bioEnergy! works

Another RBEP Success:
Demonstrating the value of a fishy biodiesel blend in Alaska's Aleutian Islands

The Regional Biomass Energy Program (RBEP) promotes increased production and use of bioenergy resources, and helps advance the use of renewable biomass feedstocks and technologies. Historically, the RBEP leverages two nonfederal dollars for every federal dollar it administers.

Benefits of Fish Oil Biodiesel Blend Fuel

- *Saves money*
- *Reduces reliance on petroleum-based fuels*
- *Develops a sustainable local fuel source*
- *Burns cleaner than traditional diesel fuel*
- *Requires minimal processing, all of which can be performed locally*
- *Creates new markets for low-value fish processing byproducts*

"The economics of this demonstration are really impressive when you consider that UniSea is replacing $1.19/gallon diesel with 25 cent/gallon fish oil. Using a local natural resource to displace imported oil and improve the environment can only help the sustainability of our fishing communities."

Bob Poe, Executive Director
Alaska Energy Authority

U.S. Department of Energy
Regional Biomass Energy Program
www.ott.doe.gov/rbep

Challenge

The community of Unalaska/Dutch Harbor is located in the Aleutian Islands southwest of mainland Alaska. UniSea, Inc. operates a seafood processing facility in the community, where a pollock oil-diesel fuel blend is being tested in generator engines.

Some 3.5 million gallons of fish oil are produced annually from processing pollock in the Alaskan Aleutian Islands community of Unalaska/Dutch Harbor, even more when other parts of coastal Alaska are included in the list of producers. This oil has minimal commercial value, especially considering the cost of transporting it to markets in the Pacific Rim and continental U.S. Because fish oil contains approximately 90% of the energy content of #2 diesel fuel and is easy to process into usable biodiesel blend fuels, this clean-burning bio-oil could be used to reduce dependence on imported fuel and improve air quality in the region.

RBEP Solution

With funding from the U.S. Department of Energy's Regional Biomass Energy program (RBEP), the Alaska Energy Authority, and the Alaska Science & Technology Foundation, seafood producer UniSea, Inc., has undertaken a demonstration project to test the practical use of blended fish oil and diesel fuel as generator engine fuel. Much of rural Alaska depends on such generators for power — the 200 or so rural Alaskan village utility companies consume approximately 28 million gallons of diesel fuel each year just for power production. Additional diesel fuel is used throughout the state for space heating and powering fishing vessels.

Using one of the company's six 2.3-megawatt generator engines at its seafood processing facility in Unalaska/Dutch Harbor, Alaska, UniSea had Colorado environmental consulting firm Steigers Corporation test several fish oil biodiesel blends over a five-day period, followed by several months of regular operation using one of the blends.

Partners

U.S. Department of Energy
Regional Biomass Energy Program

Alaska Energy Authority

Alaska Science & Technology Foundation

Alaska Department of Environmental Conservation

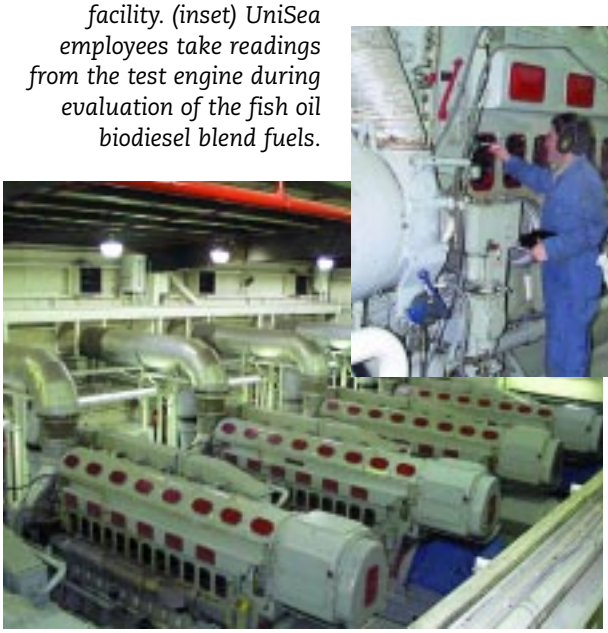
UniSea, Inc.

Results

Fuel blends tested ranged from 100% fish oil fuel to 100% diesel fuel. Current testing is being done with a 50-50 fish oil-diesel fuel blend (known as B50). Overall, the fish oil blends performed comparably to the traditional diesel fuel. They produced significantly lower emissions with the exception of oxides of nitrogen (NO_x), which were slightly higher with all the fish oil blends. In some regards (such as starting) the test engine actually performed better using the fish oil biodiesel blends.

UniSea, Inc.'s, Unalaska/Dutch Harbor, Alaska processing facility.
(Photos courtesy of Steigers Corporation.)

UniSea, Inc., operates six Fairbanks Morse generator engines to produce power at the company's Unalaska/Dutch Harbor facility. (inset) UniSea employees take readings from the test engine during evaluation of the fish oil biodiesel blend fuels.



One of the beauties of fish oil is that it requires minimal processing to be made usable as fuel — an additional mechanical filtration step is all that is needed, making fish oil a much more cost-effective fuel resource than many other materials used to make biodiesel. At a cost of 25 cents per gallon for fish oil compared to $1.19 per gallon for diesel fuel, it's easy to see why fish oil biodiesel blend fuels make good economic sense.

Future efforts will focus on assessing 1) the long-term effects of fish oil fuel blends on the equipment, 2) the suitability of fish oil biodiesel blends for use in the most common engines in the region, and 3) the amount of fish oil available for processing into fish oil biodiesel blends.

Benefits

Locally produced fish oil biodiesel blend fuels have the potential to create a sustainable energy supply for use in remote regions of Alaska, yielding dramatic cost savings and reducing dependence on imported petroleum products. Easy-to-manufacture, cleaner-burning fish oil biodiesel blends could potentially replace millions of gallons of traditional diesel fuel now used in rural Alaska.

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