

TENNESSEE

Clean Fuels Advisor



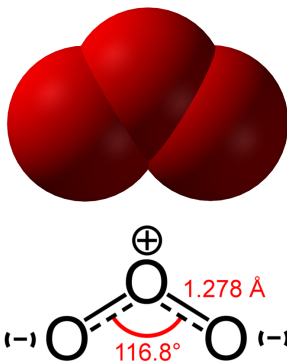
A quarterly publication from the partnership between the Clean Cities coalitions in Tennessee and the state of Tennessee.

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

New Ozone Standard to be Challenging

Contributed by Quincy Styke of the TN Dept. of Environment and Conservation, Division of Air Pollution Control.

In mid-March, the EPA approved a new 8-hour ozone standard that is more stringent than the current standard. The old standard was 84 ppb (parts-per-billion), while the newly minted standard has been reduced to 75 ppb. Although federal designations of attainment or nonattainment areas will be based on future air



quality measurements, the current air quality measurements suggest that many counties of Tennessee and the nation will be designated nonattainment under the terms of the more restrictive standard.

Another factor that may increase the number of Tennessee counties in nonattainment of this

Two views of ozone (O₃), a triatomic molecule consisting of three oxygen atoms. It is much less stable than diatomic O₂. Ground-level ozone is an air pollutant with harmful effects on the respiratory system. It is named after the Greek word for smell (ozein), from the odor in lightning storms.

new standard is the increase in the number of counties in metropolitan statistical areas (MSAs). The MSA usually forms the starting point for EPA to draw nonattainment boundaries when one or more counties in that area measure nonattainment. States must prove to EPA's satisfaction that all counties in an MSA should not be listed as nonattainment.

National Ambient Air Quality Standards are reviewed on a five-year cycle to determine whether they are sufficiently protective of public health and welfare. A congressionally chartered advisory body of scientists known as the Clean Air Scientific Advisory Committee (CASAC) provides recommendations to the EPA Administrator as to what should be done.

CASAC recommended that the old primary ozone standard should be made more stringent to protect public health. CASAC also recommended a separate secondary ozone standard to protect public welfare (crops and forests) that would be different from the primary standard.

TDEC's Air Pollution Control Division is monitoring the proposal and will work with impacted counties to ensure that attainment designations for the final standard are properly applied.

To learn more about the new standard, visit: <http://epa.gov/air/ozonepollution/naaqsv2007.html>.

Nu-Energie - Open for Business

Roughly one and half years ago, Brian Hullette of Surgoinville decided that the biofuels field was just too exciting and attractive not to get into. After talking his accountant and friend Joel Day into the idea, they collectively developed Nu-Energie, LLC, which has gone from abstract concept to fully operational biodiesel manufacturing plant in that time frame. Today, they are open for business.

"It is a little amazing to watch the changes that have gone on in the industry and see our plant come to fruition," says Hullette. "Clearly raw material pricing is driving the market in new directions, but we are ready to process all different kinds of feedstocks, and built our plant on the idea that that would be necessary. We are very excited to be making biodiesel for the Tri-Cities regional community."

The first production line has been built in a facility Hullette already owned and can produce up to 5 million gallons per year (MGY). There is room for two other production lines in this plant which would bring the facil-

ity's capacity up to 15 MGY.

Day says, "We have our own in-house testing equipment which will help us ensure product quality before it gets tested by other outside certifying laboratories."

They started producing and testing product in mid-February, have processed soybean oil, and expect to have run several different types of non-virgin oil raw materials through their plant by the end of March. Additionally, they are speaking with a number of regional fuel suppliers about developing supply arrangements.

To learn more about Nu-Energie or their weekly tours, visit their Website at <http://www.nu-energie.com/>.



The tank farm at Nu-Energie that holds the raw materials including methanol and the finished product, B100. Truck loading will be just to the right of this picture, and rail access will be just across the street to the left with piping running both raw materials and final product to and from the tanker cars.

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THE EAST TENNESSEE CLEAN FUELS COALITION HOLDS MONTHLY MEETINGS IN KNOXVILLE AND BI-MONTHLY MEETINGS IN JOHNSON CITY AND CHATTANOOGA. THE WEST TENNESSEE CLEAN CITIES COALITION HOLDS BI-MONTHLY MEETINGS IN MEMPHIS. COME JOIN US AT ONE OF OUR MEETINGS AND GET PLUGGED-IN TO LOCAL ACTION!



