

# ETHANOL GROWTH STORY

Fulfilling Aatmanirbhar Bharat Dream



सत्यमेव जयते

पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय  
MINISTRY OF PETROLEUM AND NATURAL GAS  
GOVERNMENT OF INDIA



# The journey from Farm to Fuel

(As on November 2022)

Ethanol procurement / blending under EBP programme increased from 38 crore litres in ESY 2013-14 to 433.6 crore litres in ESY 2021-22.

Ethanol blending %age increased from 1.53% in ESY 2013-14 to 10.0% in ESY 2021-22.

Oil Marketing Companies (OMCs) paid distillers nearly ₹ 81,796 crore towards ethanol supplies, enabling timely payment to farmers in last 8 years.

CO<sub>2</sub> emissions lowered by 318.2 lac ton in last 8 years.

Cumulative foreign exchange impact due to Ethanol Blended Petrol (EBP) programme is estimated over ₹53,894 crores.

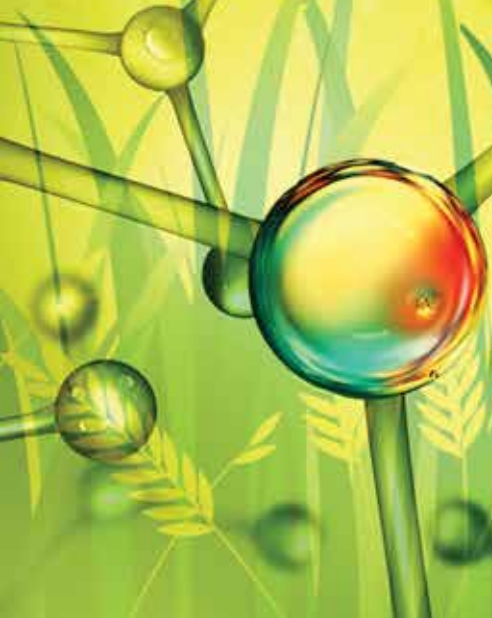
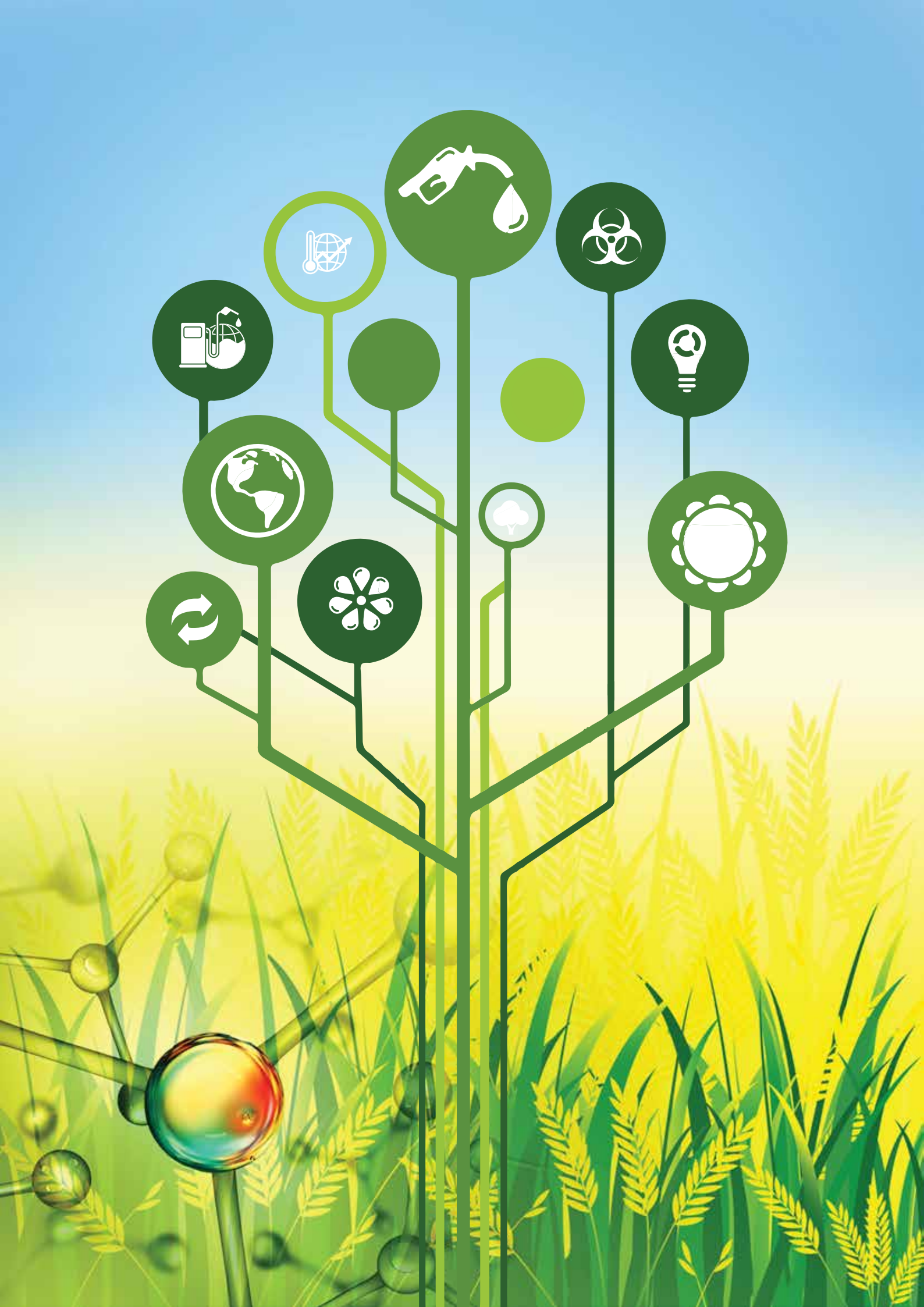
Ethanol production capacity increased more than 2.5 times and no. of distilleries increased by 66% in 8 years.

