ASOPE™ Newsletter

American Society of Power Engineers, Inc.

May 8, 2009 **Volume 5, Number 1**

In This Issue

- Green Diesel: Oxymoron or real promise?
- DOE Project Shows Promise
- The Organizations in Today's World
- CrossWord Link
- High Efficiency Motor Utilization
- Photos by Larry

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If you have news paper articles or photos you'd like published in the ASOPE Monthly Newsletters, contact Larry Tarvin at
lgtarvin@asope.org
or
admin@asope.org

Contact Us

http://www.asope.org

Email: admin@asope.org

Or

asopeinc@aol.com

Green Diesel: Oxymoron or real promise?

Energy Expert Peter Garforth explains why biodiesel and ethanol don't belong in the same

By Peter Garforth
PlantServices.com

Burning gasoline and diesel in cars is the second-largest cause of U.S. greenhouse gas emissions (after buildings and homes). About 70% of oil is imported, which, in turn, exports hundreds of billions of dollars and adds little value to the U.S. economy. In terms of pollution, cost and supply security, reducing automotive petroleum use is generally good for both the country and the planet. Can biofuels be a major factor in improving supply reliability, reducing pollution and even reducing costs?

As with all energy questions, the first supply source should always be higher efficiency. Reducing the average weight of a car by 20% to 40% by using lighter materials and choosing smaller vehicles would dramatically reduce oil use. A Toyota Camry weighs 3,500 lbs and a Corolla weighs 2,600 lbs. This 900-lb difference provides an 18% gain in fuel efficiency by dropping one vehicle size. In the next couple of vehicle-design cycles, we can expect significantly lower weights as new materials like composites and aluminum substitute for steel and heavier plastics. Even relatively small changes in weight across the U.S. fleet would reduce oil use far more than any current targets likely to come from a switch to using ethanol.

After efficiency, the next step is to look at fuel choice. Nearly all U.S. cars and light trucks use gasoline. The United States recently introduced low-sulfur diesel, already available in Europe for a number of years. Diesel cars use 20% to 30% less fuel. In Europe, just about every model can be purchased with a clean-diesel engine, including small vehicles like the Toyota Yaris, and sporty ones like the BMW 7 series and the Mercedes S Class. Even the humble Ford Focus has three diesel engine choices. In a recent fuel economy race, the diesel Yaris exceeded 70 mpg. A Corolla with a clean-diesel engine has fuel efficiency similar to a Prius. The same car would be 40% more fuel efficient than a gasoline Camry.

More than 60% of new cars sold in Europe are clean diesels. Probably the next logical step for the United States government would be to encourage a switch to clean diesels, because every manufacturer, including Ford and GM, already has them; they simply don't sell them here.

Biofuels are being proposed as a partial alternative. Ethanol has less energy than gasoline on a volume basis, so more is needed to cover the same distance. In the United States, bio-ethanol is typically mixed at 85% with gasoline, and engines require some redesign to handle the fuel. U.S. bio-ethanol mostly is made from corn, which uses energy for planting, fertilizing, harvesting and refining. Even more energy is needed to transport it for sale. By some estimates, it takes at least 80% more energy to make the ethanol than it provides to drive the car. Thus, the overall environmental gain is very small, the avoided imports negligible, and the costs are high. Also, corn is the base ingredient of a lot of food products, including meat, so the diversion to ethanol pushed up food prices.

Biodiesel, on the other hand, can be refined from many sources, including used cooking oil and even agricultural waste. Oil seeds grow easily on poor land and need little fertilizer. Diesel engines need little alteration to use biodiesel, even at 100%.

Algae are attracting a lot of attention as a source of biofuel. Where large amounts of mid- to low-grade heat are available, it's possible to grow algae with very high natural oil content that can be refined into a diesel fuel with good calorific value.

As with any biological product, energy is needed to sustain algae growth, so it's essential to find sources of heat that are cheap, readily available and low in environmental side-effects. Two hold out great promise: sunlight and heat recovered from large-scale electricity generation. Heat recovery is the largest immediately available U.S. energy source, if we can work out how to use it. Growing algae to make biodiesel might be one such use, with the added advantage that the algae need carbon dioxide to thrive, and fossil-based power plants make plenty of it.

The next step up the efficiency ladder will be diesel-electric hybrids. The first ones are expected in the market in 2010 from Peugeot and Volkswagen. These will reach yet another level of efficiency of 60 mpg to 70 mpg in a vehicle about the size of a Corolla. Powered with biodiesel, this will be a much less polluting than any other immediately available car technology, at a fairly reasonable cost.

Whether it's from plants or algae, biodiesel is likely to be more useful than bio-ethanol refined from foodstuffs in terms of being a practical, efficient and environmentally less damaging substitute for fossil oil-based transport fuels.

