

National Corn Growers Association President Bill Northey and Illinois Governor Jim Edgar at Ford's E-85 Taurus rollout

## E-85 COMING TO YOUR LOCAL STATION

The midwest is being linked by ethanol refueling sites that will make it possible for many drivers to keep E-85 in their tanks all the time. When 1996 began, there were 33 E-85 fueling sites in the nation, including 13 open to the public. By the end of the year, there will be an additional 40 public E-85 fueling stations throughout the Midwest through the efforts of the National Ethanol Vehicle Coalition (NEVC). The project will focus initially on 13 states: Missouri, Iowa, Nebraska, Minnesota, Wisconsin, Michigan, Indiana, Illinois, Ohio, Kentucky, North Dakota, South Dakota and Colorado.

Funding for the E-85 refueling station project will come from the National Corn Growers Association (NCGA) and the Governors' Ethanol Coalition (GEC), which received \$250,000 on behalf of the GEC as part of the U.S. Department of Energy's state and local incentives program. The Urban Consortium also contributed to the effort with a \$75,000 grant to the NEVC.

The task involves more than making ethanol available to the public, according to NEVC project coordinator Phillip Lampert. The fuel must also be convenient. "It's similar to that said about real estate," he said. "Location, location, location."

Lampert has been working closely with the General Services Administration (GSA), which has already placed 250 ethanol federal fleet vehicles in the St. Louis and Chicago areas. An additional 1,352 will be delivered during the 1996 model year. "The GSA said it got burned with M-85 [when promised methanol fueling sites were not completed, forcing the vehicles to run on gasoline], but promised to purchase a few hundred E-85 vehicles if infrastructure commitments were kept," Lampert said.

Lampert has found several gasoline retailers in the region who are interested in adding ethanol pumps, and Coastal Mart in St. Louis and SuperAmerica in Chicago were among the first to offer ethanol at their public stations. Public access will address GSA's concerns and help increase the number of dedicated ethanol vehicles on the roads.

Through the program, GEC and NCGA will finance the installation of E-85 refueling equipment.

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## DETROIT BRINGS ETHANOL VEHICLES TO THE SHOWROOM

For the first time, consumers can purchase a flexible-fuel ethanol vehicle at no additional cost. Ford Motor Company announced it will offer an ethanol version of its redesigned 1996 Taurus for the same price as a gasoline model through all of its dealerships.

"The Ford Taurus has traditionally offered progressive auto designs and features," said Bill Northey, president of the National Corn Growers Association (NCGA). "The NCGA is made up of some of the most progressive farmers who constantly seek new uses for corn. It's an appropriate match to provide the first, mass-produced, flexible fuel vehicle that runs on a renewable resource made from corn grown by U.S. farmers."

Ford Motor Company began its alcohol vehicle program in 1993 when it started selling a car that could run on up to 85% methanol, an alcohol fuel derived from natural gas. Strong midwest support

for ethanol led the auto manufacturer to add the grain-derived renewable fuel to its program.

Ford's production plant in Chicago is prepared to produce several thousand ethanol models this year.

"We'll increase the volume of flexible fuel vehicles to respond to demand, and we expect consumers to increase their demand for ethanol," said Tom Artushin, Ford's specialty fleet manager. "The corn growers are forging on to expand the fuel infrastructure, and we're trying to support that." (See related story) Ford and the National Corn Growers Association's National Ethanol Vehicle Coalition will join forces this spring to introduce the vehicle to several key Midwest

markets.

So far, state and federal government fleets are leading the demand for E-85 vehicles. "We're investigating other light-duty applications in response to customers' requests and desires,"

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## E-85 COMING TO YOUR LOCAL STATION

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E-85 Refueling Pump in Washington D.C.

Retailers will be responsible for labor and will acquire rights to the equipment after carrying the fuel for two years.

In St. Louis and Chicago, underground tanks are being reconditioned to hold ethanol. They are sandblasted, then sprayed with an inner liner to ensure they can handle alcohol fuel. Because aluminum reacts negatively with high-alcohol fuel, pipes that are either stainless steel or nickel plated are also installed.

In building the sites, GEC and NCGA are following standards established by the American Automobile Manufacturers Association (see bottom

*A gasoline fuel pump can be made ethanol compatible for as little as \$1,000, according to Lampert. A new E-85 fueling site can be constructed for about \$40,000.*

right) as well as those developed by the California Energy Commission for 85% methanol fuel. "Methanol is more corrosive than ethanol, so we believe we're over-engineering the E-85 refueling facilities," Lampert said. "But we believe it's prudent because in the future there may be an alcohol-transparent vehicle that can use either methanol or ethanol."

A gasoline fuel pump can be made ethanol compatible for as little as \$1,000, according to Lampert. A new E-85 fueling site can be constructed for about \$40,000.

Bringing E-85 into the marketplace requires support from fuel producers as well as suppliers. At the existing public E-85 fuel stations supported by the National Corn Growers Association, the fuel price is equivalent to mid-grade gasoline.

Fuel standards will also add to consumers' assurance that their vehicle is reliable. The American Standard for Testing Material (ASTM) Specifications D5798 will prescribe the dispensed fuel quality level required for reliable flexible fuel vehicle operation. These specifications, developed by the auto manufacturers, oil and ethanol producers, are expected to become the commercial standard for E-85 (See box at bottom right).

• For information on pending sites or fuel specifications, call the National Ethanol Vehicle Coalition's hotline at 1-800-E-85-8895.

## Automakers Set Fueling Standards

The automotive industry is also working to build the infrastructure. "Auto industry officials acknowledge it's a lot easier and cheaper to establish fueling sites that provide an 85% blend of ethanol fuel than any other alternative to straight gasoline," said Bill Northey, president of the National Corn Growers Association.

Ethanol storage and dispensing is similar to gasoline service stations. However, use of the wrong materials could lead to leakage, fuel contamination and equipment failure. "It's to the auto manufacturers' benefit to provide assistance with standardizing the infrastructure," said Lampert, "and both Ford and General Motors have been active in that regard."

The American Automobile Manufacturers Association (AAMA) has established standards for above- and underground dispensers that make it easier to install reliable ethanol fueling sites. As part of this endeavor, the Society of Automotive Engineers is developing a standard labeling system for designated "E-85 Compatible" systems. Fueling sites that have been operating reliably for more than a year but without the rigorous testing can be designated

"E-85 Temporary Use." Tanks and dispensers that have been upgraded to be E-85 compatible can also be used for gasoline, giving station owners flexibility as the E-85 market develops.

The auto manufacturers' involvement stems from their experiences with methanol. "A lot of the refueling station equipment designed for gasoline had problems with alcohol fuel," said General Motors engineer Norman Brinkman. "There was concern about leaking, but the real issue was whether components would impact the fuel and cause vehicle problems." According to Brinkman, methanol corroded the aluminum nozzles and the corrosion entered the fuel. Just a small amount was enough to clog vehicle filters. Likewise, methanol affected the rubber hoses and ions leached into the fuel.

"We are taking what we learned with methanol and applying it to ethanol. Today ethanol stations are put in with this knowledge," Brinkman said.

• For equipment dispensing standards, contact James Steiger at the American Automobile Manufacturers Association, 7430 Second Avenue, Suite 300, Detroit, MI 48202, 313-872-4311.

## Glossary of Terms:

**Alcohol** Organic compounds distinguished from hydrocarbons by inclusion of a hydroxyl group. Ethanol and methanol are the two simplest alcohols.

**Alternative Fuel Vehicles (AFV)** In the Energy Policy Act of 1992, these are vehicles that can run on 85% blends of ethanol or methanol, compressed or liquefied natural gas, propane, hydrogen, electricity, and other fuels from biological materials.