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The Economics and Sustainability of Biofuels

Recently there has been a lot of criticism of first generation biofuels by national media such as *The New York Times* that calls into question the sustainability of biofuels such as ethanol and biodiesel. What was not pointed out by the media was that the biofuels industry is in its infancy and is only going to improve. There was \$5 billion worth of venture capital investment in Europe and the United States last year in this sector, and numerous technological advancements. This investment and science will make biofuel crops and processes dramatically more efficient and therefore much more sustainable.

The media's misunderstanding of the tremendous technology improvements over the next decade is similar to issues being faced in other parts of the renewable industry such as solar and wind. What is needed is fundamental change in the overall transpor-

tation and energy system which means efficiency, new building and manufacturing practices, improvements in agricultural production, and entirely new sustainable products such as biofuels and bioplastics.

This revolution toward a more sustainable context for biofuels is something that West Tennessee Clean Cities Coalition (WTCCC) is pushing very aggressively. By partnering with local stakeholders, business organizations, and green businesses, WTCCC is helping to change the local business model to promote new generation alternatives to change the way business is done in the region.

WTCCC has posted links to several reports and websites that provide more information about sustainable technology, green products, and the role of biofuels. Read more by visiting our Website at <http://www.wtccc.com/>.

Partnering with Rhodes College

Rhodes freshmen Josh Anderson, Robert Burrow, and Stephen Powell are working with the WTCCC for ten weeks. This program—part of the service learning component for an Environmental Persuasions class—allows these students to interact with the community and get firsthand experience in the environmental field.

Rhodes College Professor Dr. Susan Crisafulli, stated that this program is a great combination of “meaningful hands-on work in the community and classroom learning.” They will be conducting research on environmentally friendly alternatives, surveying local businesses, and interacting with the U.S. Department of Energy.

“We are fortunate to have the opportunity to work with the WTCCC” said Burrow. “Being able to interact in a field that we are learning about everyday will hopefully give us a better perspective of the issues facing our community, country, and planet.”

We are happy to be working with younger people in the community and are always looking for opportunities to get involved with local schools and

universities. “Josh, Robert, and Stephen have already proven to be very helpful and will hopefully continue to help us make a difference in the community” said coalition Executive Director Andrew Couch. “Working with younger people is an important part of our coalition’s work. If our interaction can lay the foundation for greater environmental proactivity in West Tennessee, then we are making a difference.”



(l-r) New WTCCC representatives Robert Burrow, Josh Anderson, Tim Schnippert, and Stephen Powell discuss and contemplate their new roles helping the coalition strengthen its impact in West Tennessee.

More New Faces at the WTCCC

I've been working on a number of community outreach and development projects recently that will require more time, expertise, and effort than one person can handle. With these projects in mind, I began looking around for qualified help. Fortunately, qualified help was not hard to find.

Tim Schnippert, a Memphis resident and our new community outreach manager, came to us via Latin America (Panama), where he was running a nonprofit organization called Alacridad. While in Panama, Tim developed an English language and technology training curriculum for the Panamanian Ministry of Tourism.

Tim's experience in Latin America qualifies him to effectively tackle just about any community development project imaginable; his experience in engineering will help him to understand and be effective in the complex and ever-changing world of renewable energy, energy efficiency, and energy education.

Tim is looking forward to working with the WTCCC partners and stakeholders. If you have a community development project that involves energy education, “green” development, or anything fuel related, feel free to contact him by email tim@wtccc.com, or by phone 901-448-1974.



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Edwards Oil Adds Biofuel Pumps

Edwards Oil Company, which operates 40 convenient stores in middle Tennessee, opened three biofuel refueling points in March: two E85 pumps and one B20 pump. They applied for and received public biofuel refueling infrastructure grant funding from the Tennessee Department of Transportation (TDOT) to install these pumps.

Owner Jonathan Edwards looked at market trends and industry longevity when deciding to add biofuels to their product line. "Edwards Oil has been in business 61 years. We understand biofuels need to be a part of our future." Edwards has plans to continue expanding access to biofuels for their customers as markets dictate and as the right

opportunities arise.

The two locations are both under their brand, Quik Mart, and are at the following sites: Columbia (1102 Nashville Highway) and Lewisburg (800 North Ellington Parkway). The Lewisburg station now has an E85 pump, while the Columbia station now has both E85 and B20 for public sale.