Government has allowed use of damaged and surplus food grains for ethanol production.

Multimodal transportation of ethanol & ethanol blended petrol by Oil Marketing Companies (OMCs).

OMCs have signed Long Term Offtake Agreements (LTOAs) to set up Dedicated Ethanol Plants (DEPs).









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 21<sup>st</sup> 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 has increased more than 10 times to 408 crore liters in ESY 21-22. In ESY 21-22 approximately ₹25,750 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 of foodgrains and sugar. Mitigating all such challenges is in the interest of the farmers for which ethanol is important.

**Shri Narendra Modi**  
Prime Minister



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# 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 largely on imports. 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.

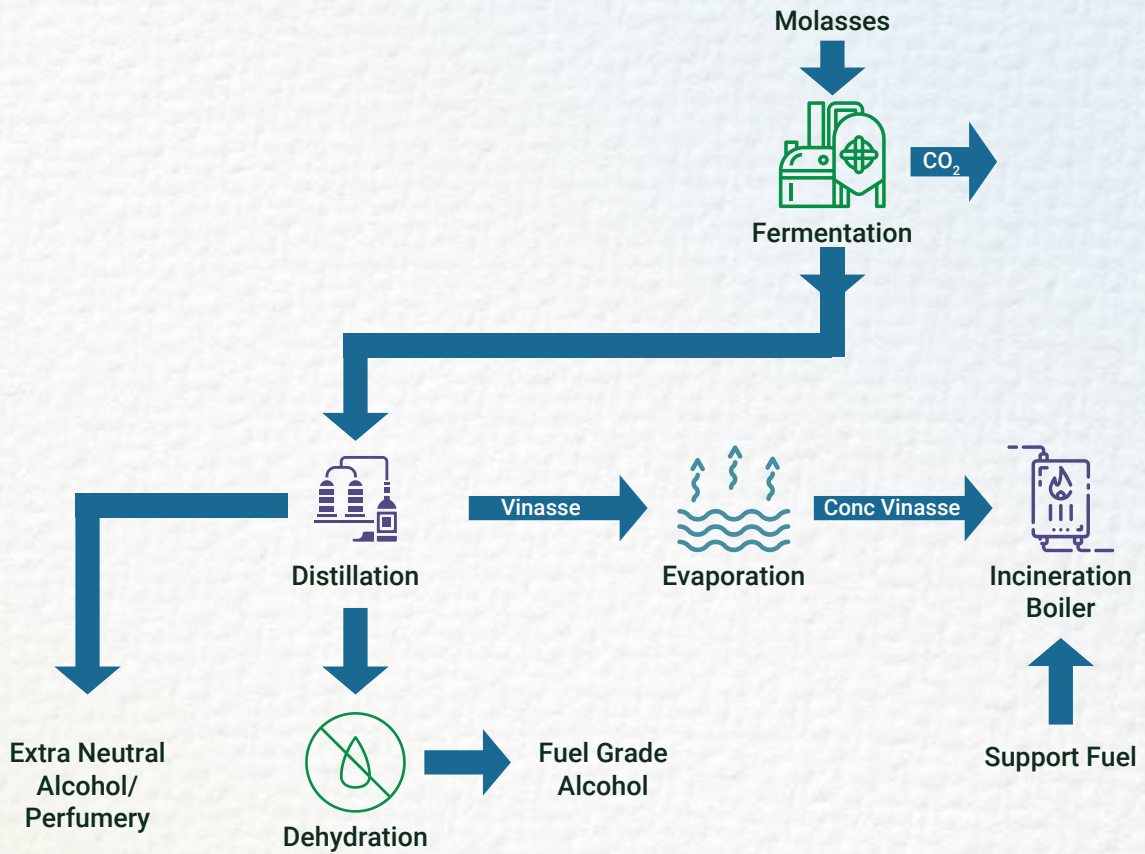
Domestically produced ethanol is a potential opportunity to reduce reliance on oil imports by blending it with conventional fossil fuels for consumption.

India started blending ethanol in petrol on a pilot basis in 2001. The ethanol was produced as a byproduct 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.

