RFA RENEWABLE FUELS ASSOCIATION

Octane and Federal Vehicle Requirements

Meeting aggressive new corporate average fuel economy (CAFE) requirements and tailpipe Greenhouse Gas (GHG) emissions standards will require revolutionary changes in fuel and vehicle technologies. Accordingly, automakers are exploring a broad portfolio of technologies that can simultaneously improve vehicle efficiency and reduce emissions impacts.

One very promising strategy is the use of high octane fuels in advanced internal combustion engines. When paired with downsized, high-compression, turbo-charged engines, high octane fuels will deliver better fuel economy than regular gasoline, consuming less energy and producing fewer GHG emissions. There is data that high octane fuels can also increase fuel efficiency and reduce emissions in legacy vehicles. As the U.S. Environmental Protection Agency (EPA) has recognized, high octane fuels "…could help manufacturers who wish to raise compression ratios to improve vehicle efficiency as a step toward complying with the 2017 and later GHG and CAFE standards."

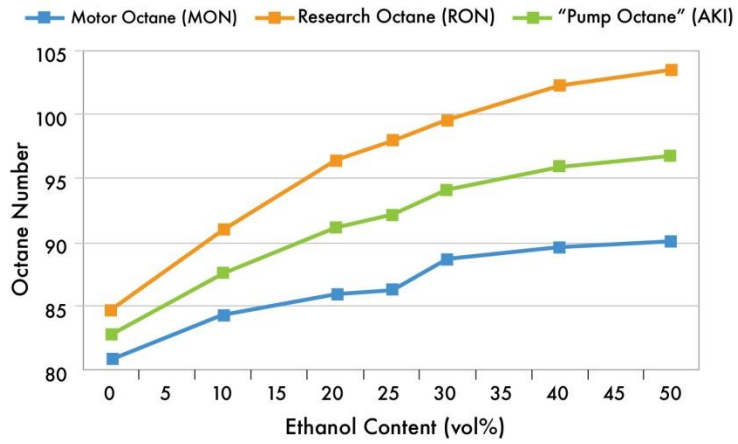
A growing body of research by automakers, government labs and universities demonstrates that gasoline blends containing 20-40% ethanol can deliver the octane needed to maximize efficiency in advanced internal combustion engines. In addition to possessing an extremely high octane rating, ethanol is less expensive and cleaner than other potential octane sources.

In recent years, a broad coalition of stakeholders has rallied to help advance ethanol as the "key ingredient" in the high octane fuels of tomorrow. Ethanol producers, automakers, government researchers, fuel retailers, agricultural groups and others continue to collaboratively chart the course to a high octane future that finally recognizes ethanol's full potential.

A recent study by the Massachusetts Institute of Technology found that the use of high octane fuels in appropriately designed vehicles by 2040 could:

- Reduce annual gasoline consumption in the U.S. by 3.0 – 4.4%;
- Provide additional CO2 emission reductions of 19-35 metric tons/year;
- Generate an annual direct economic benefit of $0.4 – 6.4 billion; and
- Offer a net societal benefit (including the social cost of carbon) of $1.7 – 8.8 billion annually.

Octane Effect of Adding Ethanol to CA Gasoline Blendstock (CARBOB)



Source: RON, MON from Chupka et al. (2015); AKI based on R+M/2

Find out more about the future potential of ethanol-based high octane fuel from the U.S. Department of Energy