

A man with grey hair and a beard, wearing a yellow kurta and a red scarf, is giving a thumbs up gesture. He is standing in a field of tall green sugarcane stalks. The background is a dense field of sugarcane. The overall tone of the image is green, with a yellow rectangular block on the left side.

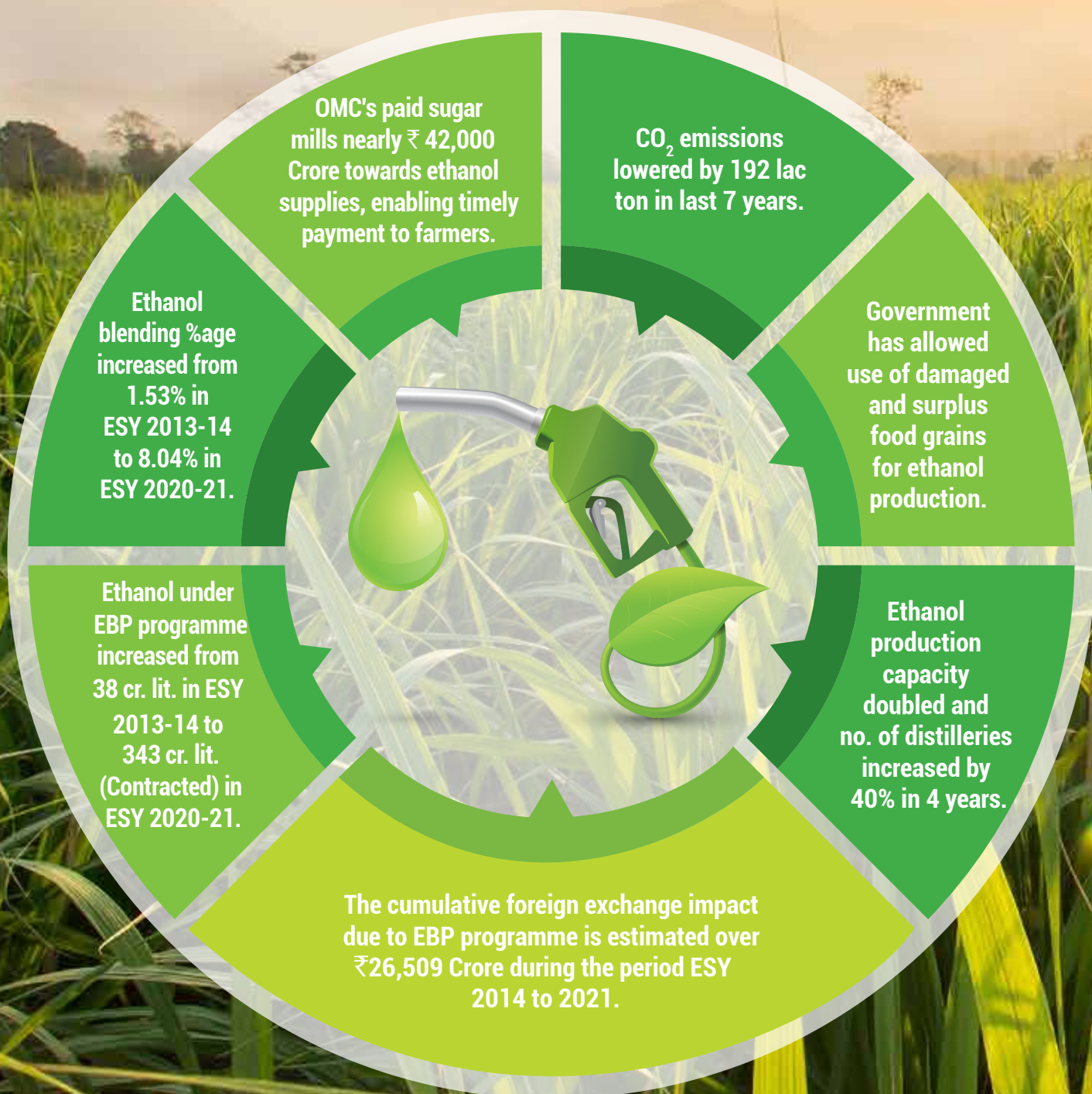
# Ethanol x *TeamSync*

*Fulfilling the Aatmanirbhar Bharat Dream  
at IN-Region*

Ministry of Petroleum and Natural Gas

# The journey from Farm to Fuel

(As on July 2021)





*Friends,*

*Ethanol was rarely discussed in the country about 7-8 years ago. But now ethanol has become one of the major priorities of the 21st century India. Considering the achievements in the previous few years and acknowledging the public support, Government has decided to advance the target of 20% ethanol blending in petrol by 5 years from 2030 to 2025. Apart from sugarcane, modern technology based ethanol plants are being set up across the country to convert agricultural waste to ethanol.*

*Focus on ethanol has impacted the environment as well as life of the farmers positively. During 2013-14, 38 crore litres of ethanol was being purchased, which is estimated to increase by eight times to 320 crore liters. Last year approximately Rs.21,000 crore of ethanol was purchased, a large sum of which has gone in the pocket of our farmers. It has especially benefitted the sugarcane farmers.*

*Ethanol also helps in mitigating the challenges of sales and storage associated with over-production. Mitigating all such challenges is in the interest of the farmers for which ethanol is important.*