**Dedicated** A vehicle that runs only on one fuel.

**Denatured** Ethanol that contains a small amount of a toxic substance such as methanol or gasoline to prevent ingestion and to preclude the federal alcoholic beverage tax.

**Ethanol** An alcohol fuel produced by the fermentation of various sugars from carbohydrates found in agricultural crops and cellulosic residues from crops or wood.

**E-10** Also known as gasohol, this fuel is 10% ethanol and 90% gasoline by volume.

**E-85 Fuel** containing 85% ethanol, 15% gasoline by volume.

**Flexible-Fuel** Vehicles designed to run on any blend of unleaded gasoline and either ethanol or methanol.

**Methanol** An alcohol fuel typically made by steam reforming natural gas. Can also be formed in the destructive distillation of wood.

**M-85 Fuel** containing 85% methanol, 15% gasoline by volume.

**Renewable Fuel** Fuel from renewable sources, such as agricultural products or solar energy.

## ASTM/AAMA E<sub>75</sub>-E<sub>85</sub> Specifications

- ASTM/AAMA
  - Acidity, ppm 1
  - Chloride Ion, ppm 1
  - Gum, unwashed, mg/100ml 20
  - Gum, washed, mg/100ml 5
  - Water, weight % 1
- AAMA Only
  - Conductivity, micro Siemens/m 500

## E-85 Specifications

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# BENEFITS OF E-85

## Environment, Energy Security, Economics

Several countries have recognized the benefits of ethanol. Today there are more than 2.5 million ethanol-fueled vehicles in use world-wide. Less than 900 of those are in the United States, but that number is expected to grow rapidly in recognition of what renewable fuels have to offer our efforts to improve our environment, national security and economic development.

### Ethanol can displace gasoline and decrease U.S. dependence on foreign oil.

The United States now imports more than half of its oil, and our overall consumption continues to increase. Domestically produced ethanol could go a long way toward closing the gap between supply and demand.

The low cost of gasoline to U.S. consumers can be misleading. The price of gasoline at the fuel pump does not include the costs of defending our resources, repairing environmental damage from oil spills, and health costs from breathing dirty air. While the market price for a barrel of oil is about \$20, the U.S. General Accounting Office estimates its true cost is really about \$126 per barrel. When calculating the real cost of gasoline, ethanol becomes even more attractive.

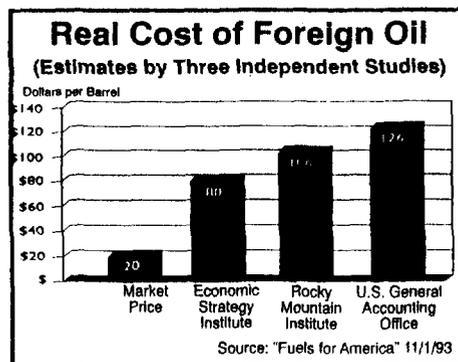
That outlook gets brighter as ethanol production technology continues to become more efficient. Corn ethanol production creates 24 percent more energy than it uses, according to a study performed by the U.S. Department of Agriculture (USDA) and the Colorado School of Mines. Furthermore, the study found, ethanol can replace petroleum imports by a factor of 7 to 1 because it uses abundant domestic feedstocks such as natural gas and propane.

By sending fewer dollars overseas for fuel, more money can be spent on domestic production, stimulating economic growth.

### A stronger ethanol market is a stronger U.S. economy.

A new 100-million-gallon ethanol facility creates (on average) 870 permanent jobs in plant operation, and an additional 500-680 jobs in indirectly related areas, according to the USDA.

Those jobs are already having a positive impact on our economic health. The General Accounting Office estimated that a 90 percent reduction in current U.S. ethanol production would decrease



farm income by \$5.9 billion over five years.

For most producers, ethanol is just one piece of their economic pie. The value of ethanol is multiplied by the value of its co-products. This includes corn gluten meal, corn gluten feed and corn oil, and distillers dry grains, a benefit to other agricultural industries and consumers as well. The remaining protein-rich dry grains from ethanol production are often used for cattle feed. A syrup that contains about half of the co-product's nutrients is mixed with the dry grains and hay. Most corn gluten meal from ethanol is used domestically as a protein feed. Some producers have even maximized

the market potential by using the warm water from their ethanol facility's cooling coils to grow white talapia fish.

In addition to reducing fuel imports, U.S. ethanol producers are helping our trade balance by exporting the fuel and its co-products. While the U.S. works to expand its ethanol vehicle and fueling base, Brazil has already done that and has imported fuel from American farmers since 1990. Europe provides another market for ethanol's co-products, importing almost all the corn gluten feed produced by the U.S. ethanol industry.

### Ethanol can improve our environment.

Motor vehicles account for at least half of all air pollution in the United States. Tests have shown that E-85 can significantly reduce hydrocarbon, benzene, carbon monoxide and nitrogen oxide emissions from cars.

Using ethanol for transportation can also reduce the greenhouse effect. Carbon dioxide (CO<sub>2</sub>) is the major culprit in the threat of global warming. The United States contributes more than 20 percent of the world's CO<sub>2</sub> emissions, and about one-third of that is generated by the production and consumption of transportation fuels.

Fossil fuels release CO<sub>2</sub> that had been locked away and would otherwise remain so if we did not drill it out of the earth. Although CO<sub>2</sub> is released during ethanol production and combustion, it is recycled back as a nutrient to the crops that are used to produce it in a continuing circle. By replacing fossil fuels with ethanol, additional carbon emissions from transportation could be eliminated and a neutral carbon balance could be maintained.

Since ethanol degrades quickly in water, it also poses less of a risk to the environment than a petroleum spill. The impact of a major ethanol spill would be short-term when compared to an oil spill.

## ETHANOL PROVIDES A NET ENERGY GAIN FOR THE UNITED STATES

Corn ethanol production creates 24% more energy than it uses, according to a recent study performed by the U.S. Department of Agriculture (USDA) and the Colorado School of Mines. Furthermore, ethanol can replace petroleum imports by a factor of 7 to 1 because it uses abundant domestic feedstocks such as natural gas, propane, and coal, reported USDA agricultural economist Hosein Shapouri at the Second Annual Biomass Conference of the Americas held in Portland, Oregon, last August.

The question of ethanol's true energy value has been addressed in numerous studies, which reported wide variations. "Studies using older data may tend to overestimate energy use because ethanol manufacturing and farm production technologies have become increasingly energy efficient over time," the USDA authors noted.

The study looked only at direct energy used in production, and relied on the 1991 Farm Costs Returns Survey. Researchers made their calculations using the 1991-1992 average corn yield of 122 bushels/acre. The net value of ethanol is greater when energy credits are allocated to basic coproducts such as corn gluten meal, feed, and corn oil, according to the study. It also found that the dry milling

process, which accounts for about one-third of U.S. ethanol production, creates more energy than wet milling.

The net value of corn ethanol could improve even more as newer, more efficient plants come on-line, the study illustrates. A recently closed plant in South Point, Ohio, was "one of the first plants built and probably went out of business because they were not as energy efficient as those today," said Shapouri.

Energy Value of Ethanol Production			
	Dry Mill	Wet Mill	Weighted Average
Total Btu Input	189,890	199,449	196,294
Total Btu Output	218,980	209,903	212,674
Petroleum Replacement Factor	7.24	7.02	7.09

\*Source: "Estimating the Net Energy Value of Corn-Ethanol," USDA

# CASE STUDY: IOWA'S STATE FLEETS LEAD THE WAY

Iowa made a commitment to alternative fuels in 1992 when state fleets were required to begin incorporating alternative fuel vehicles with an emphasis on using renewable fuels.

"Clearly E-85 is the way we need to go in the Midwest," said Dale Schroeder, administrator for the Iowa Department of General Services' Fleet and Mail Division. Schroeder's 2,240-vehicle fleet includes 119 E-85 vehicles. These include Ford Tauruses from the 1992, 1994 and 1995 model years and 1993 Chevrolet Lumina. An additional 68 Ford Tauruses are on order this year.

