

TENNESSEE

Clean Fuels Advisor



A quarterly publication from the partnership between the Clean Cities coalitions in Tennessee and the state of Tennessee.

Bringing alternative fuels and hybrids to the forefront. Alt fuels = biodiesel, electricity, ethanol, hydrogen, natural gas and propane.

UTBI & Mascoma Select Vonore for Tennessee's First Cellulosic Ethanol Plant

The UT Biofuels Initiative (UTBI) and their technology partner, Mascoma Corp., have selected the Niles Ferry Industrial Park in Vonore, Tennessee as the location for the state's first cellulosic ethanol plant. Vonore is located in Monroe County, southwest of Knox County and due west of the Great Smoky Mountains National Park.

The plant is expected to produce 5 million gallons per year of ethanol and utilize switchgrass and other biomass material grown within a roughly 50 miles radius of the facility. This plant will consume about 170 tons per day of raw material and is estimated to need on the order of 8,000 acres to grow the necessary feedstock. That is based on a growth efficiency of harvesting 8 tons of switchgrass per acre.

In addition to producing the ethanol, the facility will be used to refine technologies and concepts in working with the team partners to help make cellulosic ethanol

an economically viable industry for Tennessee and the United States.

The plant is scheduled to begin production in 2009.

The Niles Ferry Industrial Park offers great access to road, rail and river transportation, if needed. The project funding comes from several entities including primarily the State of Tennessee and Mascoma.

UTBI is a partnership of the University of Tennessee, the State of Tennessee, Oak Ridge National Laboratory and private industry partners, including Mascoma.

Mascoma was founded in 2006 specifically to commercialize cellulosic ethanol and has three other production facilities in the works of various sizes at different locations in the U.S.

For more information, visit the UTBI Website at www.utbioenergy.org or Mascoma at www.mascoma.com.



Join us on the Tennessee Alt Fuel Calls

As a part of the Southeast Alt Fuels Task Force (www.sealtfuels.org), Tennesseans from across the state participate in bi-monthly calls to discuss alt fuels actions and needs. One month the Task Force will hold a call of

the entire multi-state network (about six states), then each state holds its own call during the next month.

Contact Greg Riggs of TDEC (615-532-0567 or greg.riggs@state.tn.us) to get in on the calls.

Biodiesel Incentive Fund Kicks In

As of September 1, 2007, any Tennessee biodiesel producer that sells their biodiesel to a Tennessee fuel supplier/distributor now gets a \$0.20 per gallon credit. The state-based incentive funding was passed by the General Assembly during the last session, and the Department of Revenue will certify the transactions.

"Tennessee companies produced and sold approximately 2.7 million gallons of biodiesel fuel to Tennessee distributors in 2006," Department of Revenue Commissioner Reagan Farr said. "This incentive should result in

an estimated two million additional gallons of biodiesel fuel made available to Tennessee consumers."

Diane Mulloy, president of Milagro BioFuels of Memphis and one of the main producer advocates of this legislation said, "Producers play a key role in meeting the renewable fuels objective for Tennessee and we greatly appreciate this investment from the state. As market demand continues to grow, this incentive will allow companies to continue to supply biodiesel fuel to Tennesseans without interruption."

"This incentive is a positive and calculated step in the Governor's overall vision for biofuel production in Tennessee," Economic and Community Development Commissioner Matt Kisber said. "The biofuel industry is still very much in its infancy, and the state needs to provide the necessary resources to ensure the long-term vision of increasing consumption of alternative fuels is met. Incentivizing biodiesel production in this way will make it easier for manufacturers to provide the product to consumers, and it demonstrates the Governor's commitment to make biofuels available to Tennesseans."



Tennessee public biodiesel pumps in these cities (l-r): Maryville, Lebanon, Vonore and Athens.

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American Fuels Checklist:

1. Visit the www.biotenn.org Website to see all of the public E85 and B20 stations that are open statewide!
2. All three of Tennessee's Clean Cities coalitions need your help to continue their efforts.

Please consider becoming a supporter! See the [backpage](#) for info.



U. S. Department of Energy



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Large Diesel Consumer Switches to Biodiesel

Lehman-Roberts Company (LRC), an asphalt paving contractor, and sister company Memphis Stone and Gravel, a large mining company, have successfully migrated a large portion of their fleets to B20. Both companies have made a commitment to operate their Memphis metropolitan fleets on the environmentally friendly fuel. LRC operates nine asphalt plants and significant paving operations in the mid-south area, and along with its sister company consumes some 2.5 million gallons of diesel per year. They are a minority investor in Milagro Biofuels of Memphis.