**Shri Narendra Modi**  
Prime Minister

# CONTENTS

India's Rising Energy Concerns.....	1
Molasses Plant Process Flow /.....	2
Grain Plant Process Flow	
Ethanol Blended Petrol (EBP) Programme - Challenges .....	3
Ethanol Blended Petrol (EBP) Programme - Stimulus .....	5
Effects of Landmark Reforms .....	8
A Farmer's Journey from an 'Annadaata' to 'Urjadaata'.....	11
The Future Landscape of Opportunities.....	13
An Integrated Bio-Refinery Model.....	14
Testimonials.....	16
Abbreviations and their full forms .....	18



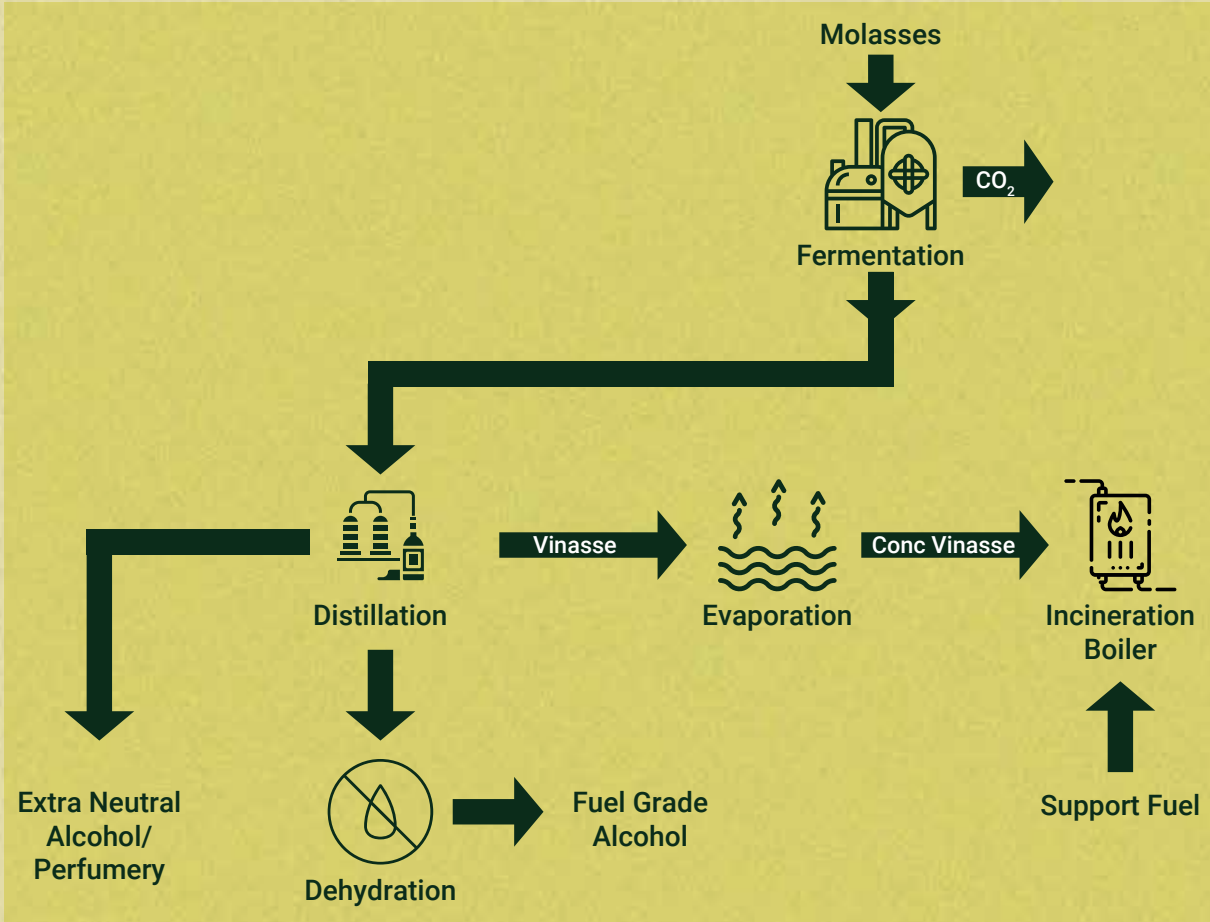
# India's Rising Energy Concerns

India is the world's third largest energy consuming nation and a significant part of India's energy requirement is met through oil which continues to rely on imports largely. India's share in global energy consumption is set to double by 2050. A rising energy demand and high reliance on import poses significant energy security challenges. It also leads to massive foreign currency outflow. Further, excessive use of fossil fuels leads to higher carbon emissions and associated health concerns.

