EPP Rapid Research

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EPP Rapid Research
Biodiesel Powered Landscaping Equipment
January 2, 2007

Request:

(City of Seattle, Jason Edens) Explore feasibility of replacing the traditional gas / diesel fuel that powers landscaping equipment (lawnmowers, blowers, trimmers as well as generators) with biofuel or other alternative power (electrical or rechargeable battery). There has to some type of cost parity as well as ergonomic consideration (ie, battery operated equipment is often heavier).

Key Findings:

Bio based fuel, lubricants and additives are available, tested and work well in landscaping equipment. As long as the fuel is ASTM Certified, it shouldn't invalidate equipment warrantees.

Bio diesel, lubricant and additive providers:

Associated Petroleum,
Provides biodiesel to King County Metro Transit.
P.O. Box 1397 - 2320 Milwaukee Way
Tacoma, WA 98401-1397
Phone: 1-800-929-5243 or 253-627-6179
Fax: 253-627-3637
http://www.associatedpetroleum.com/Biodiesel.htm

Renewable Lubricants, Hartville, OH
Manufactures and distributes a wide range of bio-based lubricants, additives and cycle 2 fuel oil. City of Seattle ordered two drums of chainsaw oil from Renewable in November 2006 for use in SDOT and Urban Forestry. Shipping costs can be minimized by ordered in pallet quantities. Government discount available.
http://www.renewablelube.com/index.htm

World Energy Alternatives
Provides biodiesel and lubricants to the Mt. Rainier Park
Western Region
Graham Noyes, Vice President of Business Development
Ph: 888-785-8373
info@worldenergy.net
408 Broad St., #11B
Nevada City, CA 95959
http://www.worldenergy.net/

Chris V. Case
Facility Manager
Pictured Rocks National Lakeshore
(906) 387-2607, ext. 209
chris_case@nps.gov

Pictured Rocks National Park has been using environmentally friendly products for at least 15 years. This activity increased substantially in 1999 when they signed the agreement between the US Department of Energy and Department of the Interior establishing the Green Energy Parks Program.

Pictured Rocks and Chris Case have led other parks in an aggressive adoption of primarily soy-based biofuels, oils and additives for the equipment listed in the following table[1]. The soy 2-cycle oil powers equipment such as blowers as trimmers.

• 10 Ton dump truck	Soy Hydraulic & Biodiesel
• 5 Ton dump truck	Soy Hydraulic & Biodiesel
• Two backhoe loaders	Soy Hydraulic, Soy Transmission & Biodiesel
• Crawler dozer	Soy Hydraulic, Soy Transmission & Biodiesel
• Grader	Soy Hydraulic, Soy Transmission & Biodiesel
• Utility tractors	Soy Hydraulic, Soy Transmission & Biodiesel
• Tractor mowers	Soy Hydraulic, Soy Transmission
• Snowmachines	Soy 2-cycle Oil
• Outboard Motorboat	Soy 2-cycle Oil
• Gas Engine vehicles	Soy Crankcase Oil
• Grounds Equipment	Soy 2-Cycle Oil
• Diesel Truck	Soy Bioengine Oil & Biodiesel

Non-vehicle products including:

• Soy Parts Cleaner	• Soy Handcleaner
• Soy Penetrating Oil	• Cleaning products

What was the budgetary impact of the biofuels and do they have experience running generators on these fuels?

"Regarding cost of the Bio conversion; fluids like hydraulic and trans-hydraulic are about twice as costly as petroleum, however many of the more commonly used items like 2-cycle, bar and chain, parts cleaner, and lubricants are nearly the same as their petroleum counterparts. Renewable Lubes has a government discount-pricing sheet available if you give them a call. Our fleet of 30 vehicles, 6 pieces of heavy equipment and 35 small engine pieces cost about 10K to switch over during a period of about a year. If fluids were not changed over in the individual piece until the

[1] A Profile in Biobased Success, United Soybean Board

recommended service interval, the cost would be somewhat less than making the change over all at once. Because our fleet is relatively small and we were working from a grant to make the switch, we changed many of the fluids before their replacement cycle was reached.

