries are coming up in this state. Omcs requirement for Rajasthan is around 54 crore liters per annum, whereas the contracts given currently is less than 20 crore liters.
- The other state, which is Andhra Pradesh, has only 2 new distilleries coming up. Omcs requirement here is around 41 core liters per annum, whereas the contract is less than 14 crore liters.

STATUTORY CLEARANCES REQUIRED FOR THE PROJECT

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PRIOR TO ESTABLISHMENT –

- Approval on excise license – state excise letter of intent / NOC
- Permission to draw water from the CGWB/ SWID – state
- 'Environmental clearance' from moef & CC / SIA-SAC committee - CPCB
- Consent to establish from central pollution control board

POST ESTABLISHMENT –

- Consent to operate from central pollution control board once plant is installed.
- Approval from factory inspector & industrial safety /health
- Approval from boiler inspector
- Approval from electrical inspector
- Approval from weights & measures
- NOC from fire department
- NOC from petroleum and explosives organization (PESO)

Project Cost

S.No	SECTIONS	AMOUNT IN Rs. (Crores)	AMOUNT IN GBP (Million)
1	**Land**	₹ 10,00,00,000	GBP 10,00,000
2	**Site Development Cost**	₹ 10,00,00,000	GBP 10,00,000
3	**Building & Civil Works**	₹ 20,00,00,000	GBP 20,00,000
4	**Ethanol Plant & Machinery & Captive Power Plant (Boiler & turbine)**	₹ 2,00,00,00,000	GBP 2,00,00,000
5	**Total cost**	₹ 2,40,00,00,000	GBP 2,40,00,000
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1	**Working Capital Margin**	₹ 10,00,00,000	GBP 10,00,000
2	**Pre-operative Expenses @ 1.5% on project cost**	₹ 3,60,00,000	GBP 3,60,000
3	**Contingencies @ 3% on project cost**	₹ 7,20,00,000	GBP 7,20,000
TOTAL PROJECT INVESTMENT		₹ 2,60,80,00,000	GBP 2,60,80,000

BASIS AND ASSUMPTIONS:

- All figures are worked out on the basis of current prices and no escalation has been assumed in either selling prices or any other costs, i.e. inflationary and deflationary tendencies have been ignored.
- The buildings to be constructed have been assumed on the basis of the requirements of the production proposed and material storage facilities for material handling, chemicals and consumables, equipment spares as well as for packaging has been estimated.
- Taxes and duties should be considered at actual
- Freight cost isn't included

Ethanol Costing			
S. No.	Details	Rs. / liter	GBP /Liter
1	Variable cost of Ethanol	₹ 37.51	GBP 0.3751
2	Manpower cost of Ethanol	₹ 0.79	GBP 0.0079
3	Maintenance @ 1% of variable cost	₹ 0.38	GBP 0.0038
4	Miscallaneous @ 1% of variable cost	₹ 0.38	GBP 0.0038
Total Cost		**₹ 39.05**	**GBP 0.3905**
Ethanol Selling Price			
1	Ethanol Selling Price to OMC	**₹ 52.92**	GBP 0.5292
EBITDA		**₹ 13.87**	**GBP 0.1387**
EBITDA in %		**26.21%**	

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