

CHAPTER 13

SURPRISE! ETHANOL IS THE PERFECT FUEL

To begin this section on using alcohol as fuel, I've brought together a few items that are so exciting that I felt that everyone, including those who don't consider themselves mechanically inclined, would want to hear about them. So if you are planning to just hand this book to your mechanic when it comes time to convert your car, you will still want to read this chapter.

You'll learn herein how to one-up your friends who are already running partially green on biodiesel. You'll learn how to deny the gas and electric companies their monthly check. And how we can reverse deforestation using alcohol. How about junking your nuclear-electricity-powered stove and cooking with something more environmentally friendly? Read on!

Here are some reasons why ethanol is the perfect fuel:

WE CAN PUT E-85 (85% ALCOHOL/15% GASOLINE) IN OUR CARS NOW! REALLY!

For some time, I had been hearing these rumors about a bunch of crazy farmers in South Dakota. When I'd ask about them among the upper echelons of the alcohol industry, there would be a lot of rolling of eyes and embarrassment—so I knew they were upsetting some serious apple carts. I knew I had to seek these guys out and see what they were doing with their cars. Little did I know I'd soon be doing my own versions of their experiments, with spectacular results.

One December, I flew into Sioux Falls and paid a call on a tall, rangy fellow in shiny cowboy boots and a baseball cap that proclaimed he was a member of FOIL (Foreign Oil Independence League). Orrie Swayze is the past president of the South Dakota Corn Growers Association, a former Air Force pilot, active in the Veterans of Foreign Wars, a farmer himself, and a man with a mission.

IF YOU ARE PLANNING TO JUST HAND THIS BOOK TO YOUR MECHANIC WHEN IT COMES TIME TO CONVERT YOUR CAR, YOU'LL STILL WANT TO READ THIS CHAPTER. YOU'LL LEARN HEREIN HOW TO ONE-UP YOUR FRIENDS WHO ARE ALREADY RUNNING PARTIALLY GREEN ON BIODIESEL. YOU'LL LEARN HOW TO DENY THE GAS AND ELECTRIC COMPANIES THEIR MONTHLY CHECK. AND HOW WE CAN REVERSE DEFORESTATION USING ALCOHOL. HOW ABOUT JUNKING YOUR NUCLEAR-ELECTRICITY-POWERED STOVE AND COOKING WITH SOMETHING MORE ENVIRONMENTALLY FRIENDLY? READ ON!



Fig. 13-1 "Pa, feller down there says he's [California Governor] Jerry Brown ... says he's lookin' into alternative fuels."

Fig. 13-2 Orrie Swayze. Pilot, patriot, veteran, and long-time alcohol fuel activist.



Orrie Swayze was running a non-flexible-fuel vehicle on E-85 (which is actually about 70% alcohol in the cold months). He's been doing it in this vehicle for over 20,000 miles, and he has other vehicles that have more than 150,000 miles on them altogether, running on E-85, with no conversion.

On the way to his town, two hours from the airport, we cruised in his 1993 Cadillac running on E-85, while he regaled me with story after story of his relationship to alcohol fuel, dating back to 1965. The amazing thing about his Cadillac is that he hadn't done a darned thing to convert it to alcohol. Yet, there we were, roaring up the highway at 90 mph, doing something that almost everyone says is impossible. Orrie was running a non-flexible-fuel vehicle on E-85 (which is actually about 70% alcohol in the cold months). He'd been doing it in this vehicle for over 20,000 miles, and he had other vehicles, with more than 150,000 miles on them altogether, running on E-85, with no conversion.

And that was his point. He explained to us that there are a lot of vehicles that can run high percentages of alcohol without any of the modifications usually done to convert an engine. He noted a Minnesota State University study where participants were running a wide variety of cars on 30% alcohol, and every car they tested ran on it. No auto manufacturer notifies you that you can run more than 10% ethanol in your car, unless you have a flexible-fuel vehicle.

Also notable is that there was a wide variation on the miles per gallon of various makes and models. The 1992 Ford Taurus (pre-flex-fuel model) lost only 1.28% mpg, compared to the 1996 Oldsmobile Achieva, which lost 14.66% mpg. The 1994 Buick Regal lost only 2.96%.¹ No writer or pundit who buys into the "heating value equals mileage" argument would have predicted that the majority of unmodified cars running on 30% alcohol would have less than 10% loss in miles per gallon.²

We had heard since the 1980s that Brazilian vehicles routinely ran at least 30% alcohol in their fuel-injected engines, so I wasn't too surprised by this study, except for the very low mileage drop in some of the best examples. But Orrie wants the study done again, this time pushing each car to its limit on E-85, to see what the maximum is that each model can run. He tells us that no one he knows who has tried using alcohol has had to go any less than 40%, and some people have gone all the way up to using E-85 like he has—all without modification. (Based on the work of these pioneers and the Minnesota State University study, the governor of Minnesota has passed a mandated minimum of E-20 for the state.)