The E-85 vehicles fuel at fleet-only sites in Sioux City and Des Moines, and at the Universities of Northern Iowa and Iowa.

Schroeder said statements that adding ethanol fueling sites is expensive is "baloney." Schroeder paid about \$800 to clean out an unused gasoline tank

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to fuel his first E-85 vehicles in 1991. Since then, he has discovered "setting up a tank for E-85 is no more or less expensive than for gasoline."

Iowa's General Services monitors the vehicles'



Bumper Sticker on Iowa State Fleet Vehicles Promotes E-85

E-85 use quarterly and reserves the right to reassign vehicles if they are not being fueled with E-85 most of the time. Drivers have not reported any problems with the fuel and usage is high. Last year, the fleet used the fuel about 80 percent of the time.

Maintenance expenses have been the same for gasoline and E-85 vehicles. While the fuel cost of about \$1.24/gallon is slightly higher than gasoline, "it makes sense for us to promote a natural resource produced here in our state," Schroeder said.

The 66 E-85 vehicles in the Iowa Department of Transportation's (DOT) fleets receive a lot of attention from the public, probably because they wear a decal on their back bumper that reads "Fueled with E-85: Promoting Renewable Iowa Resources."

"It's very effective," said Mike Sherfy, Standards and Specifications Manager for Iowa DOT's Office of Equipment and Supply.

"Sometimes people track down the driver to ask questions. The public acceptance is very good."

Driver acceptance of the vehicles is also positive, he said. Fueling records prove they fill the vehicles with E-85 about 93 percent of the time, using gasoline only when they drive out of range of the state's 3,500-gallon above-ground tank in Ames. Sherfy said the tank cost about \$9,000 to install, and the fuel costs about \$1.32/gallon. Fueling remains Sherfy's only limitation in placing the vehicles around the state, and more public stations are reportedly on the way. "It's finally gaining momentum," he said.

And with good reason. The E-85 vehicles have transitioned easily into Sherfy's fleet. "Ethanol has got to be one of the primary alternative fuels to look at," he said. Twenty new 1996 Ford Tauruses have already joined the 1993, 1994 and 1995 models that make up the fleet.

## OWNING AN ETHANOL VEHICLE

Fleet managers looking to make a difference in their community's air quality as well as reduce U.S. oil dependency will find E-85 a very economical option. E-85 also complies with most federal and state alternative fuel requirements.

Since ethanol vehicles refuel and operate the same as their gasoline counterparts, little training is required to incorporate E-85 vehicles into a fleet. Now that Detroit is designing cars for ethanol, there is no concern about voiding a warranty by using the fuel.

The flexible fueling capabilities of E-85 vehicles make them especially attractive to fleet managers. If E-85 is not available, drivers can fuel with gasoline without worrying about how much E-85 is left in the tank; the reverse is also true. It could not be simpler.

Ethanol's higher octane provides several performance advantages, including increased horsepower, fuel economy and emissions. "You can tell a difference [when driving on ethanol versus gasoline]," said Shirley Ball, an ethanol enthusiast who drives a flexible fuel Ford Taurus. "On the ethanol blend it has more pep. It has real good power."

Ethanol has few disadvantages, and advancements in engine design have addressed many issues. Ethanol has a lower energy content than gasoline, but a larger fuel tank and increased engine efficiency mean the driver should not notice a difference in range. Because ethanol is soluble in water, E-85 is susceptible to water contamination, which can lead to reduced fuel economy or fuel system corrosion depending on the water quantity and quality. This has been more of a problem in theory than in practice, according to General Motors engineer Norman Brinkman, who said no problems have been reported.

Repair and maintenance practices are generally equivalent to gasoline-fueled vehicles, but the E-85 model requires a special alcohol-tolerant oil with enhanced acid-neutralizing capabilities. This is available through any Ford and Ford Lincoln-Mercury dealer and now at some auto parts stores.

However, some points should be made clear. While ethanol is the same alcohol used for beverages, it is denatured for the fuel market to prevent ingestion. Ethanol fire dangers are similar to gasoline, but the fire rate should be somewhat lower because of ethanol's lower vapor pressure. Normal precautions should be taken, such as prohibiting smoking near refueling sites.

Since Ford and General Motors will offer vehicles at no additional cost, E-85 remains one of the best options for fleet managers today. As more vehicles take to the roads, the slightly higher cost of the fuel should disappear. There is no easier way to switch to clean, domestic alternative fuels.

## TAX-EXEMPT FLEET OPERATIONAL COST

Fuel	Cost of Operation (25,000 miles or 1 year)	Cost of Operation (75,000 miles or 3 years)	Conversion Costs	Life-Cycle Cost Compared to Gasoline
Gasoline	\$620	\$1,860	\$0	\$0
E-85	\$1,000	\$3,000	\$0	+\$1,140
CNG	\$647	\$1,941	\$3,400	+\$4,581
Propane	\$780	\$2,340	\$2,500	+\$2,980
M-85	\$1,040	\$3,120	\$0	+\$1,260

Source: National Ethanol Vehicle Coalition

### Assumptions:

- All vehicles are mid-size vehicles, such as the Chevrolet Lumina or Ford Taurus. For the purpose of this comparison, it is also assumed that fuel economy remains constant and that the vehicles are driven under identical conditions of climate and elevation, to identical destinations, by identical drivers.
- 25 miles per gallon (all around usage) for gasoline vehicles.
- 18 miles per gallon (all around usage) for E-85 vehicles.
- 12.5 miles per gallon (all around usage) for M-85 vehicles.
- 21.25 miles per therm (all around usage) for CNG vehicles.
- 20.2 miles per gallon (all around usage) for propane vehicles.
- \$0.62 per gallon of gasoline (tax exempt purchased by midwest state).
- \$1.00 per gallon of gasoline (approximate current retail price).
- \$0.72 per gallon of E-85 (tax exempt purchased by midwest state with alcohol fuels tax credit applied).
- \$1.04 per gallon of E-85 (approximate retail pump price with alcohol fuels tax credit applied).
- \$0.52 per gallon of M-85 fuel (approximate retail market price).
- \$0.84 per gallon of M-85 fuel (approximate retail market price).
- Cost of 1 therm natural gas = \$0.55 (tax exempt).
- Cost of 1 therm natural gas = \$0.776 (approximate retail price for use as motor fuel).
- Propane cost = \$0.63 per gallon (tax exempt).
- Propane cost = \$0.85 per gallon (approximate retail price).
- One gallon of gasoline = 114,000 BTUs.
- 1.14 therms of natural gas = one gallon of gasoline.
- 1.24 gallons of propane = one gallon of gasoline.
- Cost of natural gas conversion kit = \$4,500 per vehicle.
- Cost of propane conversion kit = \$2,500 per vehicle.
- Cost of M-85 OEM option = \$1,000 per vehicle.
- Cost of E-85 OEM option = \$1,000 per vehicle.
- Assume all other repair and maintenance costs are identical.

# STATE PROGRAMS AND INCENTIVES

## Status of the States

In addition to federal alternative fuel programs, many states are encouraging the use of vehicles that run on clean, domestic fuels through fleet requirements or financial incentives. The following table highlights most of these below. While many states offer additional incentives to help consumers with the cost difference between a gasoline and alternative fuel vehicle (AFV), those have been left out because the auto manufacturers are offering E-85 vehicles at no additional cost. These programs are growing all the time—it is recommended that you call the state energy office for any updates.