When you visit the new sites make sure your car is E85 compatible--in other words a flex-fuel vehicle (FFV). Your owners manual or gas cap will say E85 if it is compatible. Any diesel vehicle can use B20, a 20 percent blend of biodiesel in 80 percent petroleum diesel.

Stakeholder Focus: Hollingsworth Oil

Glen Craig of Hollingsworth Oil showed up at the very first Clean Cities of Middle Tennessee (CCMT) meeting back in 2001. He smiled politely and listened as the other 18 attendees discussed the prospects of bringing alternative fuels into the state. Toward the end of the meeting Glen broke his silence and said "I think it's a good idea and I think Hollingsworth can help." And help they did. Hollingsworth was the first dues paying member of CCMT and has been a steady supporter ever since.

In 2003 Hollingsworth installed the first public E85 station in the state using a CCMT grant from the U.S. Department of Energy. The station, located on Main Street in East Nashville, still fills flex-fuel vehicles

with E85 and now also offers B20.

Hollingsworth Oil has played a key role in helping CCMT understand both the petroleum industry and the emerging biofuel industry. The coalition often calls on Glen Craig and Hollingsworth to shed light on industry trends, history and logistics of moving fuel around the state and region.



Glen Craig of Hollingsworth Oil.

Pure Green Power

Contributed by Rodney Boyd of McMinnville Electric System.

Petro-diesel-fueled standby generators are a mainstay of back-up and standby power for public and private buildings around America. Unfortunately, these

generators—however essential—are known to emit harmful air pollutants like NOx, sulfur and carbon monoxide. It makes sense, then, that biodiesel could be an acceptable alternative for those who maintain and rely on stationary power generation.

McMinnville Electric has been testing B100 in a 2 megawatt power

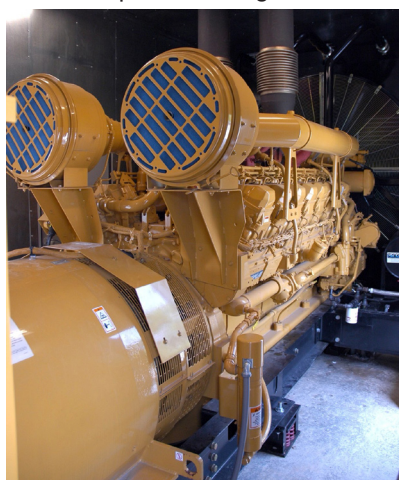
generator to produce clean electricity. The objective of the project is as simple as it is green – to generate power, and for that generation to occur as cleanly and efficiently as possible using biodiesel. So far, the company has logged over 1,000 testing hours on its biodiesel-powered generator.

Not only is biodiesel a cleaner-burning fuel straight out of the pump, McMinnville Electric System went a step further and partnered with EmeraChem, a firm based in Knoxville, to design and construct a catalytic system to further reduce harmful pollutants—especially NOx—emitted in the exhaust from the diesel generator. Stowers Caterpillar of Knoxville assisted with engine analysis and conducted a thorough evaluation of the engine at the end of the project.

Like many experiments, the McMinnville biodiesel project has required a certain amount of trial and error, but in the end, achieved NOx reduction percentages that were astounding: 96.6%.

You can view the final report at www.mesystem.net; click on "DOE Final Grant Report."

The 3516B Caterpillar generator that successfully produced 1,629,024 kWhs of electricity using soybean-based biodiesel, most of which was at the B99.9 blend level. In the process it used 126,126 gallons of biodiesel, which equates to 84,080 bushels of soybeans. Although they did have to tweak the throttling to get maximum power out of the unit (due to the energy difference between diesel and B100), they recognized an 85 percent reduction in the amount of oil that was needed to run the generator during the testing period.





The Renewable Fuel Standard

The Renewable Fuel Standard (RFS) got its start under the Energy Policy Act of 2005, but has been changed and upped in the recently signed Energy Independence and Security Act (EISA; Dec. '07) to demand that more alternative fuels come online faster to help us (the United States) begin to wean ourselves off of oil, especially that which is foreign-sourced.