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Orrie pointed out that if all of our fuel-injected cars—and that's almost all of them since the late 1980s—ran on just 40% alcohol, we probably wouldn't actually need any foreign oil. That is, we can be energy-independent with current technology—and simultaneously be slashing CO₂ output—if we just start producing the alcohol. No massive multibillion-dollar research project would be necessary just to get the cars running, as in the case of hydrogen. Just make the alcohol, put it in the cars we have on the road right now, and stop the cause for much of the conflict between the U.S. and the Middle East. Period. End of discussion. This was one of the most revolutionary statements on alcohol fuel I had ever heard.

Orrie talks to anyone who will listen about this alternate reality, which only requires that people

have enough courage to go to the pump and try it. He's been successful, too. There are now a lot of people up in his part of South Dakota who have taken the challenge and tried running at least half E-85 and half gasoline. He meets a lot of resistance, due to the propaganda over the years about how "experts" say that even 10% alcohol will ruin your vehicle. He quotes Albert Einstein, "Unthinking respect for authority is the greatest enemy of truth."

Orrie is incensed that almost all of the alcohol produced in South Dakota leaves the state. "In South Dakota, we use about 400,000 gallons of gasoline, and we produce 400,000 gallons of alcohol. If we used what we produced right here, all that money leaving our state would stay here, making everyone prosperous."

Orrie recently had discovered that the E-85 made in South Dakota is denatured with "natural gasoline," which is made up of the very volatile, hard-to-dispose-of, natural gas liquid condensates which have been banned in other places, such as California. This overly volatile stuff evaporates way too easily and causes vapor lock in cars using E-85. This means, of course, that when you can't start your car because the gasoline has turned to vapor instead of liquid—vapor-locking the engine—you'll turn your back on the fuel. As Orrie puts it, "The consumer only has to have one bad experience with E-85 before they will give up on it forever." The fault is either with the alcohol plants buying cheap "gas" to denature the alcohol, or a deliberate blending of evaporative trash by the oil companies to sour E-85's reputation.

Orrie and his compadre, Al Kasperon, have been analyzing fuel from different parts of the state to get to the bottom of this affair. Lenient about its evaporative emission standards, South Dakota gasoline is allowed to have a **Reid vapor pressure (RVP)** of over ten pounds, while in California nothing more than a smidge over six pounds is allowed.

Al turned out to be a pioneer 20 years ago when E-10 (10% alcohol) was considered controversial. He remembered how oil companies predicted dire results and put up people to come to hearings to slam their chainsaw up on the podium and say, "That gasohol wrecked my chainsaw."

Orrie and Al set out to prove them wrong. They received a small grant and ran a variety of small equipment, from chainsaws to leaf blowers, on

alcohol and did the same experiment on gasoline. All the engines running on E-10 were far cleaner, with less wear than the gasoline models. Their photographs and data went a long way to clearing the way for the mandate of E-10 in South Dakota. Nowadays, Al is working on mixtures of alcohol, diesel, and biodiesel for tractors and heavy equipment in his spare time.

Orrie is about as patriotic as they come, but he worries that the country is going into a decline in its ability to innovate, and that people are only too willing to give up their freedom of thought in the face of fear.

Orrie talked with me at some length during our drives between interviews. He lamented the lack of curiosity in people; he said he sees this often when he tries to get folks to just add a few gallons of E-85. He is about as patriotic as they come, but he worries that the country is going into a decline in its ability to innovate, and that people are only too willing to give up their freedom of thought in the face of fear.

Orrie feels strongly that we should not fight wars for resources. After he returned from the service, his wife, angry with the war protests, asked him to tell her that those protesters were wrong. Orrie replied, "I can't do that." To avoid going to war for oil is one of his strongest motivations in advocating use of alcohol.

A Vietnam vet, he lost a brother in that war. He told me stories of his being a pilot, and how it feels to see the enemy on a low pass, puffs of smoke from their guns shooting at our troops and to drop napalm "deciding which five or six hundred people would die."

Another South Dakota pioneer, Jim Behnken, came out to talk about the use of E-85 in regular cars and planes. Although Jim has focused most of his attention on aircraft (we'll come to that later) and on combustion engineering, he has studied alcohol use in vehicles, as well.

Jim confirmed that the fuel injection computer has a fairly wide range of response to air/fuel mixtures. Although some engines have big enough fuel injectors to accommodate the instructions from the computer to deliver more fuel in the case of alcohol, others do not. Sometimes the limitation is in the software of the computer, but more commonly it's in the injector size. Jim explained that