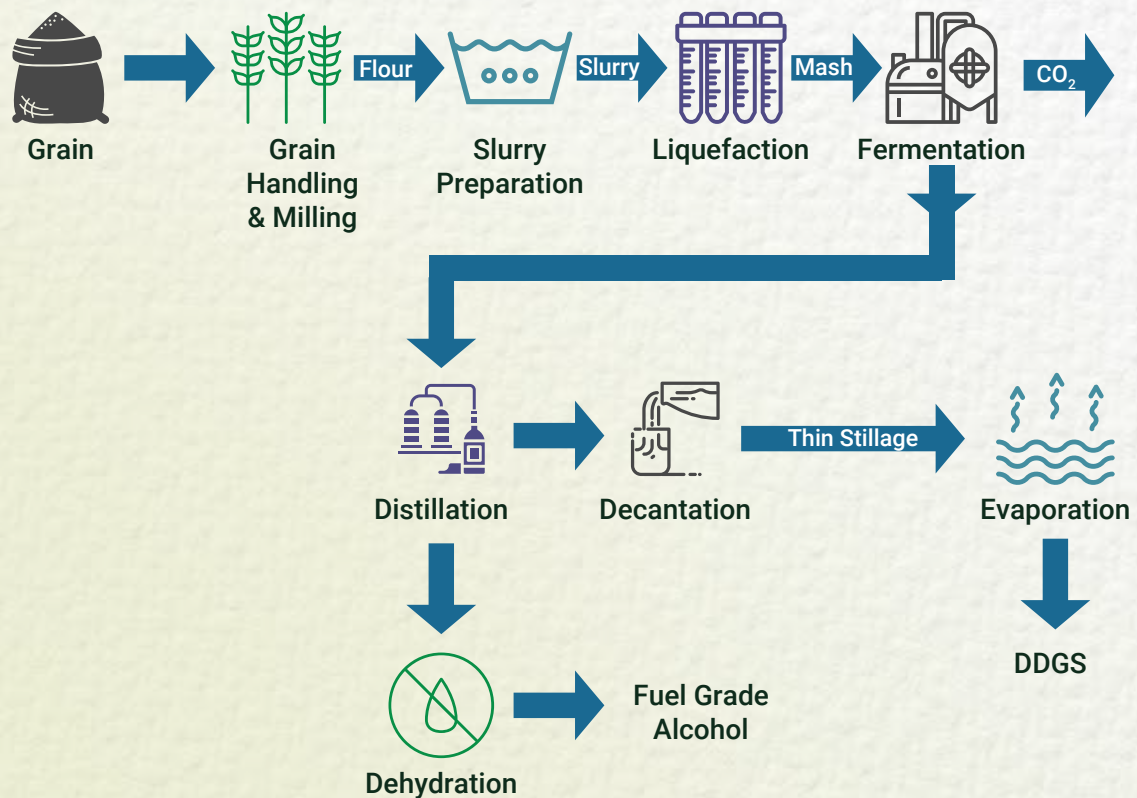




# Molasses Plant Process Flow



# 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.

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

**Non-utilisation of existing grain-based ethanol distillation capacity**

**Limited ethanol distillation capacity**



**Procurement challenges** due to infrastructural and operational issues

**Constraints on the part of State Governments**

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

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

**No clear Roadmap for higher ethanol blending in India**

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.

Dec  
2014

**Re-introduced administered price mechanism** for ethanol to be procured under the EBP Programme.

Dec  
2014

**Opened alternative route for ethanol production** (2<sup>nd</sup> Generation including Petrochemicals), directed Oil PSEs to set up bio-refineries.

ESY  
2014-15

**Tendering processes simplified** – Multiple EOI, transportation slabs and rates.

May  
2016

IDR Act Amendment on 14<sup>th</sup> May 2016 to **clarify on the roles of Central and State Government for continuous supply of ethanol** to be blended with petrol under EBP Programme.

ESY  
2016-17

Regular Interaction with states and all other stakeholders to address issues regarding the EBP Programme - this is an ongoing process.

June  
2018

**Notified forward looking and updated National Policy on Biofuels – 2018** involving all stakeholders.



July  
2018

**Interest Subvention Scheme** to improve and increase ethanol production capacity in the Country. Government to provide interest (interest subvention), for a period of 5 years. **GST on ethanol lowered from 18% to 5%.**

ESY  
2018-19

**Allowed conversion of B heavy molasses, sugarcane juice and damaged food grains to ethanol.** Fixed differentiated ex-mill ethanol price and sourcing of raw material utilised for ethanol production given priority. Marked beginning of differentiated ethanol pricing, based on raw material utilised for ethanol production.

April  
2019

**Extension of EBP Programme to the whole of India** except the Island UTs of Andaman Nicobar and Lakshadweep.

Sept  
2019

**New sources sugar & sugar syrup introduced** for ethanol production at fixed remunerative price.

Oct  
2019

Published "**Ethanol Procurement Policy on a long term basis under EBP Programme**".

August  
2020

One time registration of ethanol suppliers for long term, including giving them visibility of ethanol demand for 5 years.

Oct  
2020

Further **ease of tender conditions by Oil Marketing Companies (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.**



Expression of Interest for signing Long Term Offtake Agreements with upcoming Dedicated Ethanol Plants is a proactive step to motivate project proponents to set up ethanol plants in deficit states, thereby paving the way forward for the nation in achieving the ethanol blending target of 20% and more in the coming years

