

# ALTERNATIVE FUEL INFORMATION SHEET: ETHANOL

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## Environmental Benefits

Even Though ethanol emits carbon dioxide when used as a fuel source, the emissions are offset when the feedstocks are grown to produce the ethanol. But, overall there is still a net decrease of 40% when produced through corn-based ethanol. If cellulos-based ethanol is used these reductions reach 88-108%.

## Economic Benefits

Depending on the ethanol blend content, the impact to the fuel economy will vary. The current vehicles in the market are optimized toward gasoline, so the net positive impacts are dependent on a conversion towards ethanol optimization. Additionally, through ethanols increased octane content there is increased performance and power.

## Overview

Ethanol, derived from corn and plant materials, has evolved from a niche to a mainstream component in the U.S. fuel industry, with over 98% of gasoline in the U.S. now incorporating ethanol, mainly in the E10 blend. Introduction of E85, containing 51% to 83% ethanol, has expanded fuel options, particularly for flexible fuel vehicles. Ethanol's impact on fuel economy varies with content and engine optimization.

# Conversion

Looking at availability based on the current vehicle infrastructure, the use of low-blend ethanol does not require a change in equipment or fueling structures. To use higher blends additional equipment is needed. But, FFVs that operate on both high percentage ethanol and gasoline are standard equipment and have equal costs to traditional just gasoline-powered engines. So, this is a very accessible and affordable fuel alternative.

# Efficiency

The efficiency and impact on fuel economy of ethanol varies greatly depending on the blend used. E85 containing 83% ethanol content holds about 27% less energy per gallon than gasoline. This is largely because flex-fuel vehicles are optimized to run on gasoline, and improving the capability of flex-fuel engines could increase fuel economy. Ethanol has a higher octane number than gasoline, giving increased power and engine performance. For this reason, many IndyCar drivers use an E98 blend in their race cars. Research and development into more efficient engines operating on higher ethanol content blends continues to grow.



# Current Applications

One of the easiest ways to start utilizing ethanol is by filling up a flex fuel vehicle with E15 or E85 blends of gasoline and ethanol. Many locations in Ohio already have these blends available for use. Currently, there are seven ethanol production plants in Ohio alone, so there is already available infrastructure for the application of this fuel alternative. Additionally, ethanol has been utilized by the motorsport industry for many years. This is based on its overall performance and power as compared to traditional gasoline. Finally, there are many subsidies and government programs to aid in the production and cost-effectiveness of this fuel. To increase the production of corn production for, corn-based ethanol, the Biomass Crop Assistance Program provides financial assistance to landowners and operators. This includes establishing, producing, and delivering biomass feedstock crops. There are also programs for the manufacturing of ethanol. This includes The Biorefinery Assistance Program which provides loans and grants for ethanol production development, construction, and retrofitting of commercial-scale biorefineries. Additionally, the Bioenergy Program for Advanced Biofuels administers payments to facilities that specialize in advanced biofuel production technologies. Finally, there are various grants for education and outreach for ethanol production with landowners and overall research and development for production.