

Biofuels Boost AFV Credits and Awareness in North Carolina

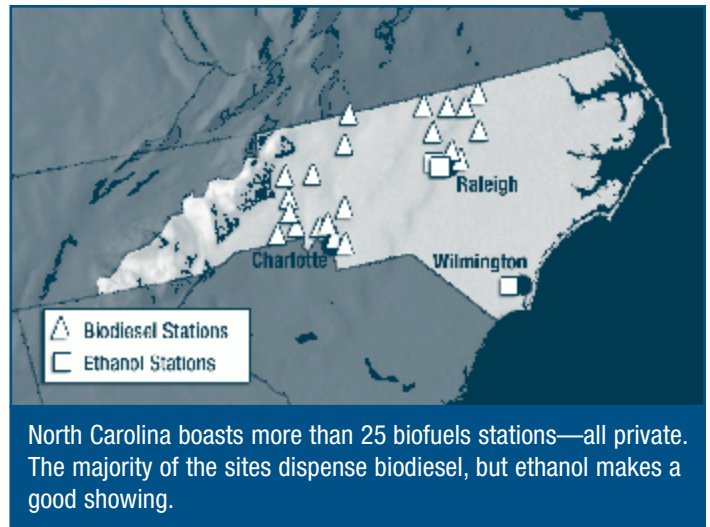
It took a little more than a decade for the State of North Carolina to become one of the nation's largest users of biofuels—ethanol and biodiesel.

In 1994, when the state acquired its first alternative fuel vehicles (AFVs), North Carolina wasn't using biofuels. Like most fleets covered under the Energy Policy Act of 1992 (EPA Act), North Carolina started its fleet of alternative fuel vehicles with cars powered by propane or natural gas.

By the late 1990s, E85 (85% ethanol, 15% gasoline) was well established as an EPA Act-approved fuel, but it was virtually nonexistent in North Carolina. E85 stations were far more common in the corn belt than in the Southeast. But the state would soon change that.

One Man's Vision

North Carolina's shift to ethanol is largely credited to the influence of one state official. Since 1997, Carlton Myrick had served as Deputy Secretary for Government Operations—essentially second in rank at the Department



of Administration. The agency oversees state business operations in a diverse array of activities such as construction, contracting for goods and services, distribution of surplus property, and purchasing and maintaining vehicles.

In 2000, alternative fuel advocates in the state were working to form a Clean Cities coalition in association with the U.S. Department of Energy. The coalition would encompass the Research Triangle anchored by Raleigh, Durham, and Chapel Hill. To qualify, the group needed to prove the presence of a minimum number of AFVs in the region. To help meet that requirement, the advocates moved to get the state government on their side. Founders of the Triangle Clean Cities Coalition worked with the governor's office to draft a proclamation promoting ethanol in North Carolina.

That proclamation cited the potential of ethanol "to diversify crop production and offer an alternative to tobacco cultivation" in the state. Corn was a crop of interest, but not the only one, says Larry Shirley, director

North Carolina Motor Fleet/NREL, PIX 13882



A driver fuels a State of North Carolina FFV with ethanol. Use of ethanol is growing in North Carolina, a "corn deficit" state.



of the State Energy Office. Cornfields are not uncommon in North Carolina, but it is a “corn deficit state,” he says. More corn is consumed—largely as feed for hogs, chickens, and turkeys—than what is produced there. Researchers at North Carolina State University are also investigating the use of sweet potatoes, barley, and other forms of biomass as a feedstock for ethanol.

Ethanol or blends of the fuel, such as E85, can be used in specially equipped cars and trucks called flexible fuel vehicles (FFVs). Several million FFVs have been sold in the United States since model year 1998, according to the National Ethanol Vehicle Coalition. Over the years, offerings included pickups and sport utility vehicles from General Motors and Ford; minivans, pickups, and small sedans from DaimlerChrysler; and the sedans and station wagons from Ford.

Green Keys

Sparking the state’s first big surge in AFV credits, North Carolina in 1998 purchased 90 new flexible fuel Ford Taurus sedans. The following year it bought 430 FFVs including 295 Tauruses, 120 Dodge minivans, and 15 Ford pickups.

The state’s accumulation of EPA credits settled down in the next two years, as the fleet was well-stocked with AFVs. But acquisition surged again in 2003, with FFVs accounting for nearly all of the 889 conventional AFV credits earned in that year. From 1999 through the end of

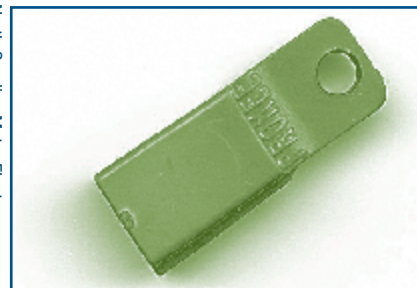
calendar year 2004, the state had purchased almost 3,000 FFVs, including almost 1,000 FFVs in model year 2004.