State	*AFV Incentives	AFV Fleet Requirements	Ethanol Tax Incentives	Energy Office
CO		Fleets of 10 or more in certain counties are required to include clean fuel vehicles in their fleets on a percentage basis. State agencies must make AFVs 40% of their new vehicles. Denver requires fleets of 30 or more to convert 10% to alternative fuels.		303-620-4292
HI	Same income tax deductions for refueling property as federal deductions.	25% of the state's vehicles in model year 1998 are to be AFVs.	4% ethanol sales tax exemption	808-587-3809
IL	The state has a rebate program for the incremental cost of E-85 fuel.	By the year 2000, 75% of the state fleet must be AFVs.	2% average state sales tax exemption	217-785-2800
IA		10% of state fleet must be AFVs.	\$0.01 (blender)	515-281-7018
KS	Tax credits worth up to 50% for fueling sites for fleets of 10 or more and more than 2,000 gallon/year consumption.	State fleets must use AFVs whenever cost-effective. In Kansas City and Wichita areas, must acquire AFVs on a percentage basis starting with 10% in 1996, up to 75% after 2000.	\$0.20 (producer)	913-271-3170
MN		Public fleets in cities with pop. 100,000 or more must acquire AFVs on a percentage basis, from 15% in 1996 to 90% in 2000.	\$0.02 (blender), \$0.20 (producer)	612-296-5175
MO		The state is required to phase-in AFVs starting with 10% in 1996, up to 50% in 2000; 30% of all state vehicles must be AFVs by 2002.	\$0.02 (blender), \$0.20 (producer)	314-751-4000
MT			\$0.30 (producer)	406-444-6697
NE			\$0.20 (producer), \$0.50 ETBE (producer)	402-471-2867
NM	Alternative fuel excise taxes were reduced to 3 cents/gal. for 1996-7, increasing in 3-cent increments to 12 cents/gal in 2002. (gasoline is 16 cents) Owners can purchase a fuel tax decal in lieu of per gallon tax.	100% of all new state and post-secondary institution vehicles must be AFVs as of 1996		505-827-5957
ND			\$0.40 (producer)	701-328-2094
OH			\$0.01 (blender)	614-466-6797
OK	Tax credit worth 50% of the cost for AFV refueling equipment. There is also a revolving loan fund for government fleet fueling site construction.	School and government fleets must run on alternative fuel when fuel cost is equal to or less than conventional fuel.		405-841-9326
SD	There is no sales tax on labor and equipment for ethanol stations, and the property tax is abated. Alternative fuels are taxed at 6 cents/gal.		\$0.20 (blender), \$0.20 (producer) Alternative fuels are taxed at \$0.06/gal	605-334-0100
TX	State agencies with 15 or more vehicles must have 50% of their fleet AFVs by 1996, 90% by 1998. Local government fleets of more than 15 vehicles, and private fleets of more than 25 in the non-attainment areas must also have 10% AFV by 9/1/98 (or 30% of their purchases after 1998); 20% by 9/1/2000 (and 50% of purchases after 2000); and 45% by 9/1/2002 (and 90% of purchases).			512-463-1931
WI	The state offers local government grants for the added costs of AFVs.	The state has a plan of 2,000 AFVs by 2000.		608-266-8234

## Current Federal Excise Tax Exemption for Ethanol-Blended Fuels\*

Ethanol Volume	Oxygen Content	Tax Exemption (cents/gal)
5.7	2.0	3.0
7.7	2.7	4.1
10.0	3.5	5.4
85.0		45.1

### Small Ethanol Producer Tax Credit

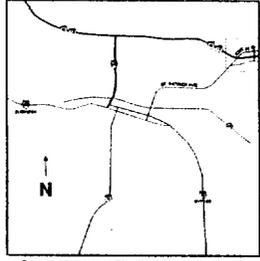
A \$0.10/gallon tax credit for ethanol producers with a total capacity of no more than 30 million gallons/year.

\*Through Sept. 30, 2000



**SOUTH DAKOTA**

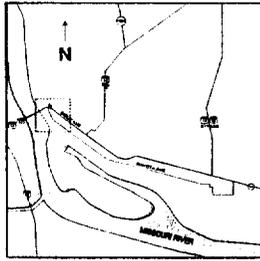
**RAPID CITY**  
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 1001 14th St. S.  
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 605-338-4100  
 National Ethanol Vehicle Coalition 1-800-858-8888



For more information on Ethanol refueling facilities contact:  
 South Dakota Corn Utilization Council 605-338-4100  
 National Ethanol Vehicle Coalition 1-800-858-8888

**SOUTH DAKOTA**

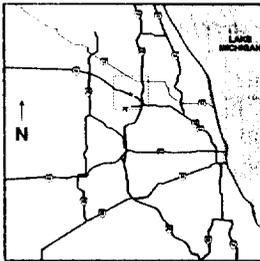
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**ILLINOIS**

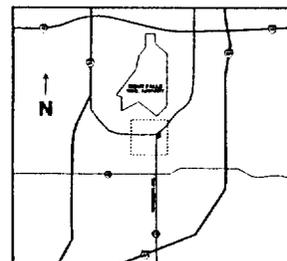
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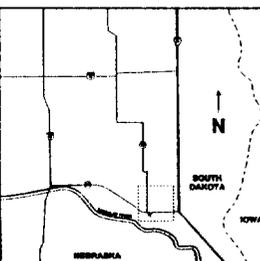
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**SOUTH DAKOTA**

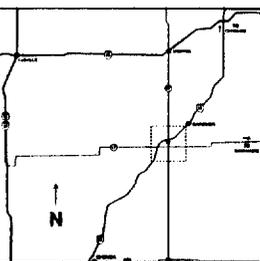
**VERMILION**  
**CONOCO**  
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 Vermillion, SD 57059  
 605-224-1100  
 National Ethanol Vehicle Coalition 1-800-858-8888



For more information on Ethanol refueling facilities contact:  
 South Dakota Corn Utilization Council 605-224-1100  
 National Ethanol Vehicle Coalition 1-800-858-8888

**ILLINOIS**

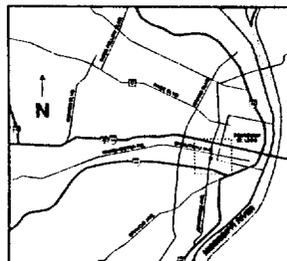
**DWIGHT**  
**ES 24**  
 1001 14th St. S.  
 Dwight, IL 62521  
 312-467-2227  
 National Ethanol Vehicle Coalition 1-800-858-8888



For more information on Ethanol refueling facilities contact:  
 Illinois Corn Growers Association 312-467-2227  
 National Ethanol Vehicle Coalition 1-800-858-8888

**MISSOURI**

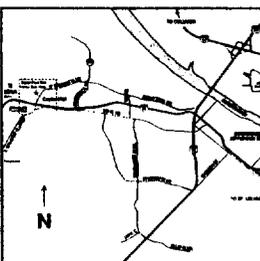
**ST. LOUIS**  
**Conoco**  
 1001 14th St. S.  
 St. Louis, MO 63101  
 314-427-1111  
 National Ethanol Vehicle Coalition 1-800-858-8888



For more information on Ethanol refueling facilities contact:  
 Missouri Corn Merchandising Council 314-427-1111  
 National Ethanol Vehicle Coalition 1-800-858-8888

**MISSOURI**

**JEFFERSON CITY**  
**CONOCO**  
 1001 14th St. S.  
 Jefferson City, MO 64501  
 314-427-1111  
 National Ethanol Vehicle Coalition 1-800-858-8888



For more information on Ethanol refueling facilities contact:  
 Missouri Corn Merchandising Council 314-427-1111  
 National Ethanol Vehicle Coalition 1-800-858-8888

**Bismarck**

**Pierre**

**Rapid City**

**Boulder**

**Denver**

**Golden**

**Colorado Springs**

Additional public facility operating at:  
 1248 Pennsylvania Ave. S.E., Washington D.C.