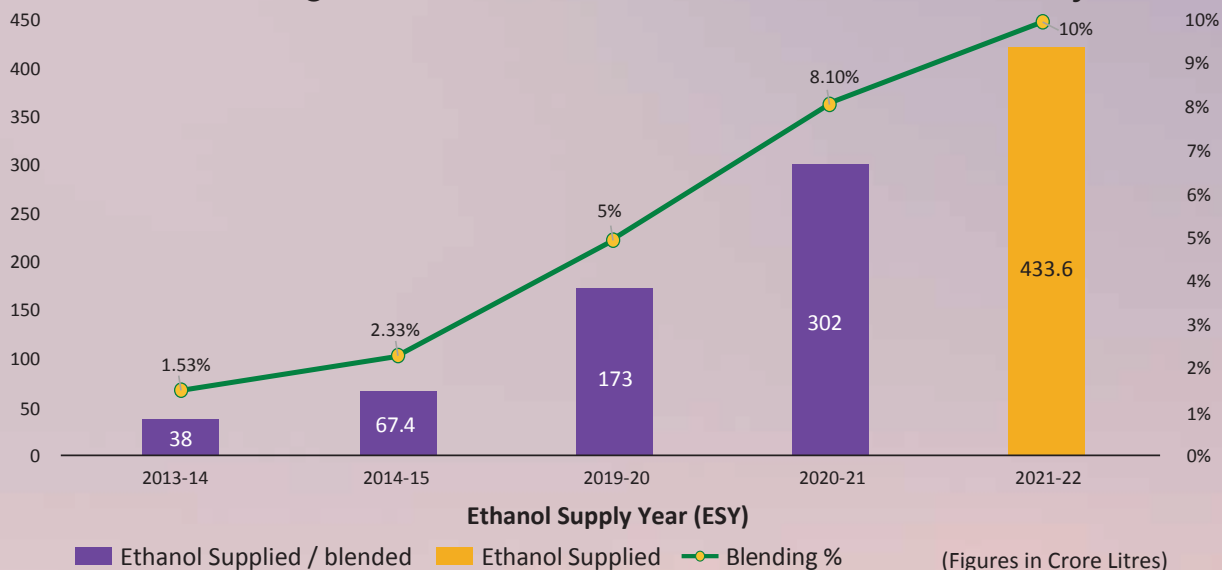
- **Shri Hardeep Singh Puri**

Minister for Petroleum & Natural Gas of India  
on 18<sup>th</sup> September 2021