In October '06, LRC began a B20 trial out of its Memphis fleet headquarters. Since then, they have successfully operated their Memphis on-road fleet on B20. Beginning in the spring of 2007, it began using B20 in one of the largest mines in the region located in Arlington. Today the use of B20 has extended to

three additional mines and includes three asphalt plants, all of which are in the Memphis metro area.

"We found that the biodiesel provided by Milagro performed exceptionally well. Through the winter we had no cold flow issues," stated David Griffith, LRC fleet manager. Additionally the companies have been able to reduce their carbon footprint on the Memphis community while improving the performance of their rolling stock. Griffith continues, "With the introduction of ULSD in Memphis we were concerned about the lack of lubricating agents for our equipment; biodiesel has brought that lubricity back to our fuel."

"The ability to burn high quality biodiesel in our fleet has allowed us to beat emissions standards and be better stewards," commented LRC President Rick Moore. "It's a win for us and Memphis."



The new B20 pump at The Riverside in Memphis. Notice the green hose!

The Riverside & Sommerville BP Now Offer B20

Recently renovated and now reopened, The Riverside, on the corner of Riverside and Carolina, is selling a B20 blend and some of the best burgers ever found in a gas station. The store hours vary, but the fuel is available via credit card 24/7. John Gary, owner/operator of The Riverside, has been an advocate of conservation and clean energy for some time. When he decided to get into the fuel business, getting biofuels into the mix was a high priority. "Biodiesel is a fuel that makes sense for this region and for this station. We're proud to be selling a locally produced fuel; it's just the right thing to do."

David Willoughby of the Somerville BP, located at 17170 highway 64E, has been in the fuel business for 18 years. Almost two years ago, David's company, Willoughby Oil, decided to start selling biodiesel blends

to its on- and off-road customers from its bulk plants in Somerville and Savannah, TN. "Moving this fuel into the retail setting was the logical next step..." says Willoughby. "Now with the availability of reliable sources of high quality biodiesel and the State's commitment to quality, getting this fuel out there is going to be much easier."

State commitment to biofuels is being made more visible as the dots on the "Green Island Corridor" pop up across the state. The Governor's Alternative Fuels Task Force working with TDOT have made possible a number of grants that are funding retail biofuel infrastructure projects all over the state. Both The Riverside and the Sommerville BP have received grant funding for their projects, and both stations have fuel available today.

THE UNIVERSITY OF MEMPHIS

Biofuels Innovation at the U of M

University of Memphis (UM) Mechanical engineering professors Dr. John Hochstein and Dr. Srikanth Gir have wanted to work with biofuels for almost two years. Thanks to a recent grant from the TDEC, UM will have the resources necessary to begin work on a project titled the Center for Biodiesel Production, Awareness and Testing (CBPAT). Studying the use of novel biodiesel feedstocks, looking for optimal process techniques and offering future engineers some hands on experience with biodiesel processing are just some of the CBPAT goals. UM will also have a new use for its used cooking oil, B20 for its diesel support vehicles and a mobile biodiesel processor that will be used as an educational tool for the region.

Dr. Gir and Dr. Hochstein, along with graduate and undergraduate engineering students, will be constructing a mobile Biodiesel Processing Unit (BPU), purchasing equipment to perform a battery of ASTM-D6751 tests on the fuel produced at the school as well as fuel produced elsewhere and educating students and others on the realities of Biodiesel production and use. Dr. Hochstein sees this project as

a strong asset to the biodiesel producing community in Tennessee. "The in-state resources for biodiesel producers in Tennessee are limited when it comes to testing biodiesel for quality, and very few have time or capital laying around for testing out new feedstocks... we hope to be a resource for any producer that is looking for help in either department."

Making the public more aware of biodiesel and what it means to our community is a major goal of this project as well. CBPAT will also be working with the Masters of Public Health program there. "This project has created a number of interesting partnerships", says Dr. Hochstein. "We are working with The Public Health students to help us get the word out on the health effects of biodiesel and students from the graphic design department to design vehicle graphics that will draw attention to a few campus diesel vehicles. We'll be taking the vehicles and mobile BPU unit to schools, community groups and environmental events like Earth Day."

