



**CUT OIL DEPENDENCE.  
SECURE AMERICA.**

# THE ALCOHOL STANDARD

**DR. ROBERT ZUBRIN**

- The U.S. Congress can make America energy secure within a decade at the stroke of a pen. All that is required is to pass a law stating that starting in 2008 all new cars sold in the U.S. must be flexible fuel vehicles.
- Flexible fuel vehicles (FFVs) are cars that can use as fuel any combination of gasoline and alcohol. The difference in price from standard units is very small, with \$100 being typical.
- Automakers should be required to make their vehicles GEM flexible: capable of running on gasoline, ethanol and methanol.
- The largest potential producers of both ethanol and methanol are all in the Western hemisphere, with the U.S. having the greatest production potential for both.
- Methanol contains about 50% the energy of gasoline per gallon, ethanol about 67%. Both thus achieve lower miles per gallon than gasoline, but at current prices more miles per dollar, and at future prices, probably much more.
- Requiring that all new cars are GEM flex fueled would encourage consumer to purchase a new car sooner to take advantage of lower alcohol prices, giving a powerful shot in the arm to the U.S. manufacturing sector.

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There is no reason the U.S. needs to remain helpless, allowing itself to be looted by people who are using the proceeds to fund the promotion of worldwide jihad. Victory in the fight for energy independence is possible – and in fact the means by which it can be achieved are completely apparent. To liberate ourselves from the threat of foreign economic domination and to destroy the economic power of the terrorist's financiers, we must take action that radically devaluates their resources and increases the value of our own. The necessary policy may be summed up in a single sentence:

*We must take the world off the petroleum standard, and put it on the alcohol standard.*

This may sound like a huge, utopian, impossible task, but in fact the means to accomplish it are immediately at hand.

### **FUEL FLEXIBILITY REQUIRED**

In order for the alcohol standard to take place, all new cars sold in the U.S. should be flexible fueled. The technology now exists to produce any automobile as a flexible fuel vehicle (FFV), with a typical cost difference of only about \$100 per vehicle. The engineering difference between the flex-fuel units and the standard gasoline-only models is in one sensor and a computer chip that controls the fuel-air mixture, and the employment of a corrosion resistant fuel line. These FFVs can run on any combination of gasoline and alcohol fuels such as ethanol and methanol. Such alcohols can be produced in quantity in the U.S. and other Western countries at prices well below current gasoline costs. FFVs are cleaner burning cars than standard models, and were originally developed to meet the desires of environmentalists for lower pollution vehicles. Previously, however, the low cost of gasoline made high alcohol fuel mixtures economically unattractive, limiting the application of FFVs to environmentalist-inspired state-subsidized demonstration projects. Now, however, the rise of gasoline prices has reversed the economic equation, making a rapid general transfer to a high-alcohol/FFV fuel economy an immediate possibility.

The first FFV's were developed by Ford, working in conjunction with the California Energy Commission in a program launched in the 1980's. Commercial versions of such vehicles have been made by all three major U.S. auto manufacturers since 1992. The initial FFVs ran on combinations of methanol and gasoline, with emphasis switching to ethanol/gasoline mixes in the more recent periods. Current FFV models are licensed to run on ethanol/gasoline, but can actually use methanol as well. In the U.S., ethanol/gasoline FFV's in 24 different models are already being produced by Ford, General Motors, and Daimler Chrysler, with some 6 million vehicles sold between 1998 and 2006. Much larger use of such vehicles is possible. However sales are deterred by the non availability of high-alcohol fuel mixes at the pump everywhere in the country except Minnesota and some neighboring states. Gas stations don't want to dedicate pumps to a fuel mix that only serves 2% of cars, and consumers are not interested in buying cars for

which the preferred fuel mix is unavailable. This may seem like an irreducible chicken-and-egg problem, but it can be readily resolved by legislation.

In fact, in one major country, this has already been done. In 2003, Brazilian lawmakers implemented a program effecting a transition to FFVs, with some tax incentives used to move things along. As a result, in 2004, Brazilian divisions of Fiat, Volkswagen, Ford, Renault, and GM all came out with ethanol FFV models which took 70% of the country's new vehicle sales in 2006. This year, 90% of all new vehicles sold in Brazil are expected to be FFVs, with a significant savings to consumers, a boost to local agriculture, and a massive benefit to the country's foreign trade balance resulting.

If it were mandated that all cars sold in the U.S. had to be flexible fueled, foreign car manufacturers would mass produce such units as well. This would create a large market in Europe and Asia for American methanol and ethanol. Instead of being the world's largest fuel importer, the U.S. would become a fuel exporter. As a result, a large portion of the money now going to the Islamic oil producers from around the world would go to the U.S. and Canada instead, with much of the rest going to Brazil and other tropical agricultural nations. This would reverse our trade deficit, improve conditions in the developing world, and cause a global shift in world economic power in favor of the West.

Furthermore, by asking Detroit to make all new cars flex fueled Congress would give a powerful shot in the arm to the U.S. manufacturing sector. This is because consumers would have a strong incentive to buy a new car as soon as possible, to take advantage of the fuel cost savings afforded by such vehicles. Currently, the only substantial reason to buy a new car is to replace an old one which has worn out. The full spectrum introduction of flex fuel vehicles would alter that, causing the turnover of the auto fleet to flexible fueled vehicles to occur much faster than might be otherwise be assumed.