- Phase I – Complete
- ★ Phase II – January '99
- ▲ Phase III – To be announced



## ILLINOIS CORN GROWERS ASSOCIATION MAKES INROADS MARKETING E-85 TO STATE FLEETS

The Bloomington, Illinois based staff of the Illinois Corn Growers Association (ICGA) is actively promoting E-85 as an alternative fuel and has been talking up the benefits of E-85 vehicles to fleets across the state.

The ICGA began its promotion of E-85 vehicles over a decade ago when it worked with the state to purchase 10 Brazilian-made Ford 3-cylinder ethanol engines for tractors, which were used for mowing roadsides along Illinois highways. In the early 1990's, the association converted a Volkswagen Jetta to run on E-85 that served as a model for auto manufacturers.

ICGA also worked with General Motors in its production of the 1992 and 1993 E-85 Lumina's. The state ordered 40 of the 350 Lumina's produced, and the Illinois Corn Growers acquired two of them for its fleet. One of the Lumina's was dispatched to fairs, corn growers' annual meetings, mall openings, and other promotional events; the other vehicle was used by the field services director to visit corn growers around the state. These vehicles

have since been replaced by newer Ford Taurus's.

The ICGA influenced many agribusinesses in the state to purchase E-85 vehicles. These companies include Farm Services, its parent company Gromark, and ethanol producer Pekin Energy. Interest has been shown by Hewlett Packard and Kraft.

The association is offering to set up a 1,000-gallon, above ground E-85 refueling tank free of charge to any fleet purchasing 10 or more E-85 vehicles.

The association is also mailing information to corporations and is visiting fleets around the Chicago area.

Why should corn growers and agribusinesses be interested in E-85? "Not only does it clean the air, it uses a large amount of fuel made from corn. E-85 is important to the economy of the state and to the corn farmer," said ICGA Market Development Director Phil Shane. Illinois is the second largest corn growing state in the nation behind Iowa.

## NATIONAL ETHANOL VEHICLE COALITION EXPANDING THE E-85 MARKET

Ethanol makes sense for U.S. transportation needs for many reasons. But without strong leadership, it does not stand much of a chance to enter the market. As auto manufacturers and policy makers will tell you, no one has done more in the past two years to bring large numbers of E-85 vehicles to the road than the National Ethanol Vehicle Coalition (NEVC).

The NEVC is an ad hoc group created in 1993 by the National Corn Growers Association (NCGA) and the Governors' Ethanol Coalition (GEC) to increase the use of E-85. The NEVC's stated mission is: "To promote the use of ethanol as an alternative fuel, enhance agricultural profitability, advance environmental stewardship, and further national energy independence."

The NEVC was formed to give ethanol vehicle supporters one voice, according to Phil Lampert, the coalition's project coordinator. In 1993, many groups were promoting ethanol as a vehicle fuel on

managers the reassurance they need to help break that cycle.

Thanks to the efforts of the NEVC, ethanol vehicle owners in the Midwest may soon be able to take full advantage of their vehicles' capability by filling up with 85% ethanol at conveniently located fueling sites. The NEVC is working hard to add more than 40 public ethanol fueling sites throughout the Midwest by 1996. Efforts are also underway to establish public E-85 fueling sites in other parts of the nation, with the goal of expanding to include the entire "lower 48" states.

In addition to providing financial incentives to existing fuel retailers to provide E-85, the NEVC is working to meet its goals in other ways. This includes providing information to key decision-makers and fleet managers about the benefits of E-85.

### The Governors' Ethanol Coalition

Arkansas, Illinois, Kansas, Minnesota, Nebraska, Ohio, Wisconsin, Colorado, Indiana, Kentucky, Missouri, New Mexico, South Dakota, Hawaii, Iowa, Michigan, Montana, North Dakota, Texas and Oklahoma.

Governor Mel Carnahan (D-MO) Chairman;  
Governor Terry E. Branstad (R-IA) is Vice Chair.

### National Corn Growers

The National Corn Growers Association's (NCGA) membership includes 30,000 members in 47 states; 24 NCGA affiliated state offices; the top 21 corn producing states.

For more information, call the NEVC's hotline at 1-800-E-85-8895.

***The NEVC's stated mission is: "To promote the use of ethanol as an alternative fuel, enhance agricultural profitability, advance environmental stewardship, and further national energy independence."***

the state level, but "ethanol was not making as much headway as other alternative fuels," he said.

No matter how well they can perform, alternative fuels always face the problem of the "chicken and the egg syndrome"—automakers cannot sell vehicles without consumers, consumers will not buy vehicles without fuel, and fuel suppliers cannot provide fuel without vehicles. The NEVC's involvement has given automakers and fleet

## GOVERNORS' ETHANOL COALITION PROVIDES BIPARTISAN E-85 SUPPORT

In 1991, Governor E. Benjamin Nelson (D-N) joined forces with governors from nine states to form the Governors' Ethanol Coalition (GEC) United by the mission to increase the use of ethanol based transportation fuels, the organization membership has now grown to 20 states.

The GEC has succeeded in its mission coordinating its member states' activities research, education, demonstration, and mail development. The coalition generates reports ethanol's local economic benefits and informs Congress and federal agencies of ethanol's benefits.

Activities to promote the use of E-85 are important to the GEC, according to Nebraska Energy Office Director Bob Harris. "E-85 can't be leveraged against foreign oil imports and is helpful in meeting clean air requirements," he said. "The GEC has been instrumental in creating an E-85 refueling infrastructure."

The National Ethanol Vehicle Coalition (NEVC) with help from the GEC and national, state and local corn growers associations, has collected more than \$1.3 million from states and federal government for E-85 promotion including funding for the NEVC activities. One of those efforts is to offer forgivable loans to service station owners for keeping E-85 refueling available for at least three years. The GEC is helping to educate potential consumers through mailings about E-85 vehicles available to business throughout the Midwest.

"The GEC helped with E-85 issues in Washington, D.C.," said Harris, including helping secure \$4 million for federal E-85 vehicle purchases. "We applaud the General Services Administration and the Department of Energy for their efforts to get E-85 recognized at the national level," he said.

Other activities sponsored by the GEC to promote ethanol include a trade mission to Brazil to explore the market for U.S. ethanol. (Most of Brazil's vehicle fleet runs on 22% ethanol, and most of the country's fuel stations also sell 95% ethanol blends.)

Active participation in promotional events also helps the GEC inform the public and private decision makers. On July 4, 1995, the GEC participated in the parade in Washington, D.C. to promote U.S. energy independence and ethanol fuels.

GEC members participate individually and in committees. They meet at least quarterly where several projects proceed in four committee areas: economics, environment, policy, and research. Consensus drives decision making, and chairmanship alternates between political parties. This year, Governor Mel Carnahan (D-MO) heads the coalition and Governor Terry E. Branstad (R-IA) is Vice Chair. Permanent administrative offices are based in Lincoln, Nebraska.

To maintain neutrality, the GEC accepts funds from non-industry sources only. Projects are funded primarily by the U.S. Departments of Energy and Agriculture.

## DETROIT BRINGS ETHANOL VEHICLES TO SHOWROOM

### Cont. from Pg. 1

Artushin said, explaining that fleets also need smaller models to meet their budgets.

The Taurus offers several unique features that give it the capability of running on gasoline or ethanol, including a special engine computer and fuel sensor. The sensor continually detects the percentage of ethanol in the fuel and signals an on-board computer to adjust the fuel flow and engine timing accordingly. This allows the vehicle to take advantage of the high performance characteristics of alcohol fuels.

The ethanol models are equipped with a larger fuel tank to ensure that the overall driving range is closer to gasoline vehicles despite ethanol's somewhat lower energy content. They also have upgraded internal components, such as piston rings and block and valve seals.