Danny Willis is assistant director of the state’s Motor Fleet Management Division, which is one of nine divisions of the North Carolina Department of Administration. Its vehicle fleet includes nearly 9,000 vehicles. Most are assigned to specific agencies, but approximately 300 vehicles are part of a motor pool from which any agency may borrow a car for a short time. All motor pool vehicles are FFVs, and their tanks are filled with E85 when they leave the lot, says Willis.

Aside from its E85 efforts, the department stopped dispensing traditional gasoline at its two facilities in October 2003 and now offers E10 (10% ethanol, 90% gasoline) instead. The switch was not announced to fleet drivers, and so far there have been no complaints, says Willis.

Vehicles in the Department of Administration fleet are equipped with electronic fuel keys to activate fuel dispensers at state-operated stations. The key is colored

North Carolina Motor Fleet

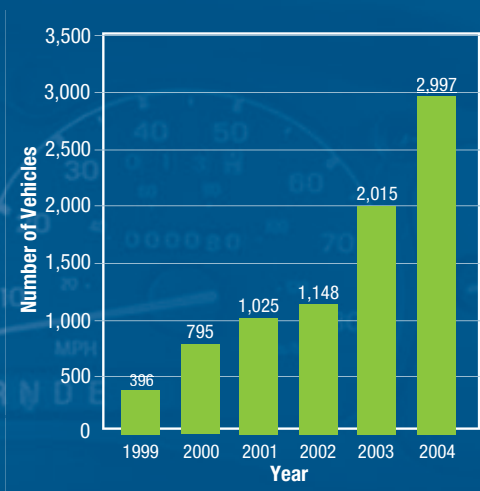


Department of Administration drivers carry this green key, which reminds them to use E85 and activates onsite ethanol pumps.

North Carolina’s FFV Inventory

The acquisitions of E85-capable FFVs by the State of North Carolina has steadily increased since 1999. The state experienced its biggest increase in fiscal year 2004, when its FFV acquisitions jumped by almost 50%—bringing the total FFV fleet to almost 3,000. The majority of North Carolina’s FFVs reside in Raleigh and Wilmington—the locations of the state’s three ethanol fueling facilities. Many fleets—including the Department of Administration—require drivers to use E85 in the vehicles when possible.

Cumulative E85 FFVs Aquisitions



green, encouraging the drivers to choose E85 whenever possible. Other vehicles (non-FFVs) are equipped with black electronic keys that can be used only to purchase gasoline.

E85 is sold at three state-operated stations—two in Raleigh and one in Wilmington. The stations are open only to government fleets. The Department of Administration's fleet consumed nearly all of the 170,954 gallons of E85 sold in the state in 2003. The remainder was used by the state's Department of Transportation (DOT).

That agency, meanwhile, contributed mightily to North Carolina's alternative fueling success story through the use of another biologically derived fuel—biodiesel.

A Boost from Biodiesel

In the United States, biodiesel is predominately made from soybean oil. Another increasingly common feedstock is restaurant waste grease, which is typically made from corn or canola oils. In Europe, canola (also called rapeseed) is the most common biodiesel feedstock.

Beginning in 2001, biodiesel use was approved as a means to help EPA-act-regulated fleets satisfy their AFV acquisition mandates. Under EPA-act, one credit is issued for every 450 gallons of pure biodiesel purchased. The use of B20 (20% biodiesel and 80% petroleum diesel) earns one credit per 2,250 gallons.

In 1997, the North Carolina DOT started using B20 as a test and evaluation pilot program in Winston-Salem. The state now boasts roughly 22 biodiesel fueling stations in 20 counties scattered throughout the state. Most of these sites also



The use of biofuels—E85 and biodiesel—is a priority for North Carolina state fleets. In 2003, fleets used roughly 170,000 gallons of E85 and about 3.9 million gallons of B20.

School's in for North Carolina

The State of North Carolina fleet includes vehicles at 17 university locations throughout the state. While many of these campuses are just beginning their AFV efforts, the state's over-compliance has "covered" these smaller university fleets so far. Within the next two years, however, the universities are expected to reach the 75% acquisition level on their own, as directed by the State Energy Office.



dispense other alternative fuels, including E85, propane, and compressed natural gas.

