

The Hydrogen Fix

and other Alternative Fuels

Al Ebron

ARE THERE REALLY VIABLE energy alternatives to gasoline? Yes, and the National Alternative Fuels Training Consortium (NAFTC), headquartered at West Virginia University (WVU), provides an integral part of the infrastructure necessary to make these alternatives a reality. Presently consisting of 27 training centers located across the United States, the NAFTC is the only nationwide training and educational outreach organization offering alternative fuel and advanced technology vehicle instruction.

In 2004, automotive service technicians and mechanics held about 803,000 jobs, according to the US Department of Labor, Bureau of Labor Statistics. Currently there is a shortage of more than 37,000 automotive technicians. It is projected that in order to meet future demand, it will be necessary to train an additional 35,000 technicians yearly. According to the US Department of Energy (DOE), at least 20 percent of those automotive

technicians and mechanics need to be trained in alternative fuel vehicles (AFVs) and advanced technology vehicles. That percent is expected to increase substantially as new advanced technology vehicles become more available and of interest to the general consumer.

As the country faces elevated gas prices, consumer interest in new advanced technology vehicles is soaring, and the NAFTC is in the spotlight addressing issues of foreign oil dependence and the need for increased development of AFVs and advanced technology vehicles. We are all aware of the recent events that injured the country's energy infrastructure. Many believe last year's devastating hurricanes were more severe due to the effects of global warming, which is caused, to a large degree, by vehicle exhaust emissions. In addition, the nation is faced with the inability to predict when, not if, US petroleum reserves will again be negatively impacted. These concerns make the goals

of improving energy independence and developing alternative fuels and new technologies a priority.

The challenges of environmental pollution and energy security are serious and growing throughout the world. Governments continue to address these problems; but, the answer may be in the efforts of research and educational institutions and major automotive manufacturers. The task of developing AFVs and advanced technology vehicles and the infrastructure to support them is critical. The NAFTC motto is "Because Clean Air and Energy Independence Matter," and it is a key player in making AFVs and advanced technology vehicles a viable solution. Its technician training and educational outreach activities build trained individuals, awareness and acceptance of these technologies.

Searching for an Alternative

In 1910, global demand for petroleum stood at about 500,000 barrels a day. Today that figure has ballooned to more than 80 million barrels a day. The United States alone consumes around 22 million barrels a day, which constitutes more than 25 percent of global consumption. While these numbers may be surprising to some, it comes as no shock to those who know that this country is no longer self-sufficient when it comes to energy resources; in fact, currently more than 60 percent of petroleum and 4 percent of natural gas is imported.

However, there is positive movement sweeping the country. In his annual State of the Union Address, President George W. Bush introduced the *Advanced Energy*



The Hydrogen Fuel Initiative will help put more hydrogen fuel cell-powered vehicles, such as this bus, on America's roads. NAFTC Photo



Fuelmaker Corporation's device allows people to refuel their natural gas cars at home.

Initiative, a plan that calls for a 22 percent increase in clean energy research at the DOE in hopes of lessening America's reliance on foreign oil and developing cleaner domestic energy sources.

Included in the plan is the *Biorefinery Initiative*, which directs \$150 million toward developing the production of cellulosic ethanol. Made from agricultural waste such as wood chips, stalks and switch grass, more research into cellulosic ethanol will make it a practical and cost-competitive alternative fuel within six years.

Another alternative energy source supported by the President is hydrogen. In his 2003 State of the Union Address, he introduced the \$1.2 billion *Hydrogen Fuel Initiative*, which seeks to enhance technology of hydrogen fuel cells. The goal is to develop this resource so that affordable hydrogen-powered cars are practical and cost effective by 2020. The

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President announced in his 2006 speech that \$289 million will be allocated for hydrogen fuel cell research in the 2007 budget.

The development of more efficient hybrid vehicle technology was a third area addressed in the *Advanced Energy Initiative*. The President's 2007 budget will award \$30 million to the continued research into battery technology for hybrids and plug-in hybrids.

Hybrids are a popular alternative choice, with consumers purchasing approximately 212,000 hybrid vehicles in 2005. This number is expected to rise to nearly 780,000 by 2012 due to the projected increase in the variety of hybrid choices over the next few years. In 2000, the hybrid-electric market was only comprised of two models and sold fewer than 10,000 vehicles, but in 2005, there were 11 models available to consumers resulting in sales of about 212,000. Fourteen models are expected to be available to consumers in 2006.