Ford will prepare a video to educate its dealers on the new vehicles, but the company expects the changes to be transparent to drivers and mechanics. "There's really not any major

change," said Al Updegrave of Ford's customer service division. "Just a few components are different, and there are two different calibrations for the ethanol and methanol," he said. The diagnostic routine is the same, and even a repair technician unfamiliar with the model will find the part numbers and know what to order, according to Updegrave.

The flexible fuel ethanol Taurus is certified to meet federal tier one emissions standards, but has demonstrated it can further reduce smog-forming hydrocarbon emissions by as much as 30 percent, according to Ford. "When customers are comfortable with the ethanol infrastructure, a dedicated ethanol vehicle could be produced to optimize emissions," said Ford Engineer Richard Bell.

The growing number of E-85 refueling stations will help support even more E-85 vehicles in the 1998 model year when General Motors plans to produce all four-cylinder S-Series and Sonoma

pickup trucks capable of running on up to 85% ethanol. Truck purchasers will not have to make a decision about alternative fuels in the showroom, but at the fueling pump instead.

The trucks will feature an advanced fuel system that includes stainless steel materials. A fuel sensor will constantly monitor the fuel mixture and send the information to a Powertrain Control Module for optimal vehicle performance.

While Chrysler has never offered ethanol vehicles, "we have a lot of experience with alcohol fuels," said Mike Clement, the company's alternative fuel vehicle sales and marketing manager. Chrysler built methanol vehicles from 1993-95, selling more than 4,500 Dodge Spirit and Acclaim models and 800 Dodge Intrepids. "There weren't a lot of M-85 fueling stations and most were running on gas, so we've dropped out for the time being," Clement said. "We have no alcohol product plans at this time, but we're looking at all alternative fuels."

## CASE STUDY: E-85 MEETS WITH SUCCESS IN NEBRASKA FLEETS

"If you care about your state and your country, it's [using ethanol] the right thing to do," said fleet manager Glen E. Eppens.

When Eppens became Administrator for Nebraska's Department of Administrative Services 13 years ago, the state already required its fleet to fuel with 10 percent ethanol blends (E-10). Today most of Eppens' 1,200 vehicles use E-10, but 48 are fueling with E-85 and 24 more E-85 vehicles are on order.

"I don't see myself as an ethanol spokesman or promoter—I'm basically a fleet manager. When I came here, I heard stories about problems ethanol causes. In my 13 years I've never seen a thing that shows those stories hold water," Eppens said. He explained that he believed early reports of problems were blamed on the fuel when other factors were responsible.

Nebraska's ethanol vehicle program began with the first order of 24 E-85 Chevrolet Lumina's in 1993, which was followed with 24 Ford Taurus models when the vehicles became available in 1995. "It's a situation for the government to lead rather than follow, and we've shown that it works," Eppens said.

Eppens reported that ethanol's higher octane improves his vehicles' performance. As an experiment he asked his drivers to fuel with regular unleaded gasoline, then E-10, and finally E-85 to

see if they could detect any range differences. "I'm not an expert, but there was no appreciable difference in mileage. It's pretty reliable."



Nebraska fleet manager Glen E. Eppens stands by his E-85 vehicles

Based on recommendations, Eppens sometimes decreases the fuel blend to 75 or 80 percent in extreme cold weather, but has not experienced any cold-start difficulties. With the exception of securing a low-cost supplier for the special oil E-

85 vehicles require, Eppens does not change his maintenance practices.

Eppens' fleet vehicles collectively travel 16-17 million miles every year, consuming 600,000 gallons of fuel. The E-85 vehicles are concentrated in Lincoln and Omaha, where fuel is already available. The only time the vehicles run on gasoline is when they travel outside that area. When it comes to incorporating alternative fuels into a fleet, "E-85's flexible-fuel capabilities makes the transition easier," Eppens said.

Eppens said his biggest obstacles have been vehicle and fuel availability, and fortunately that is rapidly changing. After the first 24 E-85 Chevrolet Lumina's were introduced in his fleet in 1993, there was nothing to order again until Ford offered limited numbers of E-85 Taurus models in 1995. More fueling stations are being installed and there are new vehicle offerings for 1996 and 1998 (see related story).

Eppens said he pays about \$1.30 per gallon for E-85, and added that he expects the price to drop to be competitive with the E-10 he uses for the rest of the fleet when 10,000-gallon tanks are installed and he can purchase the fuel in greater quantities.

"Nobody's had to twist my arm to do it," Eppens said of his efforts to incorporate E-85 vehicles in his fleet. "I'd do this whether the mandate was there or not. It's a good, clean-burning fuel."

## FEDERAL FLEET MANAGER: E-85 VEHICLE OPERATION "FLAWLESS"

The U.S. General Services Administration (GSA) is set to purchase 1,352 1996 E-85 Ford Taurus's this year. GSA Great Lakes Regional Fleet Manager Grant Jahr will receive 800 of these vehicles to place in fleets in Indiana, Michigan, Illinois, Wisconsin and Minnesota. Jahr is quite impressed with E-85 vehicle performance thus far. "The operation of these vehicles has been flawless," he said.

Jahr has leased E-85 Chevrolet Lumina's and Ford Taurus's to federal agencies in his region. "The average driver doesn't notice the difference between the E-85 and a gasoline powered vehicle," said Jahr. "So far there have been no complaints about these vehicles from drivers," he said.

Other vehicles running on methanol and compressed natural gas, however, "have not met with the same degree of success," said Jahr. He attributed

E-85 vehicles' success to the less corrosive properties of the fuel compared with M-85, and the absence of any fuel-related mechanical problems.

Jahr has placed 140 1994 and 1995 E-85 Taurus's with government agencies in his region.

GSA acts as the fleet manager for many federal agencies, by purchasing vehicles and arranging for vehicle service contracts. It then leases the vehicles to numerous federal agency offices across the nation.

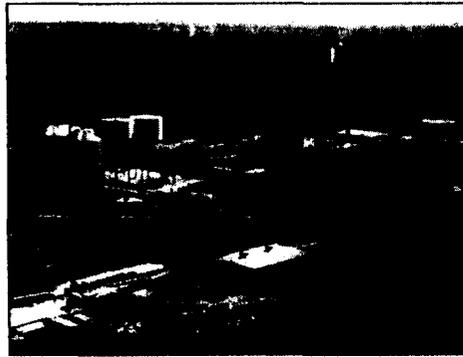
## HOW IS ETHANOL MADE?

The story of U.S. ethanol production is one of great progress, from a practically non-existent market just two decades ago to current production of more than 1.4 billion gallons each year by 40 U.S. companies.

While ethanol can be produced from a wide range of agricultural and waste products, most of our current production comes from corn. That does not mean our use is limited to how much corn we can grow; wheat and other renewable resources also serve as feedstocks and some ethanol is even produced using industrial wastes such as the sugar starch from beer production.

The United States "discovered" ethanol during the oil embargo in 1979. Since then, ethanol's assets as an octane enhancer and oxygenate have led to its continued use. Ethanol can also replace toxics in gasoline such as benzene and other aromatics, which are of increasing environmental and health concern.

Improvements in production plant efficiencies have reduced the fuel's cost, and the price is expected to drop even more as demand grows and new



The High Plains Corporation's ethanol plant in York, Nebraska

production technologies enter the market. Incentives are helping this transition.

Using the starch in corn to produce ethanol can be done by two basically different processes: dry-milling and wet-milling. Using corn for ethanol does not subtract from its food value. In the wet-milling process, there are several valuable co-products (corn germ, oil, gluten feed and gluten meal). Most ethanol producers use the dry-milling process, which can produce more ethanol and leaves high-protein distillers dry grains as a co-product.

There are many plants that produce small quantities of ethanol using locally available feedstocks such as cheese whey, potato waste, and brewery waste. This increases plant productivity while solving a disposal problem at the same time. Researchers are also developing technologies that could make ethanol production from fast-growing woods and grasses more feasible.