### **ETHANOL OR METHANOL?**

FFV's can be made to operate with mixtures of gasoline with methanol, ethanol, or both. What is the best alcohol upon which to base an FFV economy?

Ethanol is made from agricultural products like corn, sugars cane, and, in the future, cellulosic material like switch grass, wood chips and other agricultural residue. Methanol can be made from all of the above plus natural gas and coal. American coal reserves alone are sufficient to power every car in the country on methanol for centuries. Methanol is cheaper than ethanol. Currently, ethanol can be produced for less than \$2.00/gallon, without any subsidy. Methanol, a 105 octane fuel which has no subsidy, is currently selling, without any subsidy, for \$1.01/gallon. A methanol/gasoline fuel mixture that is 85% methanol (known as "M85;" a 40% ethanol mixture in gasoline would be "E40," etc.) could be produced right now for about \$1.30 a gallon.

Methanol is the safest motor fuel, because it is much less flammable than gasoline, a fact that has led to its adoption by Indianapolis 500 race car drivers. Ethanol is edible, whereas methanol is toxic when drunk. This difference, though, should not be overdrawn,

since in an FFV economy, both would be mixed with gasoline. The breakdown products of both ethanol and methanol are much less noxious than those from petroleum, and both emit much fewer particulate pollution products when burned. Until recently, both methanol and ethanol also produced significantly less NO<sub>x</sub> and CO emissions than gasoline, but recent improvements in gasoline vehicle emission technology have made them all about equal in this respect, provided the gasoline engine emission system is maintained in good working order.

Methanol is also more corrosive than ethanol, but this can be dealt with by using appropriate materials in the automobile fuel system. A fuel system acceptable for methanol use will also be fine for ethanol or pure gasoline. Both ethanol and methanol are water soluble and biodegradable in the environment. The consequences of a spill of either would be much less than that of petroleum products. If the Exxon Valdez had been carrying either of these fuels, instead of oil, the environmental impact caused by its demise would have been negligible.

Since it is made exclusively from agricultural products, ethanol use acts as a net counter to carbon emissions. Methanol can as well, but only if its source is agricultural, or from organic material such as urban trash or flared natural gas that would otherwise be allowed to decay or burn uselessly. Methanol produced from coal or commercially viable natural gas has the about same impact on carbon emissions as gasoline.

Methanol contains about 50% the energy of gasoline per gallon, ethanol about 67%. Both thus achieve lower miles per gallon than gasoline, but at current prices more miles per dollar, and at future prices, probably much more.

In short, either methanol or ethanol could be used, with roughly equal countervailing advantages. This has not stopped proponents for either fuel from vociferously arguing their unique advantage, and pushing for FFVs based exclusively on their favored product. To date, the more effective faction in this debate has been the ethanol group, backed as it is by the powerful farm lobby.

## **GEM CARS**

Given this political support, and no decisive technical argument in favor of methanol, the question might well be asked; why not just go with the stronger side and implement an exclusively ethanol/gasoline FFV economy? The answer has to do with the total resource base. If we want to use FFVs not merely as a benefit to farmers, but as a way of making America energy independent, we need a larger production base than ethanol alone can deliver.

To see this, consider the following: The U.S. uses 380 million gallons of gasoline per day, or about 1.3 gallons per person. This represents a mass of 4 kg of gasoline per person per day, which may be compared with Americans' consumption of about 1 kg of food per person per day. Thus speaking in round numbers, if we wanted to produce a quantity of ethanol equal to our gasoline use, we would need to dedicate an agricultural

sector whose harvest would be *four times* as great as all of that currently devoted to food production. Now it is true that we don't need to replace all of our gasoline, at least not in the short term. Replacing half would make us substantially energy independent. Furthermore, some crops might be found with substantially higher ethanol yield per acre than other foodstuffs. Surplus ethanol from Brazil or other tropical agricultural nations could also be imported provided that Congress repeals the 54 cent tariff on imported ethanol. Still, that said, to achieve the kind of impact required with ethanol alone, we would need to place under ethanol cultivation an amount of land comparable to that which we are now using to grow all of our food. This would appear to be an unlikely prospect.

Thus, if we are to use alcohol fuels to achieve energy independence, a broader resource base is needed. This can be provided by methanol, which cannot only be produced from a large array of biomass materials, but also from coal and natural gas. This is why automakers should be required to make their FFVs capable of running on ethanol as well as methanol. Such (Gasoline-ethanol-methanol) GEM cars should not be more difficult to make than the gasoline-ethanol cars that are now commercially available.

The shifting of the world from the petroleum to the alcohol standard would be of great benefit not only to the American agricultural sector, but to farmers around the globe. Developing world's farmers, in particular, would benefit greatly by being offered an unlimited market for crop exports, as well as by the depression of petroleum prices which otherwise threaten them with devastating consequences. There is thus an extremely strong humanitarian case for the transition to FFVs. In addition, by providing impoverished populations with an extensive source of income, the alcohol economy would give them the wherewithal to buy manufactured products from the advanced sector. This would greatly help our own economy. Instead of selling AOL/Time Warner and Newscorp to the Saudis, we could be selling tractors to Africans. The purpose of our government is to provide for our defense and promote our welfare. In the face of the current situation, decisive action for energy independence is required to achieve these ends. Congress should act immediately to require that all future vehicles sold in the U.S. be flexible fueled.

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*Set America Free is a coalition of leading national security, religious, and environmental leaders working to reduce our nation's dependence on foreign oil.*