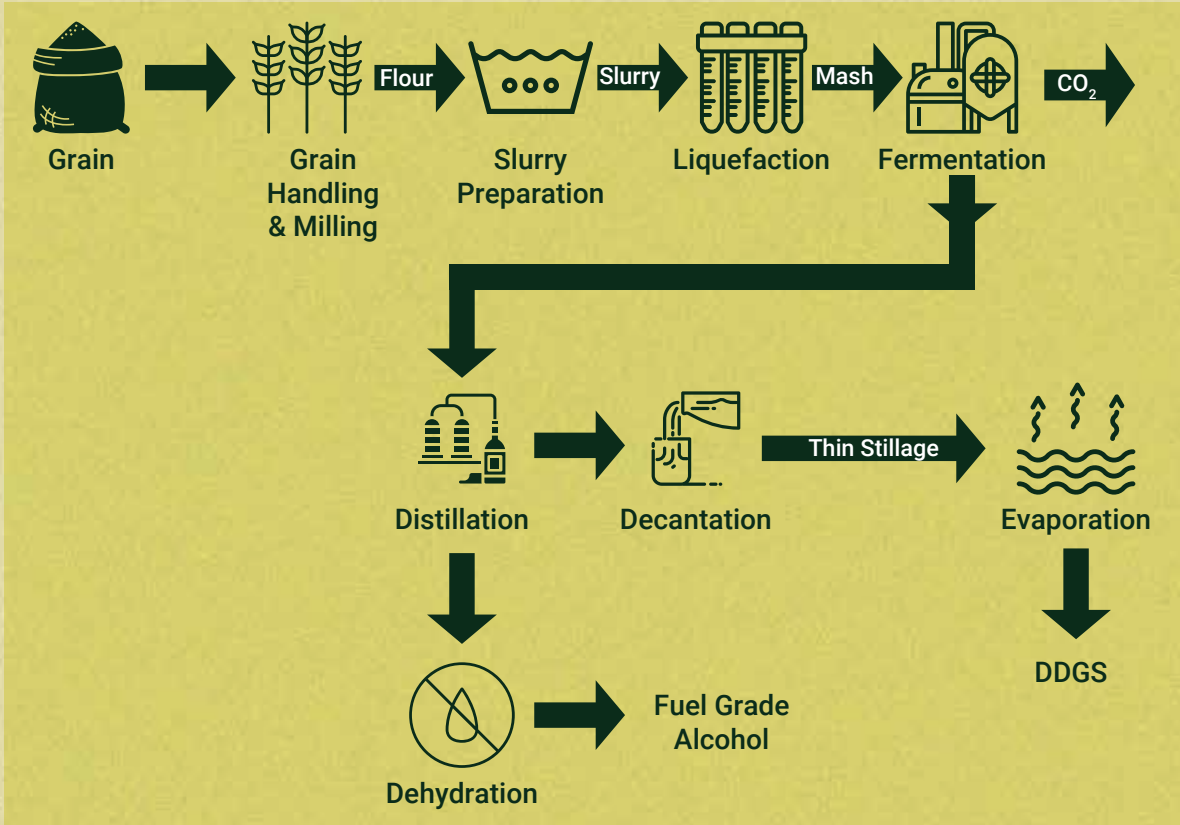
Domestically produced ethanol is a potential opportunity to reduce reliance on oil imports by blending it with conventional fossil fuels for consumption.

India started blending ethanol in petrol on a pilot basis in 2001. The ethanol was produced as a by-product during the process of making sugar from sugarcane. However, despite potential, no significant progress was made under the ethanol programme and the production of ethanol remained stagnated until recently when transformative reforms were carried out. The results are set to help not only the economy but transform farmers' income and recharge the rural economy.

# Molasses Plant Process Flow



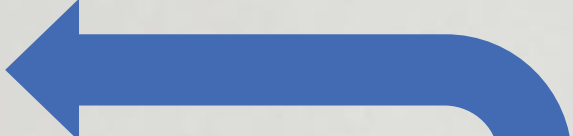
# Grain Plant Process Flow



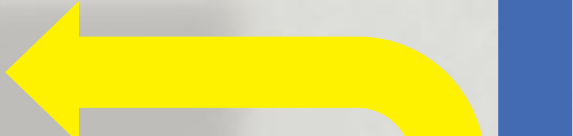
# Ethanol Blended Petrol (EBP) Programme - Challenges

EBP was launched in January 2003. In 2006, the Ministry of Petroleum and Natural Gas directed the Public Sector Oil Marketing Companies (OMCs) to sell 5% EBP in 20 states and 4 UTs. Even though the programme started early it faced multiple inherent challenges leading to slow adoption and growth. But the programme did not meet success.