Through biodiesel use, North Carolina earned 53 EPA-act credits in 2001, followed by 128 in 2002, and 377 in 2003. In any given year, a state may earn up to half of its required credits with biodiesel. The state achieved that 50% limit in 2002, 2003, and 2004. Unlike AFV credits, biodiesel credits cannot be banked, traded, or sold.

North Carolina's most common use of biodiesel is in heavy-duty trucks operated by the state DOT. The agency operates approximately 11,500 vehicles, of which 8,250 are onroad and 3,250 are off-road vehicles. Roughly half of DOT's vehicles are diesel-powered, and, of those, approximately 25% use B20 at least some of the time. In fact, many of the vehicles use it all the time, says DOT Fleet Procurement Manager Bruce Thompson. In 2004, North Carolina state fleets consumed approximately more than 260,000 gallons of B100.

The biggest advantage of biodiesel is that it requires very little modification of tanks, dispensers, or vehicles. Use of B20 has caused no problems in the engines or fuel systems of DOT vehicles, Thompson reports. The vehicles perform with no loss of performance in terms of power or longevity, he says.

Seek Stability

In contracting to buy the fuel, North Carolina dealt primarily with one supplier since the beginning, says Thompson. Other agencies and municipalities around the country have experienced problems dealing with multiple suppliers. At a national conference, Thompson recalls, he

State & Alternative Fuel Provider Rule

met an official of one county that put its biodiesel contact out for bid on a monthly basis. Changing suppliers too often reduces the ability to build relationships and respond to problems related to fuel delivery or quality, says Thompson.

Thompson also advises fleets to seek stability in the price they pay for fuel. In its early years, North Carolina agreed to a fuel pricing scheme that was tied to the daily closing price of soybeans at the Chicago Board of Trade. That price was relatively low at the time, but it soon suddenly shot up. In its more recent contracts, the state was assured that biodiesel prices are more stable, although not fully locked in.

While it doesn't figure into North Carolina's EPAAct-reported totals, biodiesel use has spread beyond the state fleet to cities, counties, and school districts. B20 is even available to the public at several stations in the Research Triangle area and in the city of Charlotte.

Approximately 285,000 gallons of B20 are used annually by the city of Raleigh, fueling more than 300 trucks. It is used by school districts and fleets in Durham. The City of Greensboro switched its entire fleet of more than 700 diesel-powered vehicles to biodiesel in 2002. By 2004, Greensboro's B20 consumption exceeded 1 million gallons.

The State of North Carolina has demonstrated not only significant over-compliance with its EPAAct requirements but that its leadership can be used to move local nonregulated fleets, such as local governments, toward



Bruce Thompson, Fleet Procurement Manager
North Carolina DOT
rbthompson@dot.state.nc.us

Larry Shirley, Director
State Energy Office
larry.shirley@ncmail.net

Danny Willis, Assistant Director
North Carolina Motor Fleet Management Division
danny.willis@ncmail.net

What is EPAAct?

The Energy Policy Act of 1992 (EPAAct) was passed by Congress to reduce the nation's dependence on imported petroleum. Provisions of EPAAct require certain fleets to purchase AFVs. DOE administers these requirements through its State & Fuel Provider Rule, Federal Fleet Rule, and Alternative Fuel Designation Authority.

For more information, visit www.eere.energy.gov/vehiclesandfuels/epact, or call the Regulatory Information Line at 202-586-9171.

alternative fuel use. North Carolina maintains this strong commitment to alternative fuels and is currently evaluating innovative approaches to funding future efforts.

Sponsored by the U.S. Department of Energy
Energy Efficiency and Renewable Energy
FreedomCAR and Vehicle Technologies Program

For more information contact: EERE Information Center
1-877-EERE-INF (1-877-337-3463)
www.eere.energy.gov

A Strong Energy Portfolio for a Strong America

Energy efficiency and clean, renewable energy will mean a stronger economy, a cleaner environment, and greater energy independence for America. Working with a wide array of state, community, industry, and university partners, the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy invests in a diverse portfolio of energy technologies.

DOE/GO-102005-2047 • April 2005

Prepared by the National Renewable Energy Laboratory (NREL)
NREL is a U.S. Department of Energy National Laboratory
Operated by Midwest Research Institute • Battelle

Neither the United States government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States government or any agency thereof.

Printed with a renewable-source ink on paper containing at least 50% wastepaper, including 20% postconsumer waste

For more information about EPAAct, visit www.eere.energy.gov/vehiclesandfuels/epact.