



# Ethanol Update

**With current high gas prices and the increased availability of flexible fuel vehicles and fueling stations, ethanol is now the most widely used alternative to gasoline.**

## 2008 Model Flexible Fuel Vehicles Announced

The National Ethanol Vehicle Coalition (NEVC) is very pleased to announce that 31 models of motor vehicles will be offered with an E85 capable engine in 2008. Chrysler, Ford, General Motors, Nissan and Mercedes Benz are all offering flexible fuel vehicles (FFVs) throughout 2008 and beyond.

“We are pleased to see so many popular models offered with a flexible fuel engine in 2008,” stated Executive Director of the NEVC Phil Lampert. “From a humble beginning of less than 500 FFVs in 1993, we expect that more than 750,000 such FFVs will be produced in the coming year. As we work to advance our national energy independence, we encourage consumers to consider the purchase of a flexible fuel vehicle that is capable of operating on regular unleaded gasoline or up to 85% ethanol.”

Excluding the Chrysler Town and Country Minivan, which will be available in all 50 states, model year 2008 Chrysler FFVs will not be available for purchase in California, Connecticut, Maine, Massachusetts, New York, Pennsylvania, Rhode Island, and Vermont. Nissan FFVs

will be available only in select markets. Ford, GM and Mercedes Benz 2008 FFVs are available in all 50 states. Chrysler, GM, Ford and Nissan are all members of the NEVC.

Lampert added, “We are optimistic that during the course of the next several years, additional FFV platforms will be announced by our automaker members. As the production of such vehicles continues to grow, the NEVC and our partners across the nation continue to dedicate our efforts to the growth of E85 fueling facilities.”

The following platforms are being produced as Flexible Fuel Vehicles during Model Year 2008:

### CHRYSLER

- 4.7L Chrysler Aspen
- 2.7L Chrysler Sebring Convertible & Sedan
- 3.3L Chrysler Town & Country
- 2.7L Dodge Avenger
- 4.7L Dodge Dakota
- 4.7L Dodge Durango
- 3.3L Dodge Grand Caravan
- 4.7L Dodge Ram
- 4.7L Jeep Commander & Grand Cherokee

### FORD

- 4.6L Ford Crown Victoria (including taxi & police units)
- 5.4L Ford F-150
- 4.6L Mercury Grand Marquis

### GENERAL MOTORS CARS & TRUCKS

- 3.5L & 3.9L Chevrolet Impala (including police units)
- 5.3L Chevrolet Avalanche & Silverado, GMC Sierra
- 5.3L Chevrolet Express & GMC Savana
- 5.3L Chevrolet Suburban & GMC Yukon XL
- 5.3L Chevrolet Tahoe & Police Package Tahoe, GMC Yukon
- 3.9L Chevrolet Uplander
- 3.9L Pontiac Montana (only available in Canada & Mexico)
- GM’s HUMMER division recently announced the availability of the 2009 H2 SUT as E85 compatible. This will assist in GM’s commitment of producing half of their line as flexible fuel vehicles by the year 2012. Fourteen E85 compatible GM models will be available in 2009 model year.

## NISSAN TRUCKS

- 5.6L Nissan Armada
- 5.6L Nissan Titan

## MERCEDES BENZ

- 3.0L Mercedes Benz C300 Luxury & Sport

The NEVC 2008 Purchasing Guide will include a complete listing of all FFVs, photos, their engine and passenger size, and their gallon fuel capacity. This full color, 16 page guide will be available in early October. To place your order, email [order@e85fuel.com](mailto:order@e85fuel.com). For a complete listing of all model year FFVs, go to [www.E85Fuel.com](http://www.E85Fuel.com).

## Fueling Stations

The current number of E-85 fueling stations continues to grow and is currently approaching 1600 locations. Minnesota continues to lead the nation with almost 350 while their closest rival Illinois is about 1/2 that. Three years ago we reported in AERA's Shoptalk the total number of E85 stations was 480, today we currently know of 1562 locations selling E85. Those figures reflect an annual increase of approximately 500 stores each year.

If you would like to find an E85 station near you, log onto the site [www.e85refueling.com](http://www.e85refueling.com) and put in your zip code number. E85 is now available in all, but six, of the continental United States and is available in three major Ontario cities in Canada.

## Current Fuel Prices

No one likes to see the price of fuel increase, but each time it does it makes the use of E85 more practical, which also helps sell the vehicles equipped for ethanol use. Although the miles per gallon are reduced when using E85, cost savings can be achieved when the difference in price is greater. Generally, E85 can be found for \$.30 to \$.50 a gallon less than regular low grade unleaded gasoline. This, of course, depends greatly on your location and the availability of E85.