**Non inclusion of conversion of grain to Ethanol**, restricting grain-based distilleries to participate in EBP



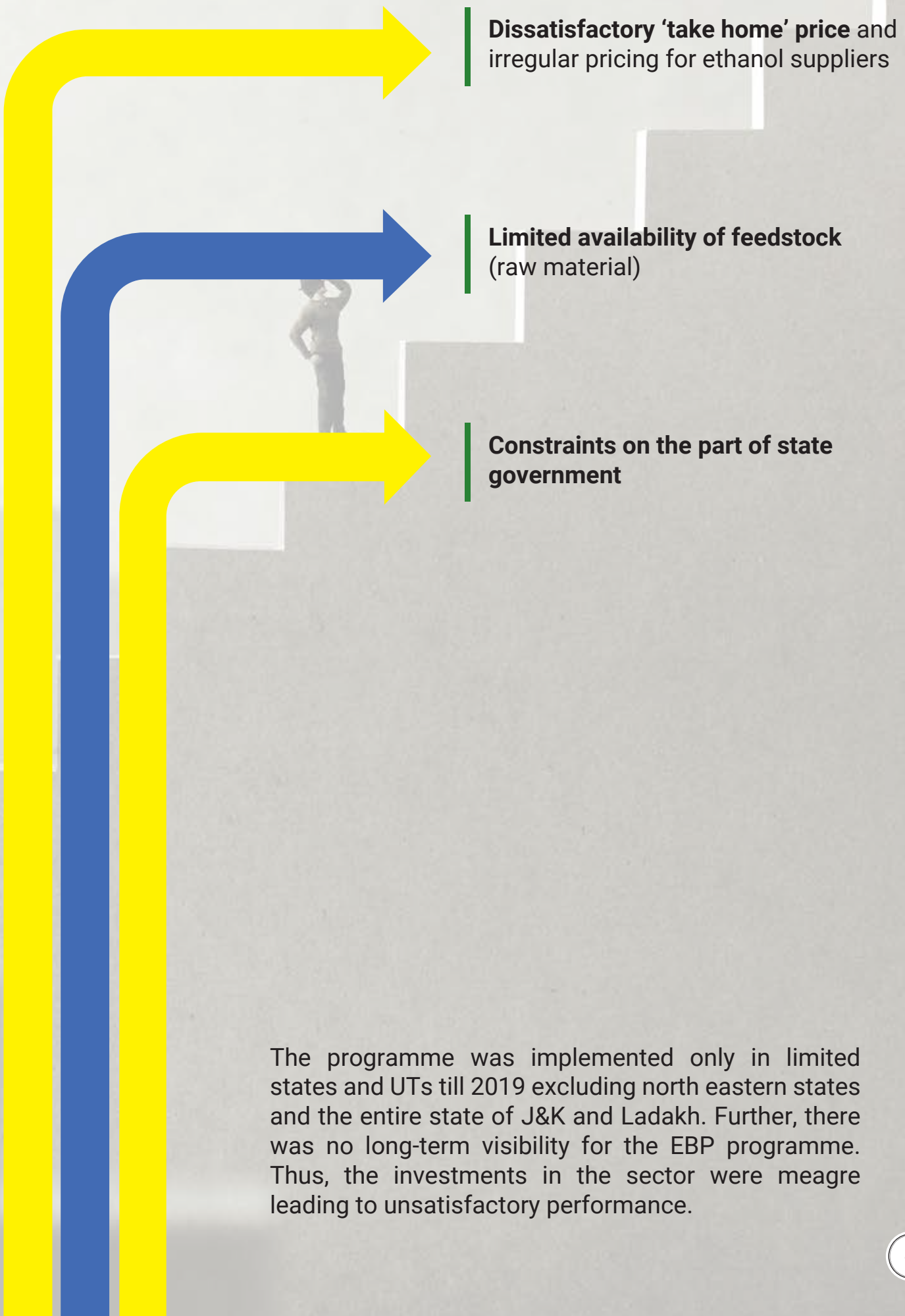
**High taxation of ethanol**, rate of 18% applicable



**Procurement challenges** due to infrastructure and multiple tenders in a given supply year







**Dissatisfactory 'take home' price** and irregular pricing for ethanol suppliers

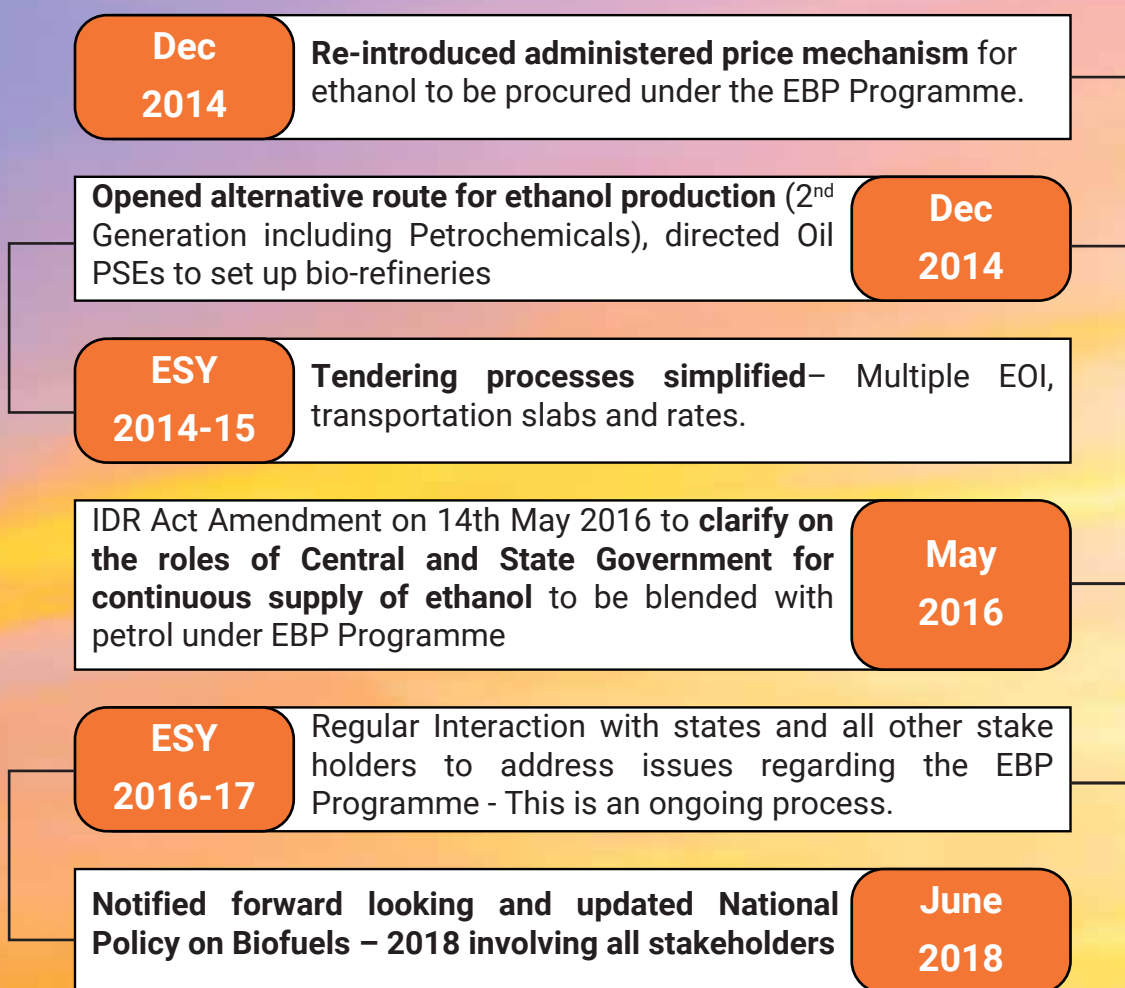
**Limited availability of feedstock** (raw material)