## IOWA CORN PROMOTION BOARD SUPPORTS LOCAL MARKET

The Iowa Corn Promotion Board (ICPB) and other Iowa organizations are seizing the opportunity to increase the E-85 market by establishing at least four public E-85 refueling sites by the end of 1996, and promoting E-85 vehicles around the state.

Since 1994, the state of Iowa has been fulfilling legislated requirements that it make at least 10% of its new acquisitions E-85 vehicles. As of February 1996, the state had acquired 200 Chevrolet Lumina and Tauruses operating in its fleet, and has an additional 125 E-85 Tauruses on order.

The ICPB, the Iowa Department of Natural Resources, and the National Ethanol Vehicle Coalition together will provide money for tank

installation for those interested in dispensing E-85. "Long term we would like to have a minimum of 10 sites serving 1,000 vehicles," said ICPB Domestic Market Development Director Lucy Norton.

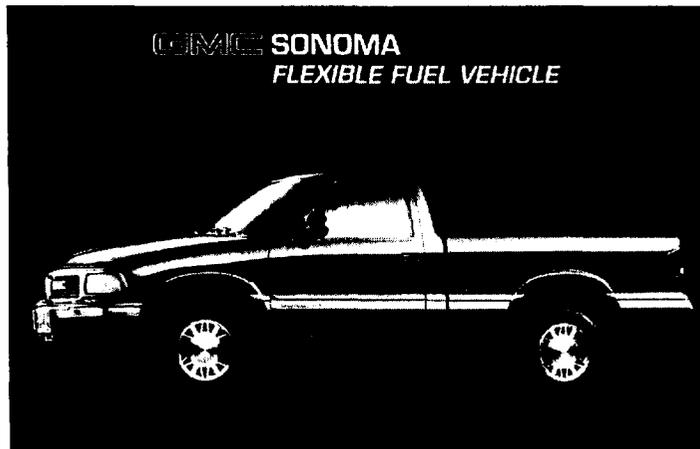
The ICPB is working with Ford to identify fleet purchasers in Des Moines and help outline benefits of the fuel. "We have surveyed fleets in various cities to obtain fleet profiles including vehicle types, annual purchasing decisions, and level of interest in purchasing these E-85 vehicles," said Norton. Fleets that show promise are then contacted personally to discuss the Ford Tauruses available this year, and the General Motors pick-up trucks that will be available in the 1998 model year.

The ICPB has a 1995 E-85 Ford Taurus and has ordered a 1996 model. The vehicles are used for promotional and display purposes such as parades and trade shows.

"We are interested in developing E-85 because of the large market potential for corn...Our purpose is to help expand markets for corn and corn products. Ethanol has been a priority of our market development effort," Norton said.

The ICPB, with a staff of 12 professional staff, is a non-profit organization formed in 1978 by Iowa corn growers and the state. Funding is derived from a corn check-off program of one-half cent/bushel. The board is directed by farmers. Funding is spent on market development, research, and education.

## COMING IN 1998 - GMC Sonoma 2.2L Flexible Fuel Vehicle



### What is E-85?

E-85 is a blend of 85% ethanol and 15% gasoline.

### Why use ethanol as a fuel?

Ethanol is a U.S.-manufactured alternative fuel produced from corn grown by U.S. farmers. Switching to ethanol reduces our country's dependence on imported fuels.

### Will Sonoma run on either E-85 or gasoline?

Yes. The Flexible Fuel Sonoma will run on unleaded gasoline, E-85 or any combination of the two fuels. The fuels are pumped into the same tank and a fuel sensor constantly monitors the fuel mixture to ensure optimal performance.

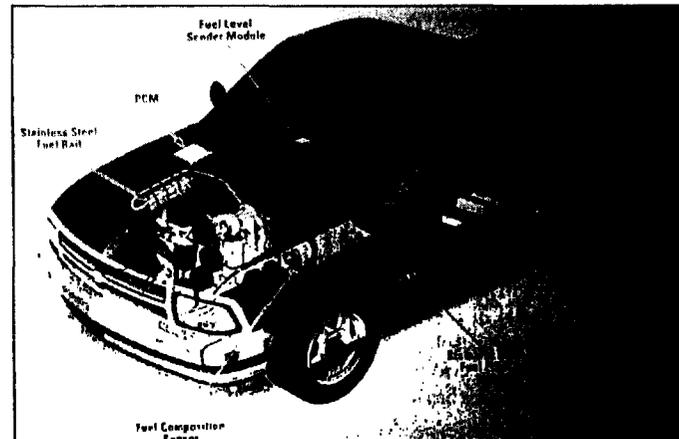
### Is Ethanol safe?

E-85 is safe. It is a liquid that is delivered and stored in the same way as gasoline.

Distinctive styling and superior performance teamed with an alternative fuel option makes the GMC Sonoma the vehicle of choice for the environmentally conscious customer. All 1998 GMC Sonomas with the 2.2 liter, four-cylinder engine will feature flexible fuel operation. Owners of these vehicles can choose fuel combinations ranging from gasoline to 85% ethanol.

The 1998 Sonoma features an advanced fuel system specifically designed to operate on either gasoline or E-85 (85% ethanol, 15% gasoline), or any combination of the two fuels. A fuel sensor constantly monitors the fuel mixture and sends information to the Powertrain Control Module for the optimal vehicle performance.

The Flexible Fuel Sonoma helps fleets meet the requirements of the Energy Policy Act of 1992. This act requires federal and state agencies to add alternative fuel vehicles to their fleets. Eventually, commercial fleets may be required to buy a percentage of vehicles powered by alternative fuels.



