

Environmental Benefits of High-Octane Low-Carbon Fuel



#DYK ethanol is a renewable, environmentally friendly octane booster that reduces greenhouse gases and other harmful tailpipe emissions?

High-octane fuel made from corn provides a cleaner source of octane compared to petroleum based products that have been shown to contribute to thousands of mortalities in the United States.

Ethanol today reduces greenhouse Gas (GHG) emissions by 40%-45%. Additionally, high-octane fuels unlock increased gains in vehicle efficiency, equating to more miles per gallon, and a further reduction of GHG emissions.

Mid-level ethanol blends (15%-40%) used in high-octane fuels are capable of reducing carbon dioxide emissions by 4% – 10%.

Studies have shown mid-level ethanol blends, such as E30, would lower GHG emissions from oil refineries between 12%-27% due to lower crude oil throughput and by limiting the intensive refining processes needed to produce petroleum-based octane additives.

#DYK higher ethanol blends are recognized as a Clean Air Choice® by the American Lung Association?

1. (WILL GET SOURCE FOR THIS)
2. (page 3 first paragraph - <https://ethanolrfa.org/wp-content/uploads/2018/10/Final-SAFE-ProposedRule-Comment-Letter.pdf>) & Thomas L. Darlington et al., Modeling the Impact of Reducing Vehicle Greenhouse Gas Emissions with High Compression Engines and High Octane Low Carbon Fuels, SAE Tech. Paper 2017-01-0906, at 4, 6 (Mar. 28, 2017)
3. (Kwasniewski, Vincent & Blieszner, John & Nelson, Richard. 2015. Petroleum refinery greenhouse gas emission variations related to higher ethanol blends at different gasoline octane rating and pool volume levels. Biofuels, Bioproducts and Biorefining. 10. n/a-n/a. 10.1002/bbb.1612.)





Why High-Octane Low-Carbon Fuel?

Automakers are seeking affordable, higher octane motor fuels enabling them to unlock increased efficiency gains within future spark ignition engines.

While there are many potential sources of additional octane in future fuels, ethanol is the only commercially available product that can check all of these boxes: Low Carbon, High Octane, Affordable, Abundant and Renewable! The National Corn Growers Association, in partnership with state corn organizations, continue their efforts to shape long-term future domestic demand for U.S. produced corn-based ethanol.

Why should you care about High-Octane Low-Carbon fuels?

1. **Domestic Market Demand:** A high-octane low-carbon fuel in the marketplace, once fully implemented, increases long-term annual ethanol usage by more than 5 billion gallons . That's equal to over 1.8 billion bushels of new annual corn demand¹.
2. **Domestic Energy Independence:** More ethanol means less reliance on foreign oil. In 2018, ethanol displaced 594 million barrels of crude oil.
3. **Future Engine Performance:** Auto makers are asking for a higher-octane fuel standard allowing new technology capable of delivering substantial gains in engine efficiency and performance.
4. **Environmental Impact:** In 2018, the use of ethanol in gasoline reduced CO₂-equivalent Greenhouse Gas Emissions (GHG) from vehicles in the U.S. by 55.1 million metric tons. That's equal to removing 11.7 million cars from the road for an entire year!
5. **Reduces the price at the Pump:** Today regular gasoline without ethanol is often times priced at well over a \$0.50 higher compared to fuel containing a minimum of E10. Higher blends of ethanol in a future high-octane fuel would allow consumers access to a high-octane fuel without the high-octane price premium we see today.



¹ Implementation gradually spread over the next 20 years



RON, MON, AKI. WHAT?



It may sound like a different language, but RON, MON and AKI are acronyms you should know!

These all have to do with the number you see at the gas pump, known as the octane rating. Octane is the measure of a fuel's ability to resist "knocking" or "pinging" during combustion, caused by fuel igniting prematurely within engines¹. Let's walk through what this all means and why you should care.

RON Research Octane Number	Engine knock resistance during low-load operations. Used in the majority of countries, outside U.S. and Canada, as the publicly posted octane rating.
MON Motor Octane Number	Engine knock resistance during high-load operations.
AKI or $(RON + MON)/2$ Anti-Knock Index	The average of RON + MON. The publicly posted octane rating primarily in the U.S. and Canada

In the U.S., the average of RON plus MON, also known as AKI, equals the minimum octane rating for unleaded motor fuel, or the number you see at the pump! Often, you'll see the octane number of 87 (regular), 89 (mid-grade) or 91-93 (premium) when you fill-up.

So, why should you care about the octane number at the pump? NCGA, in partnership with our state corn organizations, is working to implement a national minimum octane standard of 98 RON (equivalent to approximately a 93-94 AKI). Why push for a higher minimum octane standard?

A higher minimum octane standard would grow the overall market for octane additives. Ethanol demand would grow substantially as a result. Ethanol's competitive advantage in octane value, price, renewable low carbon attributes and ability to deliver improved health benefits strongly position it to capture increased market share. A high-octane, low-carbon fuel utilizing mid-level ethanol blends would generate new corn grind of at least 1.8 billion bushels annually.

Automotive manufacturers are asking for affordable higher-octane fuels in order to achieve increased efficiency gains in future spark-ignition engines while limiting the financial impact to consumers at the pump. A high-octane, low-carbon fuel blended from corn ethanol is the only commercially viable option that can meet this objective.

