

The Oak Ridge National Laboratory (ORNL) performs a broad range of research and development activities including on light-weight materials that one day could improve a vehicle's fuel economy. However, ORNL also embraces current technologies and techniques to reduce fuel consumption.

During the past several years, the ORNL campus has experienced a significant "green" transformation. Green transportation features were integrated into this transformation along with the addition of several environmentally-friendly buildings and landscaping. Specifically, ORNL has had a multi-pronged approach to green transportation: (1) encouraging lab personnel to walk and to ride bikes through innovative campus design, (2) encouraging shared transportation, (3) integrating maximized fuel efficiency features when upgrading roads, (4) continuing the expansion of the flex fuel vehicle fleet, and (5) implementing bio-diesel in the vehicle fleet. All of these activities help reduce petroleum consumption. (See attached fact sheet.)

Shoe Leather and Pedal Power. First, ORNL's updated campus is very pedestrian friendly with numerous outside walkways for use in pleasant weather and interconnected buildings and covered interior walkways for use in inclement weather. Lab staff can also easily bicycle across the campus. This design minimizes the use of government vehicles within the lab. Additionally, a pedestrian and bicycling lane was added to Bethel Valley Road to encourage lab personnel to safely commute by walking or riding a bicycle. (See attached fact sheet.)

Shared Transportation. ORNL strongly supports efficient, shared transportation to reduce fuel consumption. On site, ORNL uses a campus taxi service for all lab personnel. The campus taxi is promoted throughout the lab and has its own internal homepage. Off site, ORNL uses a lab-sponsored carpool program to encourage lab personnel to share rides while commuting to work. ORNL's active carpooling program includes approximately 130 participants. This program uses a one-stop, interactive internal carpool homepage (<http://home.ornl.gov/~fli/>) that includes information on the benefits of carpooling and carpool etiquette, carpool-related announcements, an interactive carpool database to facilitate finding carpool partners, and a fillable carpool permit application. This program encourages personnel to carpool and vanpool to work in groups by matching up personnel who would like to share rides, work on the same shift, and live near each other. This program reduces petroleum consumption and reduces out-of-pocket fuel and vehicular costs for personnel. ORNL also promotes hybrid vehicle ownership through awareness and articles highlighting lab personnel that own hybrid vehicles. (See attached fact sheet.)

Fuel-efficient Traffic Flow Features. During ORNL's green transformation, fuel-efficient traffic flow features were also integrated into the laboratory. In addition to the bicycle and walking lane added to Bethel Valley Road, ORNL also looked for ways to impact vehicular flow. ORNL examined techniques to decrease the number of traffic lights. ORNL reduced a major traffic light at the lab by adding a roundabout, also called a traffic circle, at the main entrance to the laboratory. This modification reduces petroleum consumption by eliminating the need for drivers to wait for a red light to change while their car sat idling, wasting gas. (See attached fact sheet.)

Expanding Flex Fuel Vehicle Fleet Using E85. On site, ORNL recognizes that there are many reasons to support the use of alternative fuel vehicles and specifically chose to use flex fuel vehicles that can be fueled using E85, a fuel that is 85 percent ethanol and 15 percent gasoline, or with gasoline when E85 is not available. ORNL's decision to use flex fuel vehicles that use E85 supports the greening of the ORNL fleet as required by the Energy Policy Act of 1992, Executive Order 13423, and DOE Order 450.1. E85 is also a bio-fuel made from plant-based materials such as corn, grains, and wood chips, and is a renewable

resource. Because the ethanol is made from materials grown in the United States of America, using E85 supports local farmers, strengthens the United States' bio-energy industry, and reduces the nation's dependence on foreign oil. Additionally, E85-powered vehicles, when compared to gasoline-powered vehicles, have overall reduced tail pipe emissions (carbon monoxide, ozone-forming compounds, nitrogen oxides, sulfates, and particulates). All of these benefits provided additional support for ORNL's decision to choose and expand its fleet of flex fuel vehicles.

When traveling off site, UT-Battelle, LLC personnel can also use E85 in ORNL's flex fuel vehicles in many areas of the nation. The National Ethanol Vehicle Coalition's home page (http://www.e85fuel.com/buy_e85.htm) provides a list of the locations of E85 fuel stations nationwide. The website also contains other useful links and resources.

Consequently, to meet ORNL's needs, ORNL procures flex fuel vehicles when that option is available. To date, ORNL's alternative fuel initiative has resulted in ORNL having 118 flex fuel vehicles in its fleet (25 percent) and an on-site 8,000-gallon E85 fuel tank. In fiscal year (FY) 2007, 64 percent of vehicles procured were flex fuel vehicles. (Again, the only time a flex fuel vehicle is not purchased to replace an older vehicle is if a flex fuel vehicle is not an option.). During FY 2007, ORNL used 29,558 gallons of E85 in its fleet on site, which is more than was used in 2006 (27,108 gallons) and resulted in reduced tail pipe emissions compared to using gasoline and reduced petroleum products consumption. (See attached fact sheet.)

Implementing Bio-Diesel in Vehicle Fleet. In FY 2007, ORNL's Logistics Division identified the use of bio-diesel as part of its 2007 Environmental Management System objectives and targets. ORNL's decision to use bio-diesel expanded its use of bio-based fuels and supports the greening of the ORNL fleet as required by the Energy Policy Act of 1992, Executive Order 13423, and DOE Order 450.1. Bio-diesel is also a bio-fuel made from soy beans, a plant-based material, which is a renewable resource. This transition, therefore, also supports local farmers, strengthens the United States' bio-energy industry, and reduces the nation's dependence on foreign oil. Additionally, bio-diesel-powered vehicles, when compared to traditional diesel-powered vehicles, have overall reduced tail pipe emissions (carbon monoxide, ozone-forming compounds, nitrogen oxides, sulfates, and particulates).

Initially a plan was established for the transition to bio-diesel. A separate contract was established to ensure that diesel fuel would be available for the emergency generators, the only equipment at ORNL that was not transitioning to bio-diesel.

To ensure a smooth transition, the existing underground diesel fuel tank and truck tank were then cleaned out prior to receiving the first delivery of bio-diesel. During the next several months, the type of bio-diesel was then gradually transitioned from the lowest percentage, B5 (5 percent bio-diesel), to the optimal B20 (20 percent bio-diesel).

Consequently, this ORNL B20 alternative fuel initiative has resulted in the following: (1) ORNL has 45 diesel vehicles and numerous pieces of equipment in its fleet using bio-diesel. (2) ORNL has an on-site 6,000-gallon bio-diesel fuel tank and a 80-gallon bio-diesel tank truck. (3) Since February 23, 2007, ORNL used 15,600 gallons of bio-diesel in its fleet on site in FY 2007, which resulted in reduced tail pipe emissions compared to using gasoline.

Summary. In conclusion, through ORNL's green transportation initiative, ORNL has increased the use of bio-based materials and specifically alternative fuel, reduced reliance on petroleum-based materials, reduced tail pipe emissions, and provided personnel with safer,

more cost-effective transportation options.