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DOE Funded Project Shows Promise for Tapping Vast U.S. Oil Shale Resources:

Colorado Company Seeks Patents on Low-Cost, Low-Impact Heater Technology

Washington, D.C.—A technology as simple as an advanced heater cable may hold the secret for tapping into the nation's largest source of oil, which is contained in vast amounts of shale in the American West.

In a recently completed project sponsored by the U.S. Department of Energy (DOE) through the Office of Fossil Energy's Oil and Natural Gas Program, Composite Technology Development (CTD) Inc. successfully demonstrated the application of a ceramic-composite insulated heater cable for oil shale recovery deep underground. The Small Business Innovation Research project provided employment for 25 professionals and resulted in two patent applications related to the cable.

"With DOE's support over two phases of this project, CTD has demonstrated a way to tap into the western oil shale resources," said Dr. Victor K. Der, Acting Assistant Secretary for Fossil Energy. "With two-thirds of the world's supply of oil shale in the United States, technologies such as this can go a long way toward bolstering the development of our domestic energy resources, creating jobs, and supporting energy security."

The United States holds about two thirds of the world's estimated reserves of 3.7 trillion barrels of oil shale, an amount thought to be 40 percent larger than remaining supplies of petroleum worldwide. Scientists believe that the Green River shale formation alone, in Colorado, Utah, and Wyoming, has as much as 1.1 trillion barrels of oil equivalent.

CTD researchers conducted 5,000 hours of continuous testing of its cable at temperatures ranging between 760 to 850 degrees Celsius. During the tests, the cable overcame many of the limitations of existing cables, which include conductor instability, moisture-induced degradation, and operating temperatures too limited to recover shale oil underground. The project was managed by DOE's National Energy Technology Laboratory.

Oil shale contains a substance called kerogen, which is the organic material from which oil is derived. Kerogen cannot be pumped from a reservoir like oil. Instead, the oil shale rock must be heated to separate the liquid. Once the liquid is collected, it can be upgraded to synthetic crude oil for shipment and refining in the nation's existing petroleum infrastructure.
CTD's successful test of its heater cable holds promise for heating the shale oil in situ, down to a depth of 5,000 feet, thus separating the kerogen without having to go through the expensive process of mining the oil shale rock. If future underground tests of the cable prove successful, operators should be able to extract a petroleum-like liquid that is fluid enough to be pumped to the surface.

By eliminating the mining and a portion of the large-scale processing associated with oil shale recovery, CTD's advanced cable system is estimated to cut recovery costs in half while addressing environmental issues on the surface.
Information Provided By: The U.S. Environmental Protection Agency

The Organization's in Today's World:

The shifting tide of the economy has forced a lot of organizations to drastically change their behavior in order to adapt. Some organizations will embrace change and use it as an opportunity to try new things and to correct longstanding problems with their organizations.

And, there are some organizations which will fight tooth and nail to resist change, because they fear the uncertainty that change brings. Regardless of how we feel the fact remains that times have changed, and nearly all of us will need to reorganize and find ways to cut costs and improve processes across the board.

Lets look at some facts:

How many organizations have you worked with or been involved with over the course of your life thus far? You've probably worked with dozens, beginning with the boy scouts / girl scouts as example from your youth leading all the way up to your current occupation.

Out of all those organizations, which ones were the most effective? Which organizations made the most productive use of their people and provided the best service?

No organizations are perfect, but over the years I've worked with a handful of remarkable organizations, including **American Society of Power Engineers**. I've also had to work with some organizations that were quite dreadful, to say the least that only worried about their own personal gain and not the organization. You've probably been in the same boat.

When I decided to write this post, I thought back to all of the good and bad organizations, and wrote down a list of the positive traits that separated the remarkable organization from the abysmal.

Here they are:

1. **Great Communication** – As we all know, communication is problematic for most organizations. Truly great organizations are robust communicators – they express their concerns aloud; they ask questions when others would make assumptions; they write things down; and they use schematics, diagrams, and charts to convey complex information to each other and make rational decisions..
2. **Extensive Collaboration** – Great organizations aren't authoritarian; there's no top-down dictation of ideas from leader to follower. Instead a great organization is collaborative, where every member is invited and expected to give regular feedback on new ideas and initiatives. People in these organizations feel comfortable and free to express what they really think and feel, and they also feel like they own part of the idea.
3. **Full of Initiative** – Nothing pleases an organization president more than having board members who are willing and able to pick up the ball and run with it. Truly exceptional organization often have board members who will come up with new ideas, find ways to improve existing ideas, and will perform analysis and research on their own.