This project is under way and is expected to be constructed, tested and making fuel by February '08.

Several of the students working on the biodiesel production model are shown with their prototype system.





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Governor Opens New Green Island

Governor Phil Bredesen was joined by Commissioners Ken Givens, Jim Fyke and Gerald Nicely for the grand opening of the new "Green Island" at the Daily's Shell station on South Hartman Drive in Lebanon. Governor Bredesen pumped both biodiesel and ethanol from the new pumps.

The "Green Island" concept is being duplicated across the state as part of a joint effort by the Governor's office and the departments of Environment and Conservation, Transportation, Economic and Community Development, General Services and Agriculture. "This makes economic and environmental sense" said Governor Bredesen to a group of reporters. "We help farmers, businessmen and consumers all at once."

BioTENN is a new initiative to increase visibility for biofuels in Tennessee. Grants are available to help

retail stations incorporate biofuels into their fuel offerings. The initial goal is to have biofuels available along Tennessee interstates.



Governor Bredesen speaks to reporters and biofuel supporters during the grand opening of a new "Green Island" in Lebanon.



Kyrgyzstan is cradled in central Asia by China to the southeast, Kazakhstan to the north and Uzbekistan and Tajikistan to the southwest.

Kyrgyzstan in Tennessee

Clean Cities played ambassador to a delegation from the country of Kyrgyzstan in August. The group included a member of parliament of the Kyrgyz Republic, businessmen and interpreters. The delegation came to Tennessee to learn about biofuels. Speaking through an interpreter, parliament member Taiyrbek Sarpashev explained that after a series of meetings in Washington DC they were told to visit Tennessee if they wanted to learn more about the biofuel industry. Apparently word is out that Tennessee is on the cutting edge of the industry.

The meeting was set in Memphis where I gave a brief presentation on various projects around the state and then answered questions on how ethanol

and biodiesel help the agricultural community and local economies. There were also questions about other feedstocks, like switchgrass and consumer waste materials.

"Kyrgyzstan imports most of its petroleum," explained Mr. Sarpashev. "In addition, about 60% of Kyrgyz citizens work in agriculture so this type of industry could be very beneficial." The interest in American technology is especially important since Kyrgyzstan does not have the financial resources to develop the same depth of technology on its own. With a big smile Mr. Sarpashev ended the meeting by saying "We are grateful for people like you who can help bring us a better future."

IMI Pours It On with Biodiesel

Irving Materials, Inc. of Tennessee (IMI), a concrete, aggregate and related materials supply company located in Nashville, started learning about biodiesel several years ago. Working with Tri-Star Energy (TSE), they started using B20 in 2006 at several concrete plants where they have refueling for their diesel vehicles.

In worrying about potential cold weather problems, they stopped using biodiesel for some of the

winter months, but started back in spring 2007. They have not noticed any problems so far in their use of biodiesel.

Out of a fleet of roughly 225 diesels, about 180 are now using B20. They now use it wherever TSE can supply it or where they can get it at stations.

They plan to continue watching and learning, but if their success continues, don't be surprised to see all of their vehicles in their four-state region using B20!

Car Show Mania

The Ethanol Tahoe made a trip to Union City, Tennessee for the annual Car Show held at the Goodyear plant on Labor Day. Over 200 entries and around 3,000 people helped make the day a big success. The Tahoe had a front row seat amongst the sparkling array of classic cars, trucks, roadsters, racing machines and motorcycles.

Just down the road a new ethanol plant is under construction. Having the Tahoe on display prompted a number of questions about ethanol and the future of

our nation's reliance on petroleum. In an all-American town like Union City, "Made in America" really hits home. Watching parents and grandparents walk amongst the vehicles, hotdogs in hand and children in tow, a deeper understanding of local economics was inevitable. The massive Goodyear plant in the background was a constant reminder of how important manufacturing has been to communities across the country. In fact, from the line of Corvettes to the sexy Mustangs to the glittering row of Harley Davidson's, the day was cause for celebration of our achievements as a nation.





Tennessee's Focus on Biofuels Quality

Contributed by Randy Jennings of the Dept. of Agriculture.

The Tennessee Department of Agriculture has been responsible for monitoring fuel quality throughout the state since passage of the Kerosene and Motor Fuels Quality Inspection Act of 1989. This legislation directed the department to promulgate rules and establish a testing program to ensure that all heating oils and engine fuels sold within the state will meet ASTM International standards.