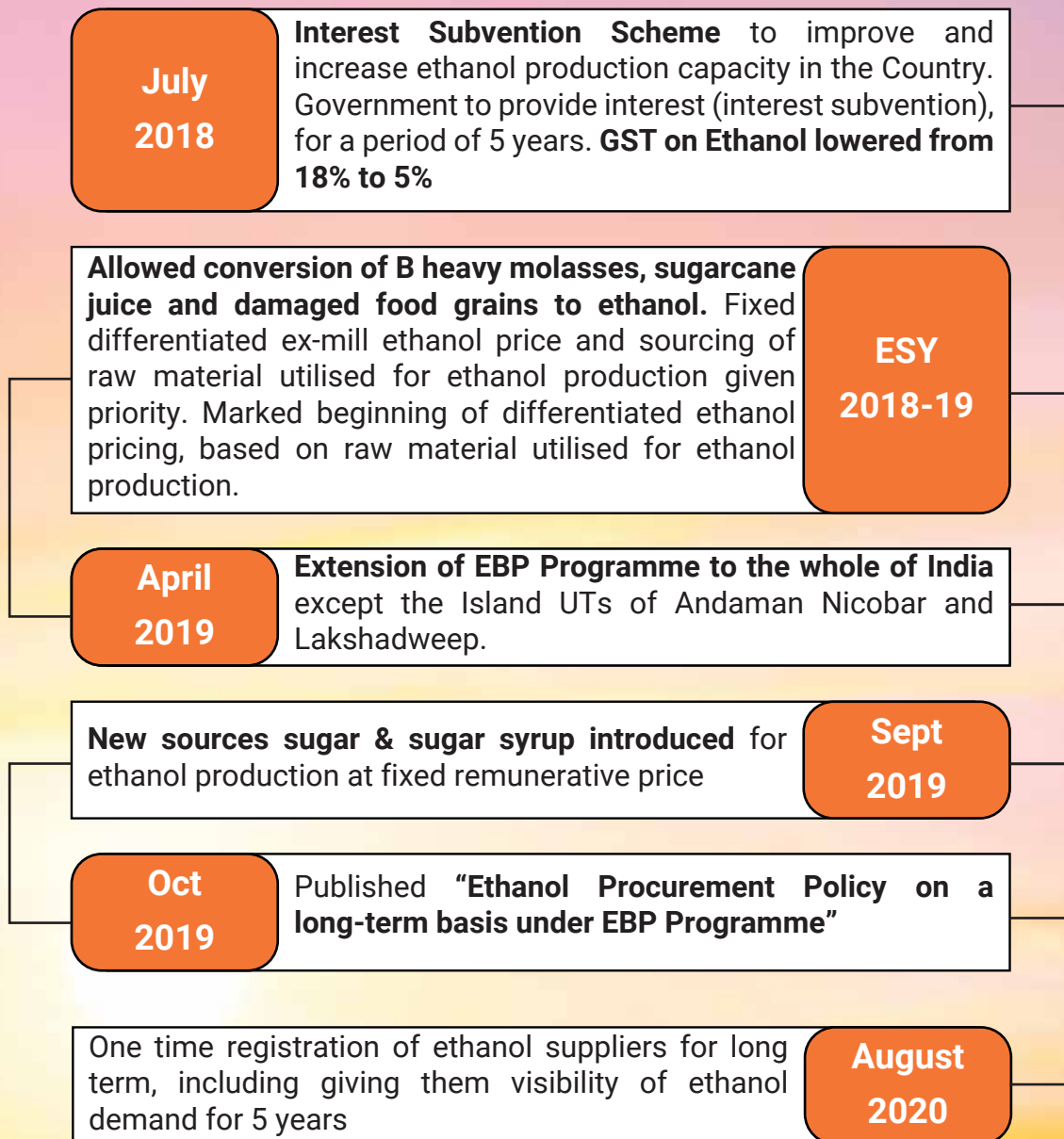
**Constraints on the part of state government**

The programme was implemented only in limited states and UTs till 2019 excluding north eastern states and the entire state of J&K and Ladakh. Further, there was no long-term visibility for the EBP programme. Thus, the investments in the sector were meagre leading to unsatisfactory performance.

