NATIONAL REVIEW ONLINE
DECEMBER 1, 2011 4:00 AM

Methanol Wins

By Robert Zubrin

On August 2, I published an open wager on National Review Online. I offered to bet up to ten people $10,000 each that I could take my 2007 Chevy Cobalt, which is not a flex-fuel car, and, running it on 100 percent methanol, get at least 24 miles per gallon on the highway. Since methanol averages less than half the price of gasoline — and can readily be made from coal, natural gas, or any kind of biomass without exception — this would demonstrate superior transportation economy from a non-petroleum fuel that is producible from plentiful American resources.

Unfortunately, no one took the bet. That fact alone says a lot. Of the 7 billion people on this planet, there are about a million or so who know a great deal about cars. Clearly, not one of them was sufficiently doubtful that it could be done to put his money on the line. Although it left me short a nice chunk of easy cash, the refusal of anyone to accept my challenge should have settled the matter. But some people, while refusing to take the bet, still demanded that I conduct the test anyway. I did, and here are the results.

First, I ran the car on 100 percent methanol. This required replacing the fuel-pump seal made of Viton, which is not methanol compatible, with one made of Buna-N, which is. The new part cost 41 cents, retail. In order to take proper advantage of methanol's very high octane rating (about 109), I advanced the timing appropriately. This dramatically improved the motor efficiency and allowed the ordinarily sedate sedan to perform with a significantly more sporty spirit. As measured on the dyno, horsepower increased 10 percent. With these modifications complete, I took my Cobalt out for a road test. The result: 24.6 miles per gallon.

When I first made the bet, many commentators thought that I would aim for high-efficiency performance with high-octane fuel by increasing the compression ratio of the engine (which is how race-car drivers using methanol have done it for the past half-century). However, with modern cars using electronic fuel injection, this is unnecessary. Instead, the necessary changes to the engine can be made simply by adjusting the Engine Control Unit software. Thus, except for switching the fuel-pump seal as noted above, no physical changes to the car were required.

Table: Comparison of Methanol with Gasoline

	Economy			Emissions (gm/mile)		
FUEL	Miles/Gal	Price/Gal	Miles/Dollar	HC	CO	NOx
M100	24.6	$1.33	18.50	0.06	2.84	0.29
M60	32.3	$1.89	17.09	0.08	0.0	0.27
Gasoline (E10)	36.3	$2.74	13.25	0.12	1.5	0.74
Colorado Limit				1.20	15.0	1.50
EPA Average				2.80	20.9	1.39

HC = hydrocarbons
CO = carbon monoxide
NO = nitrogen oxides

Other critics commented that while I might be able to achieve good fuel economy, the idea was impractical because the emissions would not be acceptable. In response, I had the car tested for emissions with 100 percent methanol (M100), 60 percent methanol (M60), and ordinary gasoline (i.e., E10, which contains about 10 percent ethanol), and for comparison, did mileage tests for these alternatives as well. The results of all these tests are shown in the table.

It can be seen that, far from failing to meet emissions standards, the Cobalt running on methanol was extremely clean, beating both the strict Colorado emissions standards and the national EPA averages by an order of magnitude. The complete elimination of carbon-monoxide emissions when using M60 is particularly remarkable — so much so that I initially thought it was an experimental error caused by faulty equipment at the emissions test station. I tested it again at a different station and got the same result.

Returning to the subject of fuel economy, this can be evaluated by dividing the miles per gallon by the pre-tax spot price of the fuels in question in order to obtain the pre-tax miles per dollar shown in the table above. It can be seen that when methanol is used, fuel-economy improvements of 40 percent can be achieved. (The spot price shown in the table is the New York Harbor spot price of gasoline and the non-discounted Methanex spot price, both averaged over the past year.)

These results should not be too surprising. Methanol contains about half the energy content of gasoline, but its high octane allows it to be burned more efficiently, and thus obtain two-thirds of the mileage. The fact that the Cobalt could easily be made to use it should be no shock either: While not a flex-fuel car, the Cobalt uses the same E-37 computer and the same engine as GM's HHR, which is a flex-fuel car. In fact, all GM cars sold in the U.S. for the past five years use either the E-37 (for small cars) or the equally flex-fuel-capable E-38 (for larger cars), and so all are capable of flex-fuel operation provided they are programmed correctly. The same is true at Ford, whose cars, whether flex-fuel or not, indiscriminately use the same "black oak," "green oak," or "silver oak" computers. Without question, the same must be the case for European and Japanese cars as well, since all are sold in Brazil, where flex-fuel capability is mandatory.

There was a time when adding flex-fuel capability to an automobile increased its cost by about $100. This is no longer true. Now almost all new cars already have flex-fuel hardware, and could easily be marketed as flex-fuel vehicles. Yet the automakers have failed to do so. This is an extraordinary disservice to the nation, because it is preventing us from meeting our fuel needs using our own resources. The United States has only about 4 billion tons of oil reserves, but over 270 billion tons of coal, unknowably vast supplies of natural gas, and by far the world's most powerful agricultural sector — all of which could be used to produce methanol. Yet instead of being able to put these assets effectively to use to meet our transportation needs, we are being forced to buy 5 billion barrels per year of imported oil. At $100 per barrel, this is costing us $500 billion per year, a deduction from our GDP equal to that required to support 5 million jobs, at $100,000 annually per job.

The Open Fuel Standard bill (H.R. 1687) would remedy this situation by requiring automakers to activate the flex-fuel capabilities of their vehicles. This would open the market to fuels producible from plentiful domestic resources not under cartel control, free us from looting by OPEC, create millions of jobs, slash our deficit, reduce the flow of income to the Islamists, and cushion us from counter-effects should forceful action be required to deal with threats such as the Iranian nuclear-bomb program. Introduced by Reps. John Shimkus (R., Ill.) and Eliot Engel (D., N.Y.), its current bipartisan list of sponsors includes liberals such as Jim McDermott (D., Wash.), Allyson Schwartz (D., Pa.), Steve Israel (D., N.Y.), and Howard Berman (D., Calif.) to conservatives Dan Burton (R., Ind.), Roscoe Bartlett (R., Md.), Tom Cole (R., Okla.), and Allen West (R., Fla.), as well as many in between. It is a bill clearly in the national interest, and should be supported by everyone from left to right.

By eliminating the artificial incompatibility between the vehicles we drive and the fuels we can make ourselves, the Open Fuel Standard bill will unchain the Invisible Hand, creating a true free market in vehicle fuels. Those reluctant to embrace it need to answer the following questions: In whose interest is it that Americans should continue to be denied fuel choice? In whose interest is it that America's vast natural-gas, coal, and biomass resources remain unusable as a source of liquid vehicle fuel? In whose interest is it that America continue to give hundreds of billions of dollars each year to foreign potentates bent upon our destruction, instead of paying our own people to make fuel out of our own resources? In whose interest is it that a foreign cartel retains unlimited power to raise the cost of our fuel? In whose interest is it that we remain in the power of our enemies? Finally, should their interests be allowed to prevail, or should ours?

The fault, dear reader, is not in our cars, but in ourselves, that we are tributaries. We can set ourselves free, but action is required.

— Dr. Robert Zubrin is president of Pioneer Astronautics, a member of the Steering Committee of Americans for Energy, and author of Energy Victory: Winning the War on Terror by Breaking Free of Oil. His next book, Merchants of Despair: Radical Environmentalists, Criminal Pseudoscientists, and the Fatal Cult of Antihumanism, will be published by Encounter Books in February.