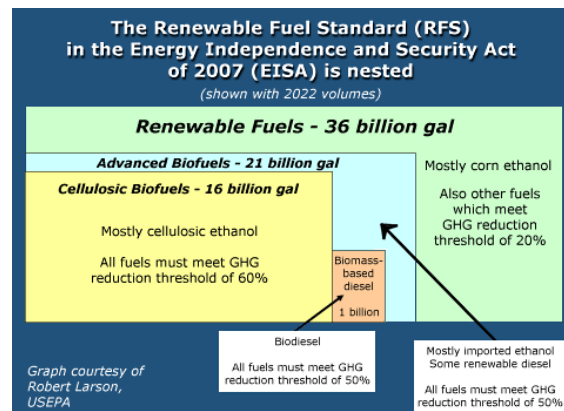
Part of what the EISA did was to increase what must be put into the fuel system in 2008 from 4.66 to 7.76 percent. In October, the U.S. Energy Information Administration projected that we will use roughly 145 billion gallons of gasoline in 2008. This means that--using the EPA's formula--we will need to use roughly 9 billion gallons of renewable fuels in the U.S. in 2008. But what happens in 2008 is not the key part of this legislation to understand. Make sure you've got a clear picture of what the goal is: 36 billion gallons of renewable fuel in the system by 2022, or four times the 2008 mark.

The image at right is provided to help graphically show or clarify what percentages of the goal

are to be fulfilled by what fuels, or essentially resources, and the associated greenhouse gas reduction thresholds. A little less than half is expected to be sourced from corn-based ethanol and the same for cellulosic ethanol, ramping its contribution up to 16 billion gallons. This is substantial as it will help force us to learn how to effectively make cellulosic fuels work.

Also important is how this works. "Obligated parties," which are defined as "any party that produces gasoline for use in the U.S., including refiners, importers, and blenders," are those who have the ultimate responsibility to meet the requirements, not just any fuel supplier.

To learn more about the RFS, visit the EPA's Website at <http://www.epa.gov/oms/renewablefuels/>.



Best Practices for Blending Ethanol

Contributed by Randy Jennings of the Dept. of Agriculture.

One of the more important controls for anyone interested in using or marketing gasoline-ethanol blends is a best practices approach to blending the two accurately and into a homogeneous solution. There are a couple of ways that this can be achieved: 1) purchasing the material from a wholesale loading rack with computer blending capabilities, or 2) splash blending into the tanker truck.

The ideal method is purchasing through a blending system at the rack. The computer will guarantee a controlled blend ratio and load the fuels simultaneously which results in a true solution. The automation also speeds up the loading process, eliminates some

safety concerns, and provides one PTD (product transfer document) at the end of the load.

The next best approach is splash blending into a tanker compartment. Safety precautions and guidelines at most terminals will prohibit loading ethanol prior to the gasoline. Gasoline must be loaded first to ensure that the vapors in the compartment are above the upper flammable limit. Therefore, the blender must depend more heavily on product agitation during both the delivery drive and the final drop into the UST to achieve the desired solution.

One final note: blending directly into the UST is NOT a recommended practice and will be much less likely to result in a good solution throughout the tank.

Agents for Change: Atha and Bart Comiskey

Atha and Bart Comiskey own C & E Biodiesel and have been making their own biodiesel for the past five years. Using established ingredients (waste vegetable oil, lye, methanol, electricity and tap water) and their own resourcefulness—including about an hour of hands-on time—provides them with the fuel they use in both of their vehicles, for about 70¢ a gallon, excluding labor.

The Comiskey's became FuelMeister dealers a couple of years ago and conduct hands-on workshops every Saturday to show users how to make quality biodiesel. These workshops are open to the public. They strive for their students to not only understand how biodiesel is made, but that biodiesel made for personal use can be of very high quality, if attention to detail is included.

"When we first started 5 years ago, our friends thought we were crazy to make our own fuel," says

Atha. "As it turns out, some of them have bought diesel cars, just so they can use some of our biodiesel!"

They believe our future fuel consumption should be based more on American ingenuity and less on foreign oil. Atha continues, "With biodiesel, ethanol and other more-sustainable alternatives out there, we can be excited about what our future holds."

To contact the Comiskey's, or to learn about their workshops, call or email them at 615-884-4908 or c_ebiodiesel@comcast.net.



Scenes from one of the Comiskey's workshops. Attendees listen to instruction first, and then are shown in a hands-on way how to properly make biodiesel on a small scale.



E85 #3 - Piney Flats

Thanks to Appalachian Oil Company (Appco) and some funding from the State of Tennessee, East Tennessee's third E85 pump is now open.