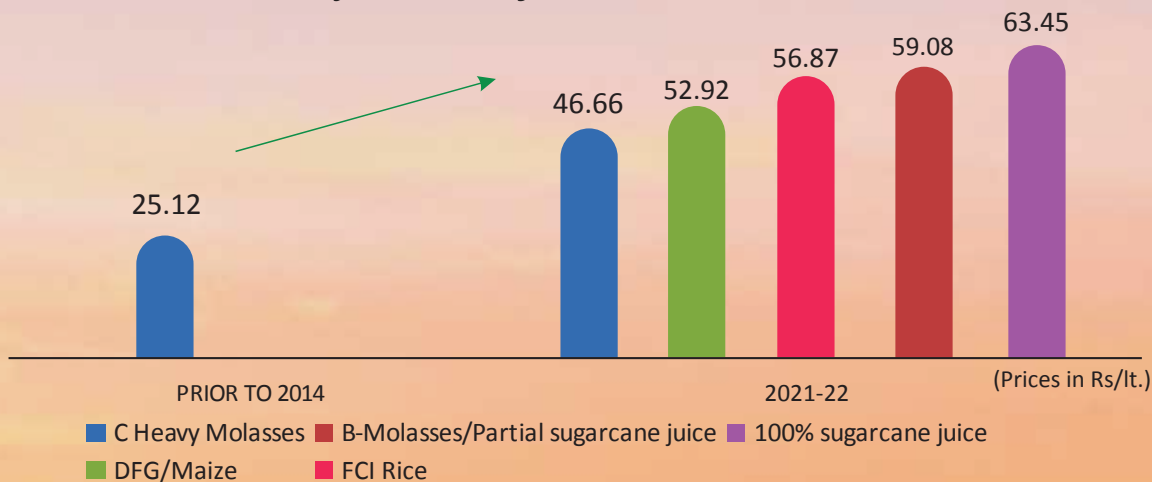


# Effects of Landmark reforms

**Ethanol blending % has increased more than 6 times in last 8 years**



**Remunerative prices of ethanol to suppliers have more than doubled in last 8 years-a major boost to farmers' income**

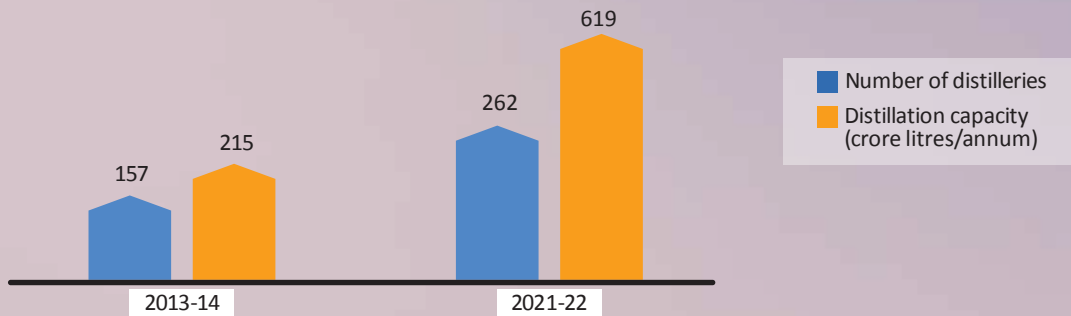


**A new era of differentiated ethanol pricing, based on feed stock utilized for ethanol production started in 2018-19. Higher prices fixed for ethanol from all feedstocks for ESY 2022-23.**

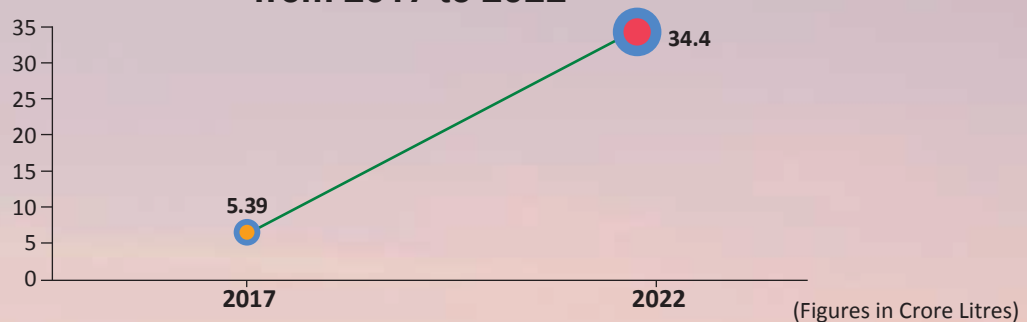
India's ethanol story is one of enormous grit and perseverance. From just 1.5% target from 2005-14, we have moved from 1.5% to 10% blending during 2014-22. It is a unique initiative which combines energy security, environmental well being and rural prosperity.