# Ethanol Blended Petrol (EBP) Programme - Stimulus

The Government under the leadership of Hon'ble Prime Minister Shri. Narendra Modi, in line with its Energy security, climate change and rural economy enhancement goals initiated multipronged reforms to boost Ethanol usage in the country





**“The ethanol production capacity in the country should be ramped up so as to achieve the ethanol blending target of 20% by 2025 and the capacity should be in place by 2023-24”**

**- Shri Dharmendra Pradhan**  
Minister for Petroleum & Natural Gas and Steel

**Sept.  
2020**

**OMCs started to provide Off-take guarantee letter and consent to sign tripartite agreement with ethanol suppliers and bankers to support the ethanol capacity expansion projects.**

**Oct  
2020**

**Further ease of tender conditions by OMCs like one time document submission, quarterly bank guarantees, multiple transportation rate slabs and transportation rates being linked to Retail Selling Price (RSP) of diesel, reduction in security deposit and applicable penalty on non-supplied quantity etc. Approval of National Biofuel Coordination Committee (NBCC) to utilise surplus stock of rice lying with Food Corporation of India (FCI) to be released to the distillers for ethanol production.**

**Nov  
2020**

**Approval of NBCC to utilise maize for ethanol production. Interest subvention scheme for enhancement and augmentation of ethanol production capacity extended to grain based distilleries.**

**December  
2020**

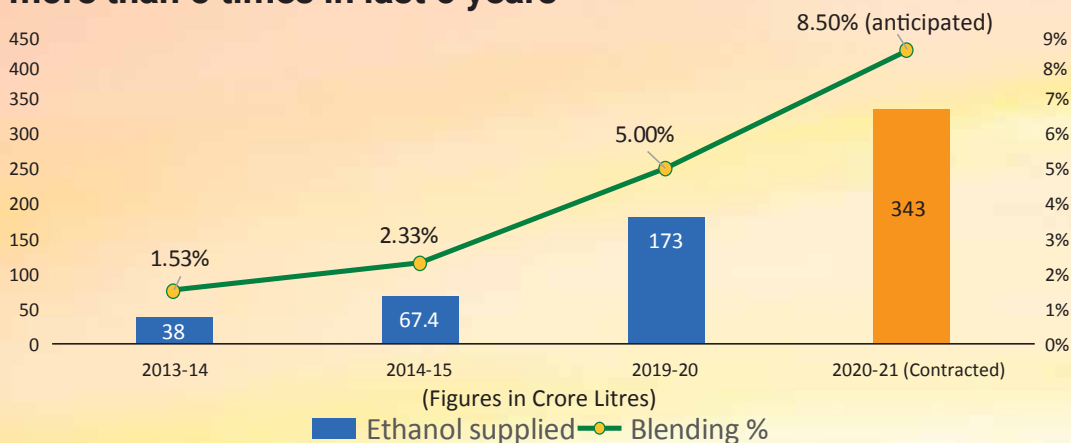
**OMCs have increased their ethanol storage capacity from 5.39 Crore litres in November 2017 to 16.9 Crore litres till December 2020, thereby providing ethanol storage cover of over 20 days at their depots. Amount spent by OMCs is approximately ₹200 Crore – This is an ongoing process.**

**“Government’s decision to expand interest subvention scheme for enhancement of ethanol distillation capacity will transform our annadaatas into urjadaatas”**

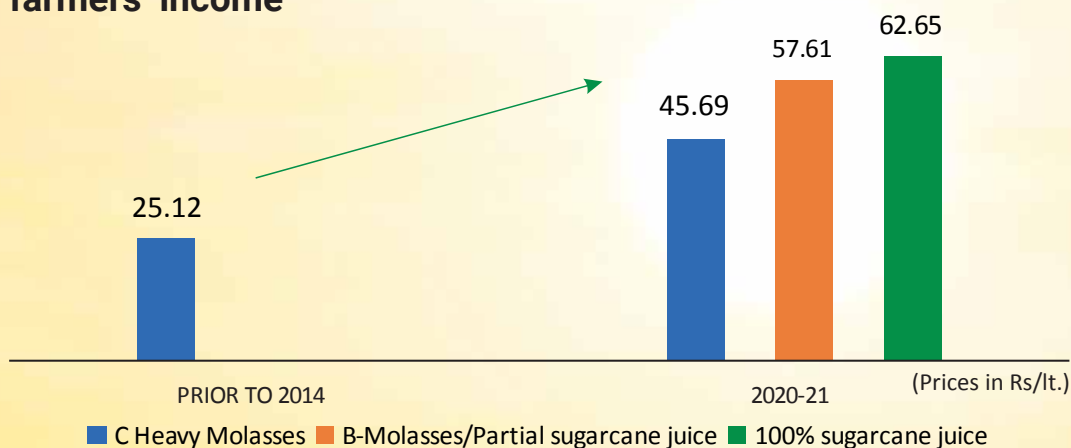
**- Shri Dharmendra Pradhan**  
Minister for Petroleum & Natural Gas and Steel

