



Biomass Program

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Ethanol Myths and Facts

Ethanol is a clean, renewable fuel. It is helping to reduce our nation's dependence on oil and offers a variety of economic and environmental benefits. As we look to broaden our domestic energy resources, common misconceptions about ethanol production and use need to be cleared up. This page addresses some of the common myths about ethanol.

More information can also be found on this site's [Frequently Asked Questions](#) page.

MYTH: In terms of emissions, ethanol pollutes the same as gasoline or more.

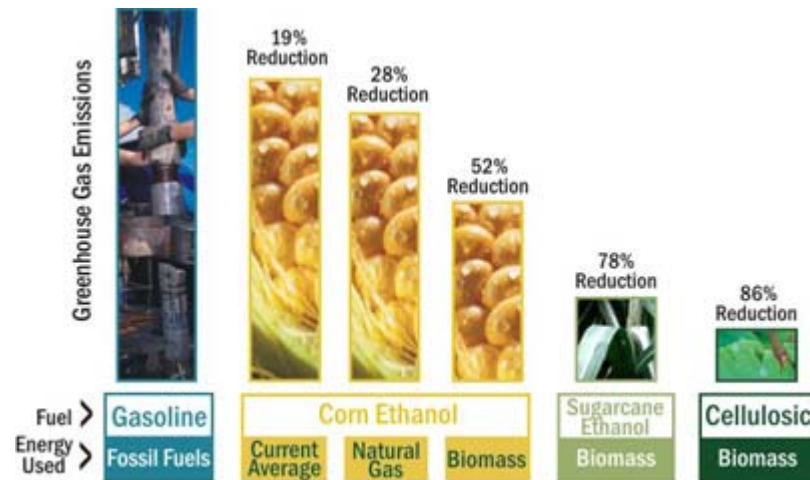
FACT: Ethanol results in fewer greenhouse gas (GHG) emissions than gasoline and is fully biodegradable, unlike some fuel additives.

- Today, on a life cycle basis, ethanol produced from corn results in about a 20% reduction in GHG emissions relative to gasoline. With improved efficiency and use of renewable energy, this reduction could be as much as 52%.
- In the future, ethanol produced from cellulose has the potential to cut life cycle GHG emissions by up to 86% relative to gasoline.



Future biofuels will be made from a wide range of hardy and fast-growing plants, such as switchgrass--which is a perennial native to American prairies. Switchgrass requires about a quarter of the irrigation and fertilization of row crops.

- Ethanol blended fuels currently in the market – whether E10 or E85 – meet stringent tailpipe emission standards.
- Ethanol readily biodegrades without harm to the environment, and is a safe, high-performance replacement for fuel additives such as MTBE.



Source: Wang et al, *Environmental Research Letters*, Vol. 2, 024001, May 22, 2007

In comparison to gasoline, ethanol made from cellulose and produced with power generated from biomass byproducts can result in an 86% reduction in greenhouse gas emissions.

MYTH: Ethanol cannot be produced from corn in large enough quantities to make a real difference without disrupting food and feed supplies.

FACT: Corn is only one source of ethanol. As we develop new, cost-effective methods for producing biofuels, a significant amount of ethanol will be made from more abundant cellulosic biomass sources.

- Future ethanol will be produced increasingly from cellulose found in crop residues (e.g., stalks, hulls), forestry residues (e.g., forest thinning, wood byproducts), energy crops (e.g., switchgrass, sorghum), and sorted municipal wastes. Some promising energy crops grow on marginal soils not suited for traditional agriculture.
- It is worth noting that a high-protein animal feed, known as Distiller's Dried Grains with Solubles (DDGS), is produced in the process of making ethanol from corn.

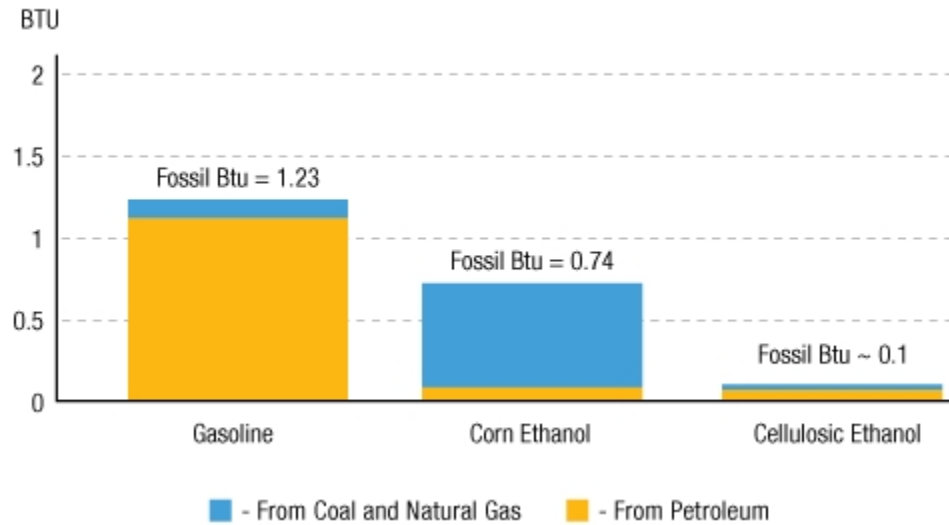
- The Energy Independence and Security Act of 2007 (EISA) requires use of 36 billion gallons of renewable transportation fuels in the U.S. by 2022. Of that quantity, 16 billion gallons must be cellulosic biofuels. Ethanol from corn is capped at 15 billion gallons.
- The U.S. Departments of Energy and Agriculture's Billion Ton Study ([PDF 8.5 MB](#)) [Download Adobe Reader](#) found that we can grow adequate biomass feedstocks to displace approximately 30% of current gasoline consumption by 2030 on a sustainable basis – with only modest changes in land use. It determined that 1.3 billion tons of U.S. biomass feedstock is potentially available for the production of biofuels – more than enough biomass to meet the new renewable fuel standard mandated by EISA.