**Shri Hardeep Singh Puri,**  
Minister for Petroleum & Natural Gas

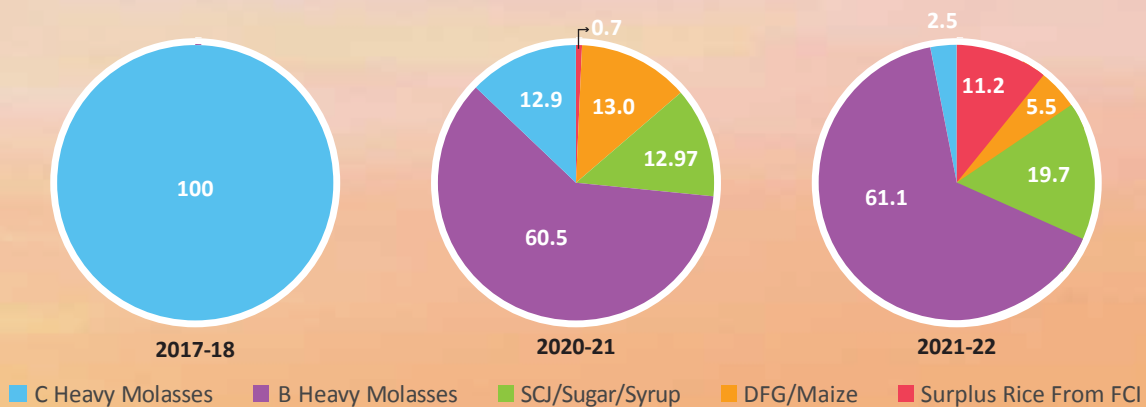
## Ethanol distillation capacities of molasses-based distilleries increased more than 2.5 times and number of distilleries increased by 66% in 8 years



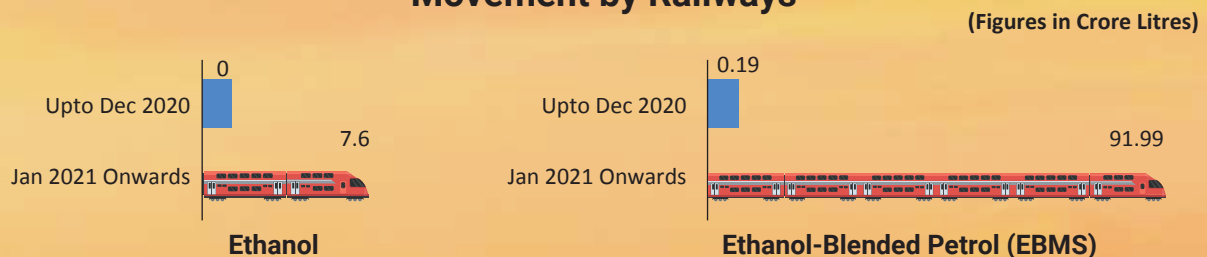
## Ethanol Storage capacity has increased more than 6 times from 2017 to 2022



## Ethanol %age contribution from different feed stocks



## Movement by Railways



The decision to allow diversion of sugarcane & grain-based feedstocks for ethanol production since 2018-19 enabled reliable supply of feedstocks and price stability for farmers.



## Protecting economic interest of farmers

Under EBP, Oil Marketing Companies (OMCs) have paid sugar mills nearly ₹81,796 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 ₹53,894 crores during 2014 to November 2022.