As the availability of this 105 octane rich fuel grows across the country so does the different uses. Anywhere there is a performance engine orientated venue, E85 is in use or being tried and considered. That would include NHRA events, junior dragsters, IRL circuit races or just a ride over at the local go-cart track.

## Future of Ethanol

Ethanol is in the middle of a flux right now, with the common corn-based ethanol being by far the most available source of the alternative



## Current E85 Refueling Locations by State

Alabama - 5  
Arkansas - 5  
Arizona - 12  
California - 10  
Colorado - 49  
District of Columbia - 3  
Delaware - 1  
Florida - 14  
Georgia - 8  
Iowa - 90  
Idaho - 4  
Illinois - 172  
Indiana - 99  
Kansas - 40  
Kentucky - 5  
Louisiana - 3  
Massachusetts - 1  
Maryland - 5  
Michigan - 64  
Minnesota - 346  
Missouri - 96  
Mississippi - 2  
Montana - 1  
North Carolina - 13  
North Dakota - 23  
Nebraska - 41  
New Mexico - 7  
Nevada - 23  
New York - 20  
Ohio - 56  
Oklahoma - 6  
Oregon - 9  
Pennsylvania - 15  
South Carolina - 60  
South Dakota - 70  
Tennessee - 13  
Texas - 38  
Utah - 4  
Virginia - 4  
Washington - 11  
Wisconsin - 102  
West Virginia - 3  
Wyoming - 6

fuel. The future of ethanol is cellulosic, but the technology has not matured to the point where the consumer can fill their tank with the cellulosic-based fuel. Unfortunately, the corn feedstock that we use for the ethanol that is common in the United States is not nearly the most efficient source of biomass. There are many better choices for biomass, like sweet sorghum, which can be grown and harvested in most of the country. In an effort to make this feasible, researchers at Oklahoma State University have come up with a potential farm-based processing scenario which could lower the price of making ethanol from the feedstock and make the entire process more efficient.

Oklahoma State University's sorghum-related bio-fuels research is taking a localized approach, with the aim of making possible the effective production of ethanol in the farmer's own field. Sweet sorghum can be grown throughout temperate climate zones of the United States, including Oklahoma. It provides high biomass yield with low irrigation and fertilizer requirements. Corn ethanol, in contrast, requires significant amounts of water for growing and processing.



Members of the OSU Bio-fuels Team harvest sweet sorghum to test the feasibility of in-field processing. (Photo by Todd Johnson)

Best of all, producing ethanol from sweet sorghum is relatively easy, said Danielle Bellmer, bio-systems engineer with the OSU Division of Agricultural Sciences and Natural Resources' Robert M. Kerr Food and Agricultural Products Center.

"Just press the juice from the stalk, add yeast, allow fermentation to take place and you have ethanol," Bellmer said. "Unfortunately, the simple sugars derived from sweet sorghum have to be fermented immediately."

Throw in the expense of constructing and operating a central processing facility that would only operate the four to five months of the year when sorghum would be available in Oklahoma and the challenge multiplies.

In Oklahoma, the potential processing scenario might look like this: Plant sweet

## TECHSIDE

BY DAVE HAGEN, MIKE CARUSO, and STEVE FOX

sorghum around mid-April, and then stagger plantings for two to three months. This would provide a harvest window of August through November.

"Ethanol yields in Oklahoma could range from 300 gallons to 600 gallons per acre, depending on biomass yield, sugar content and juice expression efficiency," said Chad Godsey, bio-fuels team member and OSU Cooperative Extension cropping systems specialist with the department of plant and soil sciences. Godsey said the team is working to determine the maximum possible harvest window for sweet sorghum in Oklahoma.

"Obviously, the longer the harvest window, the more ethanol state farmers will be able to produce," he said.

OSU Bio-fuels Team researchers also are studying environmental parameters that may affect the feasibility of on-farm fermentation. A producer must be able to ferment the juice in the field during Oklahoma's harvest season for sweet sorghum, which occurs in the fall when temperature extremes are highly possible.

"Temperature can speed up, slow



down or derail the fermentation process," Godsey said.

Weather data collected over the past 10 years in Oklahoma indicates an average low temperature of about 44 degrees Fahrenheit and an average high temperature of approximately 98 degrees Fahrenheit during the August-through-October period.

**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.**

Six test plot sites are maintained at Oklahoma Agricultural Experiment Station facilities across the state, allowing OSU scientists to conduct research on sweet sorghum under local conditions.

