



## Ethanol Blending Might Not Work for India

India should increase the use of biofuels to reduce dependence on oil imports but that could strain the country's water resources and affect food availability.

- Among biofuels, ethanol is one of the most viable alternatives, and the government intends to raise ethanol blending in petrol to 20% by 2030 from the current 2-3%.
- As the ethanol molecule contains oxygen, it allows the engine to more completely combust the fuel, resulting in fewer emissions and thereby reducing the occurrence of environmental pollution.

### Ethanol Blending and its Purpose

- In India, ethanol is mainly derived by sugarcane molasses, which is a by-product in the conversion of sugar cane juice to sugar.
- Ethanol blending is the practice of blending petrol with ethanol.
- Many countries, including India, have adopted ethanol blending in petrol in order to reduce vehicle exhaust emissions and also to reduce the import burden on account of crude petroleum from which petrol is produced.
- It is estimated that a 5% blending (105 crore litres) can result in replacement of around 1.8 million Barrels of crude oil .
- The renewable ethanol content, which is a by product of the sugar industry, is expected to result in a net reduction in the emission of carbon dioxide, carbon monoxide (CO) and hydrocarbons (HC).
- Ethanol itself burns cleaner and burns more completely than petrol it is blended into.

### Concerns with Ethanol Blending

- While India has become one of the top producers of ethanol but it lags top producers, the US and Brazil, by a huge margin and remains inefficient in terms of water usage.
- India's water requirements for producing ethanol are not met through rainwater.
- Water footprint, that is water required to produce a litre of ethanol, includes rainwater at the root zone used by ethanol-producing plants such as sugarcane, and surface, ground water, and fresh water required to wash away pollutants.
- India uses more surface and ground water than the US and Brazil. Most of our daily uses of water come from this source.
- Moreover, India has low internal surface and ground water compared with both countries.
- Sugarcane is another limited resource that affects the ethanol blending in the country.
- In order to achieve 20% blend rate, almost one-tenth of the existing net sown area will have to be diverted for sugarcane production. Any such land requirement is likely to put a stress on other crops and has the potential to increase food prices.
- India's biofuel policy stipulates that fuel requirements must not compete with food requirements and that only surplus food crops should be used for fuel production, if at all.
- Producing ethanol from crop residue can be a good alternative but the annual capacity of biorefinery is still not enough to meet the 5% petrol-ethanol blending requirement.
- Other biofuels such as Jatropha have often proven to be commercially unviable.

### Way Forward

- Concerted efforts should be made to increase sugarcane yield and decrease water usage through

better irrigation practices.

- Increase in the ethanol production capacity of bio-refineries.
- Alternatives like 3rd generation (derived from algae) and 4th generation biofuels(derived from specially engineered plants or biomass) should be encouraged.

## Biofuels

- Biofuels are fuels manufactured from biomass.
- Biomass resources are the biodegradable fraction of products, wastes and residues from agriculture, forestry and related industries as well as the biodegradable fraction of industrial and municipal wastes.

BIOFUELS		
GENERATION	CHARACTERISTICS	REMARKS
FIRST	Produced from food crops like maize, corn, sugar cane, rapeseed, palm, and soybean into ethanol and biodiesel, using a similar process to that used in beer and wine-making.	Impose significant conflict between staple crops, traditional price of staple crops
SECOND	Produced from non-food crops and organic agricultural waste, which contain cellulose.	Grasses like switchgrass seed can be transferred
THIRD	Derived from algae. Also known as green hydrocarbons	The list of fuels that Ethanol, and Jet-fuel
FOURTH	Produce sustainable energy as well as capture and store CO <sub>2</sub> by converting biomass materials, which have absorbed CO <sub>2</sub> while growing, into fuel.	At all stages of production processes.  Rather than simply generation biofuel more carbon than

## Advantages of Biofuel

- Renewable Energy source.
- Non-toxic & Biodegradable.
- Contains no sulphur that causes acid rain.
- Environment friendly-less emissions.
- Has rural employment potential.

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