Piney Flats is roughly a halfway point in traveling between Johnson City and Bristol on Highway 11E and is a fairly busy corridor. Appco selected the location for that exact reason. "In looking at area stations where we it would be easier for us to start placing biofuel pumps, Piney Flats was a good location and wouldn't cost a bundle to switch," says Appco's VP of Plant Operations Randall Tankersley. "Keep your eyes open because this is just the first of several E85 and

B20 pumps that we are working on right now."

Although there have been several pumps in the Tri-Cities area, the two best known B20s have now closed. Thanks to Appco, we will hopefully be headed back in the right direction with the opening of biofuel pumps. Current happenings point to Tri-Cities becoming the brightest biofuels spot in East Tennessee.



East Tennessee - Jonathan Overly
The "O-Zone"



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Fast Start for Green Car & Courier

Chris King first got the idea of a green-fueled, courier business while he was touring for the Jones Soda Company, refueling the tour bus with biodiesel whenever he could find it. With a passion for alternative fuels, King saw that it was time to test out his idea last August. "I started putting out some feelers and got generally positive feedback," says King.

That early work has blossomed into what is now called "Green Car & Courier," which serves the greater Knoxville area and beyond with passenger and package transportation services. All his vehicles currently operate on E85, most of which are vehicles he has converted to run on the biofuel. "I'm quickly learning which conversion kits work better than others. I take care of all the conversions and then get the vehicles emissions tested in Atlanta," he notes.

His fleet started out with a Yaris, but has quickly segued to larger vehicles as his demand has moved

to the need to haul more people and nicer clients. King says, "We've just brought the Scripps Network on-board as a client and they are super-excited. It's mostly for shuffling executives around town or to the airport or moving some of their TV show materials." He now has a couple of Lincoln Town Cars and a Ford Expedition, but he has four hybrid Escapes and a diesel Excursion ordered. "I've already got some leads on filtered WVO (waste vegetable oil) and expect to burn a lot of biodiesel."

King says, "There's so much education needed on how you don't have to sacrifice much to go green... just your misconceptions. It can be more cost effective. People just have to quit being afraid of the word "green" and figure out how they can easily become more environmentally conscience. I'm looking forward to filling up with cellulosic ethanol next year!"

Learn more at www.knoxvillegreencar.com.



The ET Clean Fuel Blitz



Retro Mow / METI
Electricity

Electric tractors, new and old, for purchase and share? It's not a dream. In and around Knoxville, Retro Mow is starting a coop to put these vehicles in use, and our own Mike Whedbee is part of the team to build new tractors. Read more at retromow.org or modernelectrictractors.com.



City of Pigeon Forge
Biodiesel

C. W. Beal got things kicked off for Pigeon Forge last year, applying for state funding to get their diesel tank cleaned. They transitioned to B5 in October, and up to B10 in December. Now Sevier County has more cities on biodiesel in-county than any other in the state - three.



Blalock Companies
Biodiesel

With the leadership of Doug and Dan Blalock, their company has moved from 8 diesel dump trucks running B2 in February '07 to 28 in Feb. '08. "We've trying to walk before we run, but we've had no issues thus far," says Doug. They are communicating their proactivity through stickers.



McMinn County Schools
Biodiesel

Trans. Supervisor Russ Barnett helped them garner \$12,000 in state funds to place a new 10,000 gallon tank at McMinn H.S.; they started B5 in March. They are the fourth area school system to start using biodiesel (after Carter and Hamilton Counties and Johnson City).

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What do you want to read about in future editions of the *Tennessee Clean Fuels Advisor*?

We want your opinions and feedback! We work to place information and stories in this newsletter that we think would be interesting to you, but we need more input. We would appreciate any comments you'd like to make, including suggestions for topics in future articles as well as any general feedback—pro or con—about this newsletter, so fire away to editor Jonathan Overly at jgoverly@utk.edu. This is your newsletter... please help us make it the best it can be!

Get involved!

All of the partners that are helping to make changes in how transportation fuels are used in Tennessee need your help! The more partners, the more change. Consider getting involved, and one way to get started is to pulg-in to one of the state's Clean Cities coalitions. Meetings, workshops, or just calling; all are options for your first step to action! We want to hear from you.



www.WTCCC.com



www.ETCleanFuels.org



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