Generators present some interesting issues, both for bio and petroleum products. If the generator is in constant use switching to bio-diesel doesn't present any problems different than pet-diesel. However if the unit is a "stand-by" power source, storage of fuel does present some challenges for both bio and pet diesel. Stuff starts growing in stored fuels, moisture can be absorbed, as well as the quality of the fuel begins to deteriorate, which are the things that folks worry about. Additives are available to counteract the problem, and honestly, I 'm not really familiar with the details very much other than I know it is of concern. You would need to talk to folks more knowledgeable than I.

Hope you are having a nice holiday season, and please let me know if I can be of further assistance.
Chris

Dean DeSantis
DeSantis Landscapes
7907 State St.
Salem, Oregon 97301
503-364-8376
800-644-7345

Have used B20 on all trucks and diesel landscaping equipment for the past two years, including GMC, Toro, Takeuchi, Case, Walkers, XMarks.

Jim Evanoff
Environmental Manager
Yellowstone National Park
307-344-2311

“I can provide information/contacts on the success of biodiesel in these types of applications. Yellowstone has worked extensively with the University of Idaho in demonstrating various types of lawn equipment (especially leaf blowers operating on pure canola oil).....I'm sure Chris Case can also help....
Please call after the holidays.....thanks!”
Jim

Mary Ann Lobdell
Inventory & Fleet Manager
Port of Seattle
206.728.3619

Lobdell.M@portseattle.org

“The Port's Seaport division has been using biodiesel since February of this year. We started with B5, then B10, B20 and went to B99 in June. We've reduced to B50 for the winter months since anti-gelling additives don't mix with biodiesel. We have had no problems to date. The equipment ranges from a 1961 lift truck to 2007 John Deere mower.

My recommendations before implementation would be:
* Clean the storage tanks
* Upgrade the dispensing filters
* Have replacement fuel filters on hand for all diesel equipment
* Know your manufacturer and distributor; gain the confidence they are meeting the latest standards for producing and storing biodiesel. If you have any further questions, please feel free to contact me”.

Joel Rodriquez
Mount Rainier National Park
360-569-2211 x3330

They have been using biodiesel in all of their diesel equipment for 4-5 years. They did use B50 in their generator, but had a problem with the filters clogging that they thought was due to the cold. They also use bio hydraulic fluid. Their main distributor is Terresolve Technologies, from Ohio with a distributor in Tacoma. (Barbara at 440-951-8633). They also purchase from a distributor of World Energy Alternatives, Associated Petroleum in Tacoma (home office 617-889-7300).

Jason Giles
Rexius Sustainable Solutions
http://www.rexius.com/

Jason Giles reports that their landscaping business has 250-350 pieces of rolling stock all run biodiesel at blends between 20% and 50%. Equipment includes tractors, loaders, grinders, trucks, mowers and trenchers made by manufacturers such as Bobcat, John Deere, Peterson, Caterpillar, Ditchwitch, GMC and Ford. Any gas or two stroke engines are running ethanol- currently E15.

Olof Hansen
U.S. Environmental Protection Agency
Pacific Southwest Region
75 Hawthorne St., WST-2
San Francisco, CA 94105
(415) 972-3328

Another contact for biodiesel use in national parks: Tim Hudson up in Anchorage, AK.
He started a program using fish oil to convert to biodiesel and uses it in equipment in Denali and other parks. His number is 907-644-3381and email is tim_hudson@nps.gov.

Good luck, Happy New Year!
Olof

Tim Hudson
National Park Service, Alaska
907-644-3381
tim_hudson@nps.gov

Tim's group has been working with biodiesel produced from fish oil for both stationary (generators) and mobile engines. Fish byproducts (currently from the Pollock industry) can be refined into oil for which there has been an occasional market. Often the byproducts (fish parts) are simply thrown back into the sea. They can instead be refined into oil.

