

## Role of Ethanol Blending in Energy Security and Rural Economy

### Why in news?

The ethanol blending programme will revolutionize India's rural economy and strengthen energy security.

### What is ethanol blending programme?

- **Ethanol blending programme (EBP)** - It is an initiative of Union Government that *aims to increase the proportion of ethanol in petrol.*
- The program promotes the blending of ethanol derived from sugarcane, maize and other agricultural feedstock with petrol.
- **Objective** - To reduce the reliance on *fossil fuel imports* and *decrease greenhouse gas emissions.*
- **Target** - To achieve *20% ethanol blending petrol by 2025-26.*
- This target was previously set for 2030, but it is changed to 2025 in 2022.
- As of 2024, India achieved a *13.8% ethanol blend.*
- **Framework for EBP** - *National Biofuel Policy, 2009 provides framework for implementation* of EBP.
- **National Biofuel Policy** - It was *launched in 2009* and is part of India's effort to achieve carbon neutrality by 2070.
- It proposed a *non-mandatory target of 20%* blending of both biodiesel and bioethanol by 2017.
- The policy is revised in 2018 to achieve 20% bioethanol blending and 5% biodiesel blending by 2030.

To know more about ethanol blending click [here](#)

### About Ethanol

- Ethanol is a *Colorless, combustible, and volatile liquid organic* substance having the *chemical formula C<sub>2</sub>H<sub>5</sub>OH.*
- Ethanol is one of the primary biofuels, *naturally produced* through the fermentation of sugars by yeasts or through petrochemical processes like ethylene hydration.
- It is widely used not only as an alternative fuel source but also in various industries as a chemical solvent and in the synthesis of organic compounds.
- Ethanol also has *medical applications* as an antiseptic and disinfectant, adding to its versatile uses.
- Ethanol, as a domestically produced biofuel, more environmentally friendly, sustainable and contributing to a cleaner energy landscape.

## What is the role of ethanol blending in energy security?

- **Reduces crude oil import** - India is the *world's second-largest importer of crude oil*, and is highly dependent on foreign sources to meet its energy needs.
- This Programme address this issue by gradually substituting imported petrol with ethanol, a domestically produced biofuel.
- **Reduce in exchequer of Indian forex** - Through increased ethanol blending, India has reduced crude oil imports, saved foreign exchange, and promoted energy self-sufficiency.
- In last decade, through EBP India has saved 1.06 crore rupees in foreign exchange.
- **Reduces external vulnerability** - By achieving self-sustainability in energy needs India will have more stable economic environment and sustainable growth.
- Reduce dependency on global oil markets and shield India from ***price volatility*** in the global energy sector.
- **Addresses energy demand** - Ethanol full-fills the energy needs of India's growing energy demands, due to expanding population, increasing urbanization, and evolving lifestyles.
- **Sustainable energy** - Ethanol can reduce emissions by 88-108% compared to petrol.
- Around 98% of the fuel used in the road transportation sector comes from fossil fuels, while only 2% is met by biofuels like ethanol.
- India reduced CO<sub>2</sub> emissions by an estimated 544 lakh metric tons through ethanol blending to meet its climate goals.

*Sustainable Aviation Fuel (SAF) Promotes compressed biogas production as a cleaner fuel alternative in aviation sector.*

## How ethanol blending can boost the rural economy?

- **Rural industrialization** - The establishment of distilleries and processing plants can lead to *rural industrialization*.
- **Meet local energy needs** - This approach not only bolsters the economy but also enhances energy security by promoting *local production of fuels*.
- **Increase farmers income** - Government offers *incentives to ethanol producers* which contributes to the *doubling of farmer income* and insulating farmers from traditional market volatility.
- By creating a *steady demand for sugarcane, maize, and other feedstock*, the program provides farmers with a reliable income source.
- **Waste-to-wealth** - Production of ethanol using agricultural waste and unused resource to *reduce environmental impact and promote circular economy*.
  - For example, molasses from sugar production and bagasse (a fibrous residue of sugarcane) are used in ethanol and power generation.
- **GOBARdhan** - Encourages the use of *bio-waste in energy production*.
- GOBARdhan with EBP fuels ethanol blending by promoting other biofuels.
- **Employment creation** - Expansion of ethanol infrastructure has created employment opportunities in rural areas, from production facilities to transportation and distribution networks.

- **Improve rural livelihood** - These economic benefits further strengthen rural livelihoods and promotes sustainable economic development.

### What lies ahead?

- Support long-term biofuel growth by advancements in second-generation (2G) and third-generation (3G) biofuels.
- Use of non-food feedstocks like agricultural residues and algae, these technologies reduce competition between food and fuel.
- Address significant concern regarding the balance between food security and energy needs.
- Ensure that ethanol production continues sustainably, without compromising food supply.
- Aim for higher blending goals like E85 and E100, bringing economic prosperity, environmental benefits, and rural rejuvenation.

### Quick facts

- **Flex-fuel vehicle (FFV) or E85** - FFV is a car with internal combustion engines that can run on gasoline or a blend of gasoline and ethanol.
- A blend of gasoline is usually has 85% ethanol and 15% gasoline and it can also run on unleaded gasoline.
- *FFVs can store both fuels* in the same tank.
- Sensors in the FFV system automatically adjust for the fuel composition.

### Reference

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