

A Fuels Game....

We are witnessing a weakening of the internal combustion engine's stronghold on our transportation infrastructure. As more and more Americans demand cleaner transportation it is only a matter of time before this two hundred year old engineering is supplemented by cleaner, more efficient means of propulsion. But don't expect the industries who have built their empires around this dirty old technology to bow out gracefully. In fact, they are spending millions of dollars a year to fight the shift to cleaner forms of transportation. The auto industry and oil lobbies are not going to give up without a fight. In recent years they've even recruited farmers and a blooming renewable fuels industry to the battle field, accentuating the "green" hue to their smog. Their weapon of choice: ethyl alcohol (code name: ethanol).

Ethanol is already starting to crack under the pressure as a growing number of Americans are questioning its environmental advantages. Ethanol has been around a while but has gained new popularity with the rising prices of gasoline. When it first hit the street the Environmental Protection Agency (EPA) refused to approve ethanol stating it violated the Clean Air Act but changed its position after receiving a presidential waiver from the first president Bush, which just happened to come during an election year while pinning for farmers' votes from the Corn Belt. Purely coincidence, I'm sure....

Even today the EPA admits that ethanol produces more nitrogen oxides and hydrocarbons (components of smog) than regular gas. But Ethanol's allies tout a reduction of lifecycle global warming emissions (emissions emitted from tilling to tailpipe and everything in between). But some scientists are scrutinizing ethanol's lifecycle to determine how "green" it really is.

In a paper by Tim Searchinger, formerly of the Environmental Defense Fund, Searchinger says *"Previous studies have found that substituting biofuels for gasoline will reduce greenhouse gases because biofuels sequester carbon through the growth of feedstock. These analyses have failed to count the carbon emissions that occur as farmers... convert forest and grassland to new cropland."* He also states *"New studies... now find that these analyses left out [this] critical factor, and that only limited categories of biofuels are likely to reduce greenhouse gases."*

Most studies conducted before Tim's paper was published told of ethanol's ability to reduce lifecycle global warming emissions by 10 to 20 percent compared to gasoline. But these studies never took land use into account. Take for instance when farmers cut and burn the Amazon rainforest to grow sugar cane for ethanol. But despite ethanol's questionable environmental benefits there is legislation in place that secures the demand for the fuel for years to come. The Energy Independence and Security Act of 2007 required 9 billion gallons of renewable fuel use in 2008 and a 400% increase in renewable fuel use by 2022.

With new legislation mandating that vehicles have higher fuel mileage ratings, adding ethanol to fuel seems counterproductive. E10 (10% ethanol blended gasoline) lowers your car's fuel economy by 3%. This is because ethanol stores less heat energy (BTUs) per gallon. Ethanol has a heating value 30% less than gasoline. This means the more ethanol in the mix the lower your fuel mileage. Most gasoline sold in the United States contains 10% ethanol. Blends with a higher percentage of ethanol are not compatible with the fuel systems of some cars and even the E10 is causing destructive problems. With E10 people are

A study by the National Academy of Science states *"Using ethanol as a blending agent in gasoline would not achieve significant air-quality benefits, and in fact would likely be detrimental."*

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experiencing costly damage to their equipment; from lawn tractors to marine outboards. Ethanol is a strong solvent that's been used for years as an industrial cleaner and has been known to wreak havoc on rubber and plastic parts. Gaskets and o-rings can deteriorate and fail. Fuel lines can lose their integrity and burst from line pressure. If the fuel is stored in a fiberglass tank the ethanol can leach chemicals from the tank that clog filters and leave deposits on internal engine parts affecting the engines performance, sometimes destroying the engine.

Two stroke engines have a unique problem with E10. They rely on an oil/gas blend for fuel. The oil in the gas bonds to metal surfaces and provides barrier lubrication. When ethanol is added to the mix it displaces

the oil forming a primary bond with the metal surfaces. This bond offers virtually no lubrication and greatly increases wear to metal parts. Two stroke engines in dirt bikes, weed trimmers, chainsaws, and snowmobiles are all susceptible to premature failure when running E10.

One of the biggest problems with ethanol is its' ability to absorb water. After absorbing enough water from the air the ethanol/water mixture will separate from the gasoline and sink to the bottom of your fuel tank. This is called phase separation. The gas at the top of the tank will lose as much as 3 octane points due to the separation and can cause your engine to knock. Your car won't run on the ethanol/water mixture that forms at the bottom of your tank but if it gets into your intake it's highly corrosive properties can destroy internal engine parts. Once phase separation has occurred there is nothing you can do to reverse it, the tank must be completely emptied of the ethanol/water mixture. The best way to prevent phase separation is to fill fuel tanks before storage, minimizing the void above the fuel and the flow of moist air in and out of the tank.

Why is Washington wasting tax payer money supporting ethanol when there are proven, reliable technologies like wind, solar thermal, photovoltaics, and geothermal? We need legislation that supports electric vehicle research and production. We need to close the FFV loop hole (look left) and use that money to build a national "smart" grid and a vehicle charging infrastructure. We have the technology, we have the means, what we need now is to raise our voices and the political-will will follow....

For ways to raise your voice visit
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A Government Loop Hole

Twenty years ago congress started an initiative to promote the use of ethanol by giving the manufacturers of flex fuel vehicles (FFV's) credit for higher fuel economy. The initiative was based on the assumption that the more cars on the road that can run on ethanol, the more ethanol would be used and in turn lessen the demand for foreign oil. The credit was calculated assuming that FFV's would run on E85 half the time but studies show FFV's on the road today only use E85 1% of the time.

For the last ten years the "Big Three" auto makers have been ramping up production of FFV's, marketing them as environmentally friendly and cashing in on these credits. Numbers from 2005 have shown that this loop hole has increased our oil dependence by 80,000 barrels a day while auto makers earned enough credits to avoid \$1.6 billion in Corporate Average Fuel Economy (CAFE) non-compliance fines.

The initiative was designed to spur the use of Ethanol and displace some of America's use of foreign oil. Although it has failed horribly congress thought it necessary to extend the credits through at least 2010.