# ETHANOL RESOURCES

<b>ASSOCIATIONS</b>			
<b>Name</b>	<b>Address</b>	<b>Contact</b>	<b>Phone #</b>
American Coalition for Ethanol	7648 Surrell Street, PO Box 85102, Sioux Falls, SD 57104		605-334-3381 605-334-3389(f)
American Farm Bureau Federation	600 Maryland Avenue, SW, Suite 800, Washington, DC 20024	Richard Newpher, Executive Director	202-484-3600 202-484-3604(f)
Biomass Energy Alliance	1001 G Street, NW, Suite 900 East, Washington, DC 20001	Reid Deutchon, Executive Director	202-639-0384 www.biomass.org
California Renewable Fuels Council	3304 Yorba Linda Boulevard, Suite 249, Fullerton, CA 92631	Cindy Hasenjager, Regulatory Affairs	714-996-6540
Clean Fuels Development Coalition	7315 Wisconsin Avenue, East Tower, Suite 515, Bethesda, MD 20814 Address will change as of 3/01/96	Douglas A. Durante, Executive Director	301-913-9633
Ethanol Producers and Consumers (EPAC)	South Route, Box 206, Nashua, MT 59248	Shirley Ball, Executive Director	406-785-EPAC (3722)
Governors' Ethanol Coalition	Office Of The Governor, PO Box 720, Jefferson City, MO 65109	Amy Jordan, Assistant to the Governor	573-751-4629 573-751-1495(f)
Institute for Local Self Reliance	1313 5th Street, SE, Suite 306, Minneapolis, MN 55414	David Morris, Vice President	612-379-3815 612-379-3920(f)
National Association of Wheat Growers	415 Second Street, NE, Suite 300, Washington, DC 20002 4993	Evelyn Mitchell	202-547-7800 202-546-2638(f)
National Corn Growers Association	1000 Executive Parkway, Suite 105, St. Louis, MO 63141	Headquarters Bill Northey, President Susan Keith, Government Relations Representative	314-275-9915 308-647-6539 202-546-7611
** Corn growing states that are affiliated with NCGA			
**Colorado Corn Growers Association	5500 South Quebec Street, Suite 114, Englewood, CO 80111	Hal Smedley, Executive Director	303-740-4329 303-694-5814(f)
**Illinois Corn Growers Association	PO Box 1623, Bloomington, Ill 61702	Phillip Shane, Market Dev. Director	309-557-3257 309-663-0570(f)
**Indiana Corn Growers Association	8534 West, State Road 38, Pendleton, IN 46064-9735	Dean Eppley	219-563-5802 219-569-0001(f)
**Iowa Corn Promotion Board	306 West Tower, 1200 35th Street, Suite 36, W. Des Moines, IA 50262	Lucy Norton, Domestic Marketing Development Director	515-225-9242 515-225-0781(f)
**Kansas Corn Growers Association	PO Box 446, Garnett, KS 66032	Jere White, Executive Director	913-448-6922 913-448-6932(f)
**Kentucky Corn Growers Association	PO Box 20700, Louisville, KY 40250	Todd Barlow, Executive Director	502-495-7700 502-495-5197(f)
**Maryland Grain Producers Association	53 Slama Road, Edgewater, MD 21037	Lynne Hoot, Executive Director	410-956-5771 410-956-0161(f)
**Michigan Corn Growers Association	6206 West Saginaw Highway, Lansing, MI 48917-2467	Keith Muxlow, Executive Director	517-323-6600 517-323-6601(f)
**Minnesota Corn Growers Association	14198 Commerce Avenue, NE, Suite 600, Prior Lake, MN 55372	Bruce Stockholm, Executive Director	612-447-CORN 612-447-2072(f)
**Missouri Corn Growers Association	3702 West Truman Boulevard, Suite 120, Jefferson City, MO 65109	Gary Marshall, Executive Director	314-893-4181 314-893-4612(f)
**Nebraska Corn Growers Association	1327 H Street, #308, Lincoln, NE 68508	Jack Moors, Executive Director	402-438-6459 402-476-8998(f)
**Nebraska Corn Development Board	PO Box 95107, Lincoln, NE 68509-5107	Don Hutchins, Executive Director	402-471-2787 402-471-3345(f)
**North Dakota Corn Growers Association	415 38th Street, SW, Suite C, Fargo, ND 58103	Bob Christman, State Coordinator	701-277-0573 701-277-9946(f)
**Ohio Corn Growers Association	1100 East Center Street, Marion, OH 43302	Mike Wagner, Executive Director	614-383-2676 614-387-0144(f)
**South Dakota Corn Growers Association	1406 West Russel, Sioux Falls, SD 57104	Robyn Hansen, Executive Director	605-334-0100 605-334-0505(f)
**Virginia Corn Growers Association	10806 Trade Road, Richmond, VA 23236	Dave Ottaway, Executive Director	804-730-7111 804-379-5245(f)
**Wisconsin Corn Growers Association	2976 Triverton Pike, Madison, WI 53711	Bob Karls, Executive Director	608-274-7266 608-274-2006(f)
National Ethanol Vehicle Coalition	1648 Highway 179, Jefferson City, MO 65109-9020	Phillip J. Lampert, Project Coordinator	573-635-8445 573-635-5466(f)
Nebraska Ethanol Board (formerly Ethanol Authority & Dev. Board)	301 Centennial Mall S., PO Box 01922, Lincoln, NE 68509	Todd Sneller, Administrator	402-471-2941 402-471-2470(f)
North Dakota Grain Growers Association	4023 N. State Street, Bismarck, ND 58501	Brad Fay, President	701-222-3221 701-223-0018(f)
Northwest Ethanol Fuel Association	PO Box 7485, Boise, ID 83707	Mark Dunn	208-336-2110 208-389-7295(f)
Renewable Fuels Association	One Massachusetts Avenue, NW, Suite 820, Washington, DC 20001	Eric Vaughn, President	202-289-3835
Wisconsin Corn Surveys Program	2976 Triverton Pike Road, Madison, WI 53711 5808	Robert Karls, Executive Director	608-274-7266 608-274-2006(f)
National Alternative Fuels Hotline			800-423-1DOE 703-528-3500 Fax: 703-528-1953 hotline@afdc.nrel.gov

**National E-85 Hotline 800-E-85-8895 ■ FORD HOTLINE 800-ALT-FUEL**

# 1996 TAURUS FFV

Flexible Fuel Vehicle



## The Best of Both Worlds

The 1996 Taurus FFV has all of the quality, safety and comfort of the gasoline powered version. And because it Ford built, it carries the same service and warranty benefit as Ford's gasoline-powered vehicles.

### 3.0L V-6 FF Engine Upgrade:

- Unique block material
- Increased wear-resistant piston rings
- Exhaust valve seat inserts
- Optimized cylinder head combustion chamber
- Alcohol compatible 25 lbs/Hour fuel injectors

### 1996 Taurus FFV Improvements

- Revised catalyst I
- Electric Thermometer Air (ETA) added +
- New steel fuel tank (18 U.S. Gallons/68 Liters)
- Revised fuel composition sensor
- New in-tank fuel delivery module
- Methanol FFV's are targeted to meet California's TLEV standards

### 1996 Taurus Feature Highlights

- Dual air bags\*\*
- Meets 1997 U.S. Federal side impact protection requirements
- "Safety-cell" body construction
- Sturdier body structure
- Seats designed to prevent occupants from sliding forward under safety belts
- Childproof rear door locks
- Heated mirrors to help clear ice and snow
- Advanced MacPherson front and quadralink rear suspensions
- Variable-assist power steering
- More rear seat knee and leg room
- 60/40 split fold-down rear seat back
- Particulate Cabin Air filtration
- Optional hands free cellular phone

\* Ask your dealer for a copy of the limited warranty.

\*\* Always wear your safety belt

+Methanol FFV only

## 1996 TAURUS 3.0L FFV

For more information on Ford's complete line of AFVs an AFV dealer nearest you, please call Ford at 1-800-ALT-FUEL

For more information on the ethanol fueled Taurus, or for locations of E-85 refueling sites in your state, call: 314-893-4181 - 1-800-E-85-8895

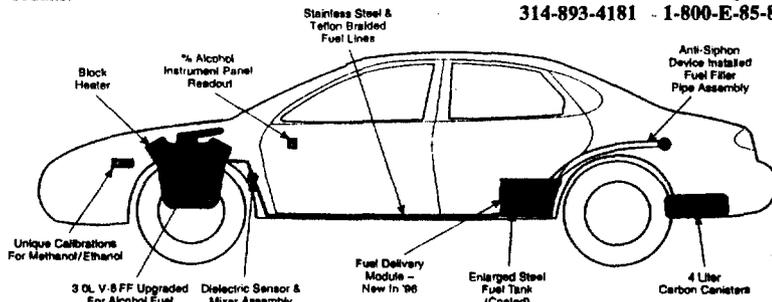
## Flexible Fuel Benefits in America's Best-Selling Fleet Car.

The Taurus FFV is a prime example of Ford's commitment to protecting the environment and world leadership in the development of alternative fuel vehicles. It's an advanced flexible fuel vehicle that is available in other ethanol or methanol versions. Both ethanol and methanol are renewable fuels that burn cleaner. The Taurus Ethanol FFV operates on E-85 (85% ethanol and 15% unleaded gasoline), unleaded gasoline or any mixture of the two in the same tank. The Taurus Methanol FFV, on the other hand, operates on M-85 (85% methanol and 15% unleaded gasoline), unleaded gasoline or any mixture of the two in the same tank. The flexibility makes it ideal for fleet use in any location.

## A Dynamic New Taurus

America's #1 fleet car has been totally redesigned. The

1996 model is the next generation Taurus, designed to be safer and quieter with more responsive performance, more agile handling and more comfort and convenience features than any Taurus before it. Aerodynamically, it incorporates advanced design thinking with the sleek appearance to match. And it sets new, higher standards for mid-size sedans.



1648 Highway 179

Jefferson City, MO 65109-9020