With the market changes that are taking place today as a result of the increased presence of biofuels, the department is demonstrating our commitment to ensuring product quality as we have dedicated additional resources that allow us to routinely sample biodiesel blend stock, biodiesel blends, and ethanol fuels (including E85) while continuing our routine surveillance of conventional fuels. If either the blend

stock (pure biofuel) or the blended fuel fails to pass the inspections, the department takes appropriate enforcement actions, which can include stop sales and civil fines.

The Department of Agriculture's dedication to the success of biofuels is exemplified by the fact that Agriculture Commissioner Ken Givens was instrumental in the formation of the Governor's Alternative Fuels Working Group (which is responsible for developing a strategic biofuels plan for Tennessee). Since the inception of this group, ensuring biofuel quality was identified as one of the essential components of a successful plan. We are committed to working with biofuel producers and marketers in a proactive manner to ensure that the ultimate consumer will indeed have a positive driving experience when utilizing biofuels purchased from Tennessee retailers.



The Department of Agriculture's Administrative Director of Regulatory Services, Randy Jennings, stands with a fresh sample of B20. The sample will be checked to ensure it meets the ASTM guidelines for quality fuel.

Alternative Fuels Strategic Plan in Draft Form

Contributed by Ryan Gooch of the Dept. of Economic and Community Development, Energy Division.

Thanks to a team of staff from various state departments, and to comments from over 100 folks from across the state who were asked to provide input, a strategic plan is unfolding for how to advance the use of alternative fuels in Tennessee.

In 2006, Governor Bredesen issued an executive order creating the Alternative Fuels Working Group and calling for the creation of an alternative fuels strategic plan that would make Tennessee a leader in the southeast in the production, distribution and use of biofuels. A two-day task force meeting was convened this last July where people involved with alternative fuels from across the entire state were asked to attend and provide input. The first day was mostly presenta-

tions; the second day was largely used to split the attendees up into groups and give them time to more deeply discuss specific parts of what were deemed major areas of interest. Each group provided recommendations for goals and priorities to be included in the strategic plan.

The resulting plan, written by a working group comprised of representative from the Departments of Agriculture, Economic and Community Development, Environment and Conservation and Transportation is nearing completion. The plan articulates achievable goals and strategies that will advance biofuels throughout Tennessee. Look for the plan to be formalized and presented to the public during the fall. More information regarding these efforts can be found by visiting www.biotenn.org.

BioEnergy Science Center Focus

From Mark Downing of ORNL and a BESC release.

The challenge of converting cellulosic biomass to sugars is the dominant obstacle to cost-effective production of biofuels in sustained quantities capable of impacting U.S. consumption of fossil transportation fuels. The BioEnergy Science Center (BESC) research program will address this challenge with an unprecedented interdisciplinary effort focused on overcoming the recalcitrance of biomass. By combining engineered plant cell walls to reduce recalcitrance with new biocatalysts to improve deconstruction, BESC within five years will revolutionize the processing of biomass. These breakthroughs will be achieved with a systems biology approach and new high-throughput analytical and computational technologies to achieve 1) targeted modification of plant cell walls to reduce their recalcitrance (using switchgrass and poplar as high-impact bioenergy feedstocks), thereby decreasing or eliminating the need for costly chemical pretreatment; and 2)

consolidated bioprocessing, which involves the use of a single microorganism or microbial consortium to overcome biomass recalcitrance through single-step conversion of biomass to biofuels.

Within five years the Center will remove biomass recalcitrance as a barrier to cost-effective biofuels production by achieving a minimum two-fold reduction in the projected cost of processing for conversion of biomass to ethanol. Through this effort we will greatly enhance our understanding of cell wall structure during synthesis and conversion. The data generated will be made available through a Web portal in order to support and catalyze the bioenergy research community. The benefits of the basic research will extend beyond the five-year program by laying the foundation for developing other biomass sources and fuel products, improving productivity of switchgrass and poplar, and ensuring sustainability of lignocellulosic biofuel production.



Funded by the DOE Office of Science. Please read more about the BESC core team, operational timeline, funding, location, facilities and expertise by visiting www.BioEnergyCenter.org.



New Biofuel Fleets in East Tennessee

There are several fleets in East Tennessee that have recently moved or are moving to using biofuels.
 >> Biodiesel

City of Kingsport: Started filling their main 10,000 gallon underground tank with B5 in early July. 230 pieces of equipment now run on biodiesel.