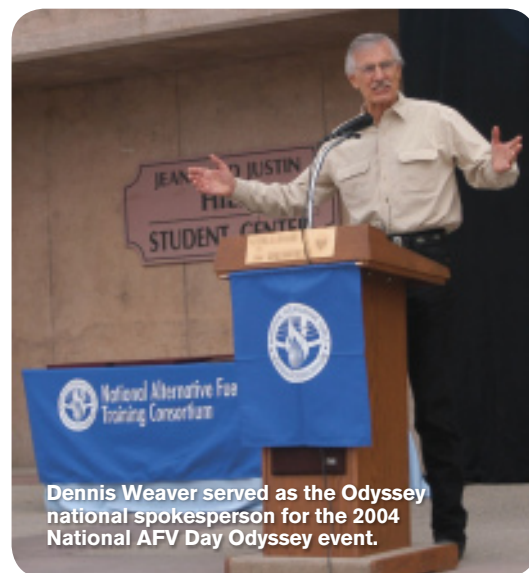
The President cited the goal of replacing more than 75 percent of oil imports from the Middle East by 2025. "By applying the talent and technology of America, this country can dramatically improve our environment, move beyond a petroleum-based economy and make our dependence on Middle Eastern oil a thing of the past."

In addition to developing ethanol and hydrogen as alternative fuel sources, biodiesel and natural gas are also options for powering vehicles. Biodiesel, typically made from soybeans, is a clean alternative to regular diesel fuel and works in most diesel engines with few or no modifications. Natural gas vehicles, such as Honda's natural gas Civic GX, are becoming popular as more natural gas refueling stations appear. The cars can also be refueled at home using a device known as Phill, a payphone-sized machine that can be mounted on a garage wall or outdoors and takes natural gas from the

gas supplied to the home and pumps it into the vehicle.

Knowledge is the Key

In the midst of these events, the NAFTCs mission to develop curricula and training and provide education on alternative energy sources has become more vital. Founded in 1992 under a cooperative agreement with the US Environmental Protection Agency and conducting business under the auspices of WVU's National Research Center for Coal and Energy, the NAFTC uses a train-the-trainers approach. Educators attend an initial NAFTC curriculum-based training class at one of the NAFTC National Training Centers located throughout the United States. The classes include classroom time to learn fundamentals, graphic presenta-



Dennis Weaver served as the Odyssey national spokesperson for the 2004 National AFV Day Odyssey event.

tions, discussions, pre- and post-tests and lab/shop activities. Supplied with technical materials and training aids, the educators return to their own institutions and pass along the newly acquired information.

In addition, the NAFTC offers courses and workshops designed for automotive technicians, fleet managers, key decision-makers, students, the general public and many others. Presently, more than 20 NAFTC courses and workshops are available. To date, more than 7,000 technicians have been trained on AFVs and advanced technology vehicles in more than 700 courses conducted by the NAFTC.

The consortium also offers support and expertise to others in the alternative fuels field through outreach and education.

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More than 775 workshops and education/awareness events have been conducted by the NAFTC with more than 160,000 attendees.

The NAFTC's premier educational outreach program is National AFV Day Odyssey, the largest AFV and advanced technology vehicle education awareness event ever conducted. National AFV Day Odyssey, held in both 2002 and 2004 and scheduled again for October 12, 2006, has brought AFV and advanced technology vehicle awareness to millions. The 2004 event alone had nearly 25,000 attendees and reached more than 24 million individuals through media coverage.

In 2004, acclaimed actor and conservationist Dennis Weaver served as the Odyssey national spokesperson, speaking at the national media kick-off event in Palm Desert, California and recording

Odyssey promotional segments that aired on radio stations throughout the country. Held at 54 sites in 34 states and provinces throughout North America, a variety of activities were offered. These included educational fairs and conferences, networking breakfasts/luncheons, information on AFV training opportunities and AFV ride-and-drive demonstrations for policymakers, legislators, students, fleet managers and the general public.

The NAFTC also disseminates timely information on exciting industry developments year round via its Web site and eNewsletter. Each month readers can learn about what is going on at the NAFTC and get up-to-date information on worldwide AFV and advanced technology vehicle news. Past story topics have ranged from the passage of national and state energy legislation, to new models of

hybrid-electric vehicles, to coal-to-liquid technologies, to the world's first hydrogen fuel cell vehicle family.

With current elevated gasoline prices and concern about protecting natural resources, keeping our air clean and dependence on foreign oil, the NAFTC serves a pivotal role in leading a nationwide movement toward AFV and advanced technology vehicle development and use. The consortium takes pride in creating this awareness and demonstrating that these vehicles are part of the solution to our country's environmental and energy needs. ■

Feature Photographs Courtesy of NAFTC.

The NAFTC has training courses and workshops covering nearly every facet of emerging vehicle technologies and alternative fuels. To learn more, visit www.naftc.wvu.edu, call 304-293-7882 or E-mail Al Ebron, the executive director at al.ebron@mail.wvu.edu.

National Alternative Fuels Training Consortium