# Effects of Landmark reforms

**Ethanol supplies and blending % have increased more than 5 times in last 6 years**

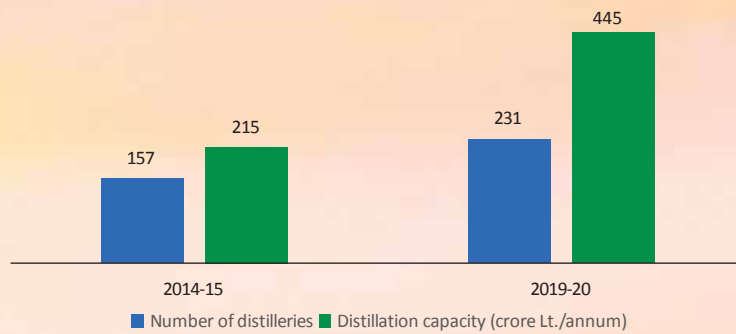


**Remunerative prices of ethanol to suppliers have more than doubled in last 6 years-a major boost to farmers' income**



Fixed price of ethanol from B heavy molasses and sugarcane juice for the first time during ESY 2018-19, heralding a new era of differentiated ethanol pricing, based on raw material utilized for ethanol production

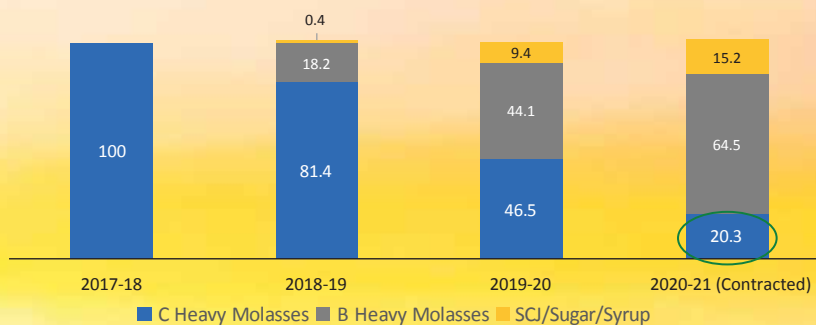
**Ethanol distillation capacities almost doubled, and number of distilleries increased by 40% in 5 years.**



**Ethanol Storage capacity has increased 3 times from 2017 to 2020**



**Ethanol %age contribution from sugarcane based raw materials**



**The decision to allow diversion of B heavy molasses, sugarcane juice / sugar / sugar syrup for ethanol production in 2018-19 enabled reliable supply of feedstock and the price stability of sugar.**

## **Protecting economic interest of farmers**

Under EBP, OMCs have paid sugar mills nearly ₹42,000 Crore for ethanol supplies in the last seven years, which has helped mills to clear farmers' dues. Additionally, decision is taken to buy damaged and surplus food grains for ethanol production, ensuring price value for surplus grain stock as well as accommodating the fresh season crop to meet EBP target.

## **Reduced Import Bill and increasing self reliance**

The cumulative foreign exchange impact due to EBP Programme is estimated over ₹26,509 Crore during the period ESY 2014 to 2021 (up to July 2021).

## **Lowered CO<sub>2</sub> emissions, cleaner environment**

One Crore litre of ethanol blended petrol can save around 20,000 tons of carbon dioxide (CO<sub>2</sub>) emission. Greenhouse gas emissions due to the EBP Programme lowered by 192 lac tons from 2014 to 2021 (up to July 2021).

## **Encouraging Ease of Doing Business through Technology**

The IDR Act implementation enabled State Governments to avoid complicated documentation procedures and conduct pro-business activities like e-approvals, online permits, electronic locking, GPS tracing of vehicles carrying ethanol etc. thereby shortening the overall process and reducing time to help the business.

# A Farmer's Journey from an 'Annadaata' to 'Urjadaata'







# The Future Landscape of Opportunities

## Ethanol Industry is expected to grow by 500%

By 2025, at 20% blending level, ethanol demand will increase to 1016 Crore litres. Therefore, the **worth of the ethanol industry will jump by over 500%** from around ₹9,000 Crore to over ₹50,000 Crore

## Ethanol distillation capacity to grow by more than three times to 1,500 Crore litre annually

Financial assistance scheme introduced by DFPD during 2018-2021 to increase ethanol production capacity.

- 895 proposals with loan amount of ₹70,419 Crore.
- Estimated 165 LMT of surplus grain to be utilized annually from 2025 to produce ethanol which would result in 30,000 crore payment to farmers.
- Launch of new vehicles compatible to run on E20 fuel from 2023 and flex fuel vehicles from 2024.

This will attract new investment and create employment opportunities.



# An Integrated Bio-Refinery Model

The concept of an integrated Bio-Refinery model or Bio-park is being envisioned which will encompass integration of the following facilities:

- 1. 2G Ethanol plant:** Second Generation or 2G ethanol plant can convert agricultural residues like rice straw, wheat straw, energy crops etc. to ethanol. With around 160MMT of surplus agricultural residues generated in India annually, 2G ethanol plants offer significant opportunity in India. A 100 kl per day plant can utilize 2 lakh tonne per annum of agricultural residue to generate around 3 crore litres of ethanol per annum.
- 2. Grain based 1G Ethanol Plant:** Grain based First Generation or 1G Ethanol Plant can convert the starch present in grains like rice, corn etc. to ethanol. Some by-products like  $\text{CO}_2$  & Dried Distillers Grains with Solubles (DDGS) are also generated which can generate additional revenue. A 100 kl per day 1G plant is estimated to incur capital expenditure of around ₹170 to 200 crores with a land requirement of approximately 20 acres.
- 3. CBG Plant:** Compressed Bio Gas (CBG) or Bio-CNG can be produced from agricultural residue, Municipal Solid Waste (MSW), cow dung etc. CBG can easily replace CNG. The bio-manure produced in the plant is an additional source of revenue. The estimated capital expenditure for a 15 tonne per day CBG plant is around Rs.60-100 crores, depending on the feedstock and the land requirement of approx. 15 acres.
- 4. Production of Chemicals:** Production of bio-chemicals in the Bio-refinery will improve its economics significantly. Some technologies for production of bio-chemicals are ready for commercialization while many are still in development stage.