Nuclear Fuel Services: They purchased a new tank to get started on B5 with six pieces of equipment but expect to transition to B20 soon. They expect to move their main tank to a biodiesel blend later on.

City of Pigeon Forge: They received a grant from the state energy office and have cleaned their 10,000 gallon tank in preparation for getting B5 started. They expect to start B5 in October and segue over time up to a B20 blend.

Cascade Outdoors: Moved their diesel tank to B5 in late spring this year and are now running on B20.
 >> E85

Electric Power Board of Chattanooga: Completed placing an onsite tank for E85 in July and started using the fuel in their vehicles in August.

City of Chattanooga: Has received funding to install two E85 pumps that will service 150 FFVs that are already in the fleet. They will start fueling early next year; and there's a chance that other local fleets like TVA, the state and county may refuel there, too.

ETSU: They also received funding through the Innovations grant process and are completing the installation of their E85 tank and pump and expect to start using the fuel in October.

East Tennessee - Jonathan Overly

"The O-Zone"



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"1st Graders for Clean Fuels" Worthy of a Show

With a little help from a first grader's mother, the ETCFC started the "1st Graders for Clean Fuels" program earlier this year, and it ended in an art show.

80 students at Eagleton Elementary in Maryville received our first 1st graders presentation in January this year. The classroom show and tell is expressly designed to appeal to early learners and incorporates all of the five senses. They learn about fuels and biofuels and then are asked to draw what they think about when they consider clean air and clean fuels. Four standout drawing from Eagleton were chosen and relationships with Blount County biodiesel users were expanded to incorporate their artwork into a travelling show. Their drawings were put into imagery that will be on the side of City of Alcoa and Blount County Highway Department vehicles for 12 months.

The program has since continued at other schools in Knox County and we expect to work with another ~10 schools over the '07-'08 school year. The funding for the program came through a grant from Alcoa, Inc. that helped the ETCFC take alt fuels education to over 500 students in Blount County.



(left, l-r) Kendall Wallace and her mother Katie stand with her magnet; Casey Sink proudly displays what his magnet looks like. (above) Hope Dixon steps to the podium to tell Blount Countians to do their part to improve air quality.

Whedbee's GE Elec-Trak Fleet Grows to 11

In 1970, General Electric introduced a fully electric, riding lawn mower, which was built until 1975. 37 years later they are still going strong, and are a cherished prize by a lucky few, including Knoxville's own Mike Whedbee. Whedbee's were all found used, but several members of his Elec-Trak.com group bought theirs new in the 70s and are still using them. The photo at left below is the first E-15 to roll off the line in Schenectady, NY 1970.

All except two of his use six golf cart batteries and will mow about two acres on a charge. Each blade has its own motor, and—as it is with all electric vehicles—the torque of a DC motor begins maximum at 0 rpm. Heavy, wet grass? No problem. With sharp blades it just slices through everything. The two smaller models that use three batteries will do about an acre. They were less expensive and made for smaller lawns. Only one of the machines is a "parts" machine; the rest are more or less complete and will

be restored or used eventually as working machines.

And Whedbee doesn't stop there. "The charging panels I use are from BP Solar. Six panels wired through a controller will charge a tractor in a few days. In addition to the Elec-Traks we are also using electric trimming mowers and weed eaters." 100% renewable energy-based lawn care!

(l-r) A shot of the first Elec-Trak to roll off the assembly line in 1970, and a picture of Whedbee on one of his 1972 E15s. For more info, visit their club Website at www.Elec-Trak.com.



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Just visit www.biotenn.org to get the latest on alt fuels' action in Tennessee.

Support alternative fuels... and your state's Clean Cities coalitions!

The state of Tennessee's Clean Cities coalitions serve an important role: local champions for change. All three coalitions serve their respective areas with assistance in helping fleets move to using alternative fuels. See any of our Websites to find out how you can become a member and get involved at the local level to help bring about change in your community!



www.WTCCC.com



www.TennesseeCleanFuels.org



www.ETCleanFuels.org

Major Partners in Tennessee's Clean Cities Coalitions

Tennessee Department of Economic and Community Development, Energy Division
The Governor's Interagency Alternative Fuels Working Group

Memphis Biofuels
Memphis Light, Gas, & Water

Valero Energy Corporation
MATA Transit
Milagro Biofuels
Tennessee Soybean Promotion Board
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