Having just a few pro-active people on a board makes a huge difference as it exponentially increases the creative energy of the organization.

4. **Visionary** – Visionary organizations do two things really well. First – they can always see the forest from the trees; they understand how the daily details relate back to the big picture and the organization's long-term objectives. Second – they anticipate problems in advance and mitigate them before they become full-blown crises.
5. **Able to Adapt** – Poor organizations resist change at all cost. They see change as a threat to their security and fight it until they inevitably fail. Great organizations embrace change; they see change as a chance to improve and try new things that they were unable to do before.
6. **Constructive** – In a poor organization people all-too-often embed their own egos in their work, thus it is often difficult to correct errors and provide constructive criticism. When you criticize the work, you criticize the worker. Organization members in high-functioning organizations are more interested in producing the best work possible and eliminating errors than they are in preserving fragile egos.
7. **Organized** – Great organizations are highly organized. They develop standard processes for their work, thy balance responsibilities using established roles, they have systems for properly planning projects, and they have methods for measuring progress and ROI. Less effective teams don't take the time to organized; rather they rely on ad-hoc organization, which is chaotic to say the least.
8. **Service** -.Great organizations offer service to their members and license holds - not word of mouth.

Of all the traits on my original list, I feel that these eight are the most pivotal traits of any high-functioning organization. An organization that is able to effectively communicate, adapt, collaborate, and innovate together is going to be ultimately more successful than a reflexive, command-driven, authoritarian organization in most instances.

Written By
Larry Tarvin
Chairman of The Board

ASOPE™ – May CrossWord Puzzle:

Visit the link below for new ASOPE™ CrossWord Puzzle Fun.
http://asope.org/Crossword/Crossword2a.html
Answers will be posted in next month's newsletter.

High Efficiency Motor Utilization

By Byron Nichols

When new motors are identified for purchase or when older motors require replacement, it is wise to consider the purchase of high efficiency motors. The efficiency of a motor is the ratio of the energy output (mechanical power produced) vs. the energy input (electricity required).

It may be expressed simply as: **EFFICIENCY = OUTPUT / INPUT**

Design changes, better materials, and manufacturing improvements reduce motor losses, making premium or energy efficient motors more efficient than standard motors. Reduced losses basically mean that an energy efficient motor produces a given amount of work using less energy than a standard motor.

Assuming a constant motor speed; the formula to calculate cost savings is expressed as:
S = hp x 0.746 x L x C x N x [(100/E std) – (100/E ee)]
Where:
S = $ Savings (annual)
Hp = Motor horsepower
L = % Load
C = Energy Cost ($/kWh)
N = Operating hours (annual)
E std = % Efficiency of standard motor
E ee = % Efficiency of high efficiency motor

Example:
A 100 hp boiler feedwater pump runs continuously at 85% load with an electrical cost of $0.065/kWh. What would be the annual savings when replacing this standard efficiency (90.2%) motor with a high efficiency (93%) motor?

S = hp x 0.746 x L x C x N x [(100/E std) – (100/E ee)]
S = 100 x 0.746 x 0.85 x 0.065 x 8760 x [(100/90.2) – (100/93.0)]
S = **$1,205 / year**

Extending this figure out by projecting a 10 year motor life, we can expect a savings of **$12,050** by replacing the standard efficiency motor with a high efficiency for the ten year period.

Power House White Bean Chili

By an Operator that created Hot-Methane Gas

Please note this recipe is very hot.

1/4	cup butter or margarine
1	large onion, chopped (1 cup)
1	garlic clove, finely chopped
32oz	chicken broth (from 32-oz carton)
2	tablespoons chopped fresh cilantro
1	tablespoon dried basil leaves
1/2	1/2 Habanera Pepper (red) (1 if you are suicidal)
1/4	teaspoon ground cloves
2	cans (15 to 16 oz each) great northern beans, undrained
1	Mozzarella Cheese 1 cup

1. Melt butter in 4-quart Dutch oven over medium heat. Cook onion and garlic in butter, stirring occasionally until onion is tender.
2. Wear Gloves and chop up Habanera Pepper extra fine and add to mixture.
3. Stir in remaining ingredients (except Mozzarella Cheese)
4. Heat to boiling; reduce heat. Cover and simmer 1/2 hour, stirring occasionally.
5. Add Mozzarella Cheese before serving

(Continued)

If you have any Power House Recipes you want published send to Larry G. Tarvin at OMCSI@aol.com make sure you give us permission to publish with your name.

Ohio River Standard Day

Photograph by Larry Tarvin

A standard day on the Ohio River four tugs of coal, one tug of LPG and coal

(Picture taken from Lesko Park in Aurora, IN April 2009)