MYTH: More energy goes into producing ethanol than it delivers as a fuel.

FACT: In terms of fossil energy, each gallon of ethanol produced from corn today delivers one third or more energy than is used to produce it.

- Ethanol has a positive energy balance – that is, the energy content of ethanol is greater than the fossil energy used to produce it – and this balance is constantly improving with new technologies.
- Over the last 20 years, the amount of energy needed to produce ethanol from corn has significantly decreased because of improved farming techniques, more efficient use of fertilizers and pesticides, higher-yielding crops, and more energy-efficient conversion technology.
- Most studies that claim a negative energy balance for ethanol fail to take into account the energy contained in the co-products.

Fossil Energy Requirements of Different Fuels

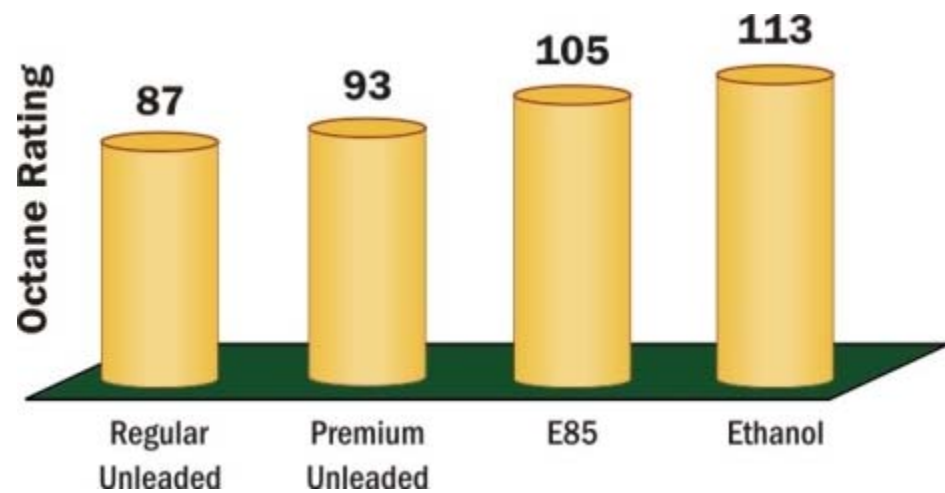


This graph shows how much fossil energy is required to provide 1 BTU of each fuel at the pump. The graph does not reflect energy derived from solar or other renewable sources used in the production of ethanol.

MYTH: Ethanol-gasoline blends can lower fuel economy and may harm your engine.

FACT: Ethanol blends in use today have little impact on fuel economy or vehicle performance.

- While ethanol delivers less energy than gasoline on a gallon-for-gallon basis, today's vehicles are designed to run on gasoline blended with small amounts of ethanol (10% or less) with no perceptible effect on fuel economy.
- Flex-fuel vehicles designed to run on higher ethanol blends (E85 or 85% ethanol) do experience reduced miles per gallon, but show a significant gain in horsepower.
- As a high-octane fuel additive and substitute for MTBE, ethanol enhances engine performance and adds oxygen to meet requirements for reformulated gasoline.



Race cars of the Indy Racing League benefit from the high performance characteristics of ethanol.

MYTH: Rainforests will be destroyed to create the new croplands required to meet food, feed, and biofuels needs, thus accelerating climate change and destroying valuable ecosystems.

FACT: Biofuels have the potential to significantly reduce global GHG emissions associated with transportation, but—as with all types of development—controls are needed to protect ecologically important lands.

- In Brazil and elsewhere, laws have already slowed deforestation, and for the past decade China has converted marginal croplands to grassland and forests to control erosion.
- Links between today's corn-based U.S. ethanol production and land use changes elsewhere are uncertain. We cannot simply assume that increases in U.S. ethanol production will lead to increased crop production abroad. Since 2002, during the greatest period of ethanol growth, U.S. corn exports increased by 60%. In part, improvements in U.S. corn yield (about 1.6 annually since 1980) have enabled simultaneous growth in corn and ethanol production. U.S. exports of Distiller's Dried Grains (DDGs) have also steadily increased over the past decade.
- Greenhouse gas emissions will decrease dramatically as biofuels of the future are increasingly made from cellulosic feedstocks and as the associated farming, harvesting, transport, and production processes increasingly use clean, renewable energy sources.

Further Reading

For more information about the energy balance, environmental impacts, and overall value of ethanol as a fuel, see the following sites. Some files may require Adobe Acrobat Reader. [Download Adobe Reader](#).

Energy Balance

- Energy Balance: The 2001 Net Energy Balance of Corn Ethanol ([PDF 30 KB](#))
- Ethanol: The Complete Energy Life-Cycle Picture Brochure ([PDF 12.1 MB](#))
- Renewable Fuels Association: [Ethanol Facts: Engine Performance](#)

Environmental Impacts

- Wells-to-Wheels Analysis of Advanced Fuel/Vehicle Systems ([PDF 1.3 MB](#))
- U.S. Environmental Protection Agency: [Greenhouse Gas Impacts of Expanded Renewable and Alternative Fuels Use](#)

Value

- Contribution of the Ethanol Industry to the Economy of the United States ([PDF 187 KB](#))

Feedstock Availability

- Biomass as Feedstock for a Bioenergy and Bioproducts Industry: The Technical Feasibility of a Billion-Ton Annual Supply, April 2005 ([PDF 8.5 MB](#))

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