**5. Cogeneration Plant:** Setting up of a Cogen plant by using Lignin (generated in 2G plant) & Biogas (CBG plant) can ensure continuous & reliable power supply to the Bio-Refinery.

**Some of the advantages of Integration of various plants in a Bio-Refinery are:**

- Improved economics with reduced cost of feedstock and sustenance of biomass supply-chain on long term basis. With the setting up of 1G, 2G and CBG plants in the same premises, there can be a common source/agreement for supply of grains (for 1G Ethanol Plant) and supply of waste straw/agricultural residue generated (feedstock for 2G/CBG Plants).
- Optimization of common resources like Utilities (Cooling tower, Boiler, ETP etc.) & Offsite facilities (tankages, loading Gantry, firefighting system etc.) can reduce capital expenditure.
- Integration of 1G ethanol and CBG plants with established & proven technologies can bring in economic viability & sustainability of the Bio-Refinery since 2G ethanol technologies are still in the maturing stage.
- Optimization of Equipment Spares & Manpower required for Operation / Maintenance of the plants.

# Testimonials

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By fuelling my vehicle with ethanol blended petrol, I am contributing towards protecting the environment. Along with that I am also securing the lives of the future generation.

**-Milan Shah**

06 Suhas Apartments, Raikar Park, Roha, Raigad – 402109, Maharashtra.

I am a farmer and I am engaged in sugarcane farming. I have enhanced the yield of my crop by employing scientific methods and I am getting timely payment from sugarcane mills through ethanol production. With the arrival of ethanol blended petrol in the market, our environment is also being secured.

**-Mohammed Zafar Niyaj**

Kokipurwa, Sikandarpur, Hardoi district, Uttar Pradesh.

I grow sugarcane in my fields. With the arrival of ethanol blended petrol, the demand for ethanol has increased, due to which my crop is being instantly sold to sugar mills.

**-Arvind Kumar**

Village/Post-East Devriya, Tediya, Hardoi district, Uttar Pradesh.

The announcements on ethanol made by the Hon'ble PM on 5th June 2021, including the advancement of 20% blending from 2030 to 2025, and the roll out of E20 and flex fuel vehicles from 2023, gives massive confidence to investors that the Government is serious about providing adequate demand and is committed to purchase all the ethanol that will and can be produced in India over the next few years. This will surely help develop ethanol production and blending capacities in the country, which is so very crucial for aatmanirbharta in our requirement of transport fuel.

**-Abinash Verma**

Director General, Indian Sugar Mills Association (ISMA)

Progressive Indian Biofuels Policy and strategic intervention from time-to-time have placed India at the top of global biofuels Industry. It is a matter of great pride for us that indigenously developed innovative technology to process diverse range of sugary and starchy feedstock for production of biofuels is positively impacting techno-commercial viability of projects. Indian technology deployed globally is setting new benchmark for performance as well as carbon footprint reduction. Our contributions in Technology advancements and engineering capabilities are helping redefine India's overall transportation fuel mix and facilitating energy transition from hydrocarbon to carbohydrate sources.

**-Dr. Pramod Chaudhari**

Founder Chairman, Praj Industries Ltd.

Indian Auto Industry is committed to develop vehicles compatible with usage of higher blends of ethanol. SIAM is working closely with stakeholders to align different milestones with the ethanol availability roadmap and support GOI in realising the grand vision of AATMA\_NIRBHAR BHARAT.

**-Prashant K Banerjee**

Executive Director SIAM (Society of Indian Automobile Manufacturers)

The pro-active and forward looking steps of GoI - assured off-take with clear pricing mechanism has enabled BCML to invest fresh capital into Ethanol segment. The policy outlook has enabled BCML to aggressively double capacity via juice and BH diversion for ethanol production thereby diverting surplus sugar. The policy has also enabled BCML to aggressively undertake Cane Development without the fear of getting into the cyclicity of the business, which in future would lead to enhanced cane availability for feeding the ethanol capacity and achieving economies of scale in operation.

**-Vivek Saraogi**

Promoter cum MD, Balrampur Chini Mills Ltd, Uttar Pradesh

The government has embarked upon a great initiative of 20 percent ethanol blending. It is good for the farmers, the economy, and for the environment. We salute the government for this laudable initiative.

**-Dr. Bhaskar Roy**

Executive Director, Globus Spirits Ltd

# Abbreviations and their full forms

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Abbreviation	Full Form
%	Percentage
DFPD	Department of Food and Public Distribution
EBP Programme	Ethanol Blended Petrol Programme
EOI	Expression of Interest
ESY	Ethanol Supply Year (period from December of a year to November of the following year)
FCI	Food Corporation of India
GST	Goods and Services Tax
IDR Act	Industries (Development and Regulation) Act
NBCC	National Biofuel Coordination Committee
NPB-2018	National Policy on Biofuels – 2018
OMCs	Oil Marketing Companies
pa	Per annum
PSEs	Public Sector Enterprises
UTs	Union Territories

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