## 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 were reduced by 318.2 lac tons during 2014 to November 2022.

## 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.

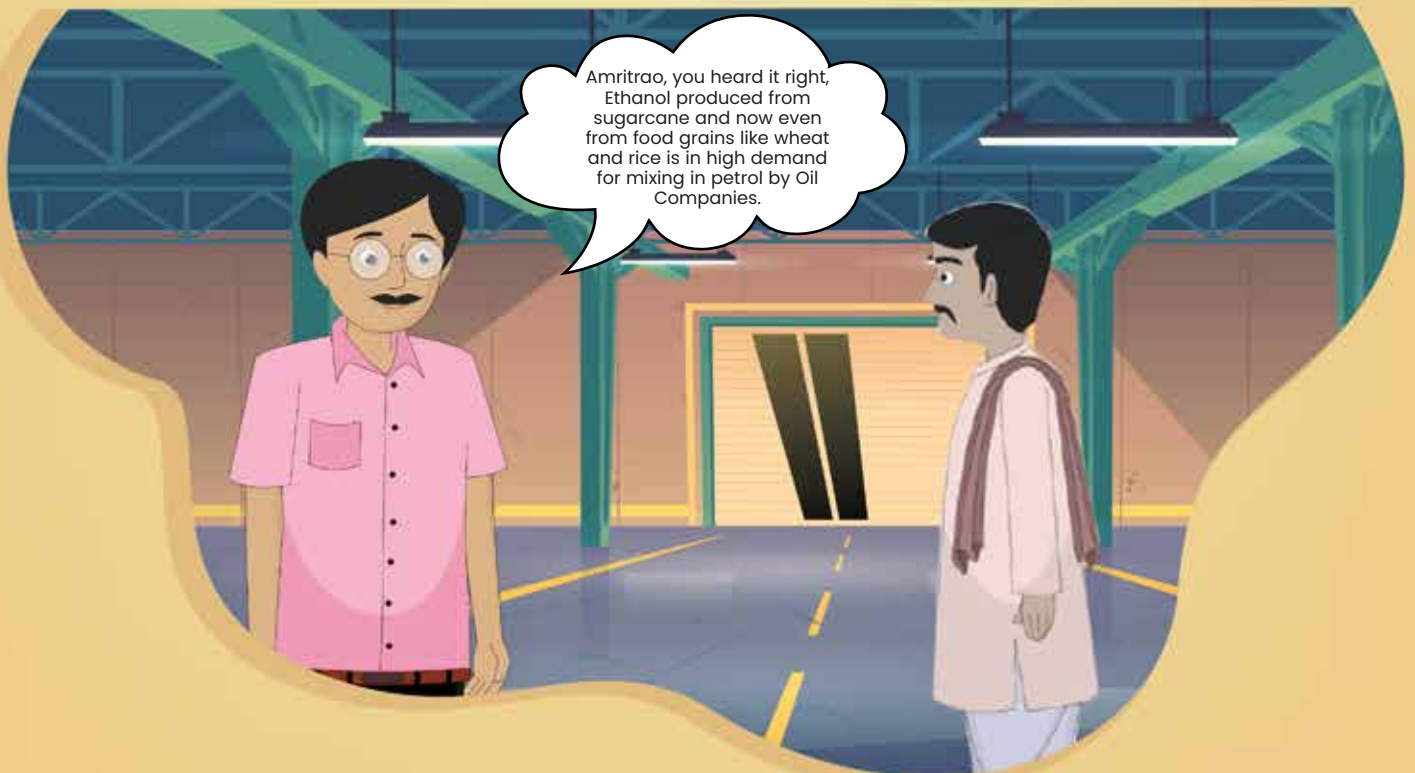
**The flag off news of Ethanol Blended Motor Spirit (EBMS) Tank Truck from Bongaigaon Refinery will be a milestone of the National Biofuel Policy in the North Eastern region.**

**Rameswar Teli,**

MoS for Petroleum & Natural Gas

17<sup>th</sup> August, 2021

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







With the Government fixing remunerative ethanol prices, there will be sustained demand for your crops. This will ensure you get the right price and timely payment for your produce.



Yes

You mean to say, now, more number of vehicles will be running with ethanol mixed petrol produced from sugarcane and food grains?



So, I have become Urjadaata from Annadaata. That's great, now, I can dream of a good future

# 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 double to 1,500 crore litres annually

- Financial assistance scheme introduced by DFPD during 2018-2022 to increase ethanol production capacity.
- Long term offtake agreement signed to establish 431 crore litres per annum of dedicated ethanol capacity.
- Estimated 165 LMT of surplus grain to be utilized annually from 2025 to produce ethanol which would result in estimated 42,000 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.

Enhanced production of 1G ethanol from various feed-stocks will help in achieving blending targets of ethanol with petrol apart from promoting ethanol as an indigenous, non-polluting, environment friendly & virtually inexhaustible fuel.

**Shri Hardeep Singh Puri,**  
Minister for Petroleum & Natural Gas



# 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 CO<sub>2</sub> & 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.

# Abbreviations and their full forms

Abbreviation	Full Form
%	Percentage
DFPD	Department of Food and Public Distribution
EBMS	Ethanol Blended Motor Spirit
EPP Programme	Ethanol Blended Petrol Programme
EOI	Express 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
LTOA	Long Term Offtake Agreement
DEP	Dedicated Ethanol Plant



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