"We would like to do with sweet sorghum what the Brazilians have done with sugar cane: In Brazil, sugar cane ethanol provides a large percentage of their fuel needs," Bellmer said.

The idea of using sweet sorghum for commercial ethanol production is not new. The reason sweet sorghum is not as popular as corn in terms of being a source of ethanol in the United States has been the need to ferment its simple sugars immediately and the high costs associated with a central processing plant that is operated only seasonally.

"By determining a process by which agricultural producers can create ethanol in the field from sweet sorghum, that barrier is removed," Bellmer said. "Producers will then have a much higher value product to sell." Time will tell how viable this method of manufacturing ethanol will become, but certainly any contribution made to reduce foreign oil dependency will be appreciated.

### The Prairies

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.

For an up to date list of Ethanol Myths and Facts prepared by the US Government link to [www1.eere.energy.gov/biomass/ethanol\\_myths\\_facts.html](http://www1.eere.energy.gov/biomass/ethanol_myths_facts.html) to learn more about this fuel source.

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### New Zealand Starts Selling Milk Ethanol

Other countries have been producing ethanol for longer periods of time than the US and recently New Zealand starting selling a mixture of 10% milk ethanol in their gasoline. E10, is a 10 percent ethanol gas blend with ethanol produced by Fonterra... a dairy cooperative. They made the ethanol from milk. Yes, milk.

It will be sold by Gull, which is family owned and has 30 petrol stations in New Zealand. The Fonterra plant produces 30,000 liters of ethanol a day. If that's not strange enough, Fonterra also makes alcohol that's used in vodka and gin. New Zealand set a target of 3.4 percent bio-fuel mandate by 2012. New Zealand also aims to be the world's first carbon neutral country.

Millions of liters are dumped out every day largely because it can't be sold and also to prevent the market from being glutted. If this excess could be diverted to making fuels without affecting the market price of milk, that would be great - but things are never that simple!

The good thing is finding out the true costs of producing ethanol from milk in New Zealand should be comparatively easy; there are no farm subsidies there. Fonterra doesn't make ethanol from the whole milk, as that would be inefficient and produce a lot of waste that would be difficult to dispose of.

In the cheese making process, the milk is treated with rennet and separates into curds and whey. The cheese curds ends up with most of the nutrients, and the whey ends up with most of the water and lactose. The market for whey is very limited, most whey is discarded, and whey disposal has been a major headache for dairies. It's the lactose in the whey that is used to make ethanol, thus they are using something that they would otherwise have to pay to dispose of!

### Skeptics – There Will Always Be!

No matter what technology, there will always be those who do not believe in developing new ideas and utilizing existing resources. If one looks deeper into those who are classified that way, you can almost always find a self concerned interest for their opposition to change. The following excerpt may be viewed as an example.



### Saudi Oil Minister Blasts Bio-fuels

Saudi Arabia's Minister of Petroleum and Mineral Resources recently denounced ethanol as an alternative to petroleum-based motor fuels.

In a speech to the International Oil Summit in Paris, Minister Ali bin Ibrahim Al-Naimi said, "Let's be realistic, ethanol and biofuels will not contribute to the protection of the global environment by reducing (carbon dioxide) emissions, they will not increase energy security, nor will they reduce dependency on fossil fuels to any appreciable degree.

"Their cultivation eats into the human food supply, reduces the absorption of carbon dioxide as forests are cut down, has not improved the security of energy supply and has not reduced petrol prices," he added. (Source: Domestic Fuels by Cindy Zimmerman.)

### End Notes

If everyone had bought into the idea of "that's good enough" we'd all still be driving horse and buggy. Look where we've come from automobiles of the '60s getting less than 10 miles a gallon to the many vehicles today averaging more than 30 miles per gallon. No matter what you think of E85, it's here now and it certainly looks like it will be around for a very long time, the only thing left to be determined is the amount of acceptance it receives from the public. ■

### We're interested in your thoughts

If you found this information useful or if you have other topics of interest for the magazine, please let us know by calling the AERA tech team directly, toll-free 888-324-2372.



The AERA tech team, from left to right:

**Steve Fox** has over 20 years experience in the engine building industry with eight of those years spent working in the machine shop. Steve is an ASE-certified Master Machinist, as well as a longtime member of the drag racing circuit.

**Dave Hagen**, our Senior Technician, has over 36 years of experience in our industry. An ASE-certified Master Machinist, Dave specialized in cylinder head work and complete engine assembly for the first 17 years of his career.

**Mike Caruso** brings over 42 years of rebuilding and high-performance experience to AERA. An ASE-certified Master Machinist, Mike came to us from FEL-PRO's high-performance R&D and tech line, where he worked for 11 years.