The NPS has contracted to have fish oil biodeisel manufactured in Hawaii and has tested the fuel in a variety of engines. The next stage of development will be to use on-site processing in a harbor with local delivery either by barge or small plane to remote locations. Initial calculations show that the fuel should be able to reach its destination points at a lower cost than regular diesel.

Jeremy Walther
BioGardener
PO Box 6253
Austin, TX 78762
512/762-3969
www.bio-gardener.com

"I'll jump in on this one, unprovoked!

We started using biodiesel in a new diesel mower beginning June 2006. We've put over 200 hours on the machine with absolutely no problems. The fuel lines are fine, the fuel filter has stayed clean, and the engine has run perfectly. Same goes for our diesel truck, which has seen 25,000 miles on B99 biodiesel in the spring, summer, and fall and reduced blends in winter.

We were awarded a contract in Spring 2005 under a City of Austin pilot program that encourages City contractors to use alternative fuels. For this contract, we use residential grade cordless electric blowers and hedge trimmers, a propane-powered commercial walk-behind mower, the biodiesel powered 60" Kubota riding mower, and gasoline-powered string trimmers. We were awarded a similar, much larger contract by Austin Energy in June 2006. We have has seen no difference in efficiency and efficacy using biodiesel compared to conventionally powered equipment, and the AE

facility coordinator has been extremely pleased with our performance. The success of these projects has encouraged us to reduce the use of traditional equipment on all maintenance contracts to about 50%. I'm hoping to get it even lower by the end of 2007, but it all depends on what equipment becomes available to the market.

We've found the only negative of biodiesel is the lack of diesel engine availability. We've done our best trying to find diesel, propane, electric, or other alternatives to gasoline powered string trimmers, chain saws, hedge trimmers, and other handheld equipment. However, our purchasing power is pretty limited as a small business, and we've had little success. As far as I know, the only diesel equipment available to the industry is on large riding mowers.

We are striving to convince other companies that biodiesel and other alternative fuels should be playing a major role in updating the way our industry does business. A collective voice would help convince manufacturers to use available technology to provide us with cleaner burning equipment, and help the green industry preserve natural resources rather than degrade them with outdated equipment and practices.

Please let me know if you have any specific questions about our experience with biodiesel or anything else, and I'll do my best to answer them. Thanks."

jeremy

Marci Young
Air Pollution Control Division
3 South, 103 South Main Street
Waterbury VT 05671-0402
802 241-4538
802 241-2590 (FAX)

We are still using biodiesel on our statehouse lawn!
I think it's a B20 blend, but what with global warming and NO snow here
in Vermont we could possibly even use B100!

Additional Resources

Landscaping Equipment Manufacturers

Caterpillar's Industrial Engine Report with a Case Study from Louisville KY ("Passing the Ultimate Test") about 12 of their diesel mowers running on biodiesel.
http://www.cat.com/cda/components/securedFile/displaySecuredFileServletJSP?fileId=363398&languageId=7

Warrantees

Many equipment manufacturers specify that biodiesel fuels may be used only if the fuel meets the provisional ASTM 6751 (U.S.) specifications. Warrantees generally don't cover any fuel related damages with petroleum or bio based fuels.

National Biodiesel Board, Standards and Warrantees
http://www.biodiesel.org/resources/fuelfactsheets/standards_and_warranties.shtm

Puget Sound Clean Cities Coalition
Additional fuel sources in the Puget Sound are listed at:
http://www.pugetsoundcleancities.org/FuelingBiodiesel_Suppliers.htm

Biodiesel Myths and Facts
Addresses issues such as equipment warrantees, filter use and cost.
http://www.biodiesel.org/pdf_files/fuelfactsheets/Myths_Facts.pdf

Criteria for Purchasing Decision Making

- Product performance
- Warrantee
- Filter compatibility
- Seal compatibility
- Cost