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73. Where conservation meets innovation. McCoy, M. Digger Farwest Edition, Aug. 2007:42-48. 2007.

The huge bank of solar cells collects enough energy to run Holden Wholesale Nursery's greenhouse operations.

Where CONSERVATION meets INNOVATION

WITH ENERGY COSTS ON THE RISE, THE ORIGINAL GREEN INDUSTRY IS TURNING TOWARD HOMEGROWN ALTERNATIVES

ENERGY IS A SIGNIFICANT COST IN BOTH GREENHOUSE AND NURSERY PRODUCTION, WHETHER IT'S TO HEAT OR COOL, TO HARVEST AND TRANSPORT, OR TO CARE FOR AND PROTECT CROPS. SO IT'S NOT SURPRISING THAT INNOVATIVE OPERATIONS HAVE MADE SIGNIFICANT INVESTMENTS IN CONSERVING ENERGY, USING IT MORE EFFICIENTLY OR EVEN FINDING ALTERNATIVES TO TRADITIONAL SOURCES.

Northwoods Nursery runs all its tractors and front-loaders on biodiesel made mostly from vegetable oil waste.

world travels, has converted his entire Molalla, Ore., nursery to biodiesel, running all nine tractors and other equipment on the renewable fuel.

"Much of my biodiesel literally comes from vegetable oil waste," he said. In Oregon, nearly all the available biodiesel is from this source — deep fat frying oil. He said a small amount comes from Midwest soybeans.

"While solar and biodiesel may point the way to future energy sources, conservation still remains one of the most cost-effective measures in controlling energy expenditures."

Another efficient oil source is canola, and eastern Oregon acreage is expanding to meet the demand. Gilbert said Oregon State University is testing new varieties that produced 4,000 pounds of canola per acre. The seeds contain roughly 40 percent oil. Gilbert converted this number to 1600 pounds of oil per acre, or 200 gallons.

Gilbert notes that for all the enthusiasm for corn ethanol, its energy conversion ratio is much less than biodiesel.

"Biodiesel provides four times more energy than the inputs to produce it," he said. "It is a much more efficient fuel."

And the diesel engines seem more efficient, even with the same car model. Gilbert compared a gas-engine Volkswagen Jetta to the diesel version of the same model. The gas model got 35 miles per gallon, while his diesel car hit 50 mpg. In addition, the fuel burns cleaner, he said.

"Diesel creates 80 percent less carbon dioxide and less particulate material than regular gas," he said. It is also much safer to handle, with a simple soap washing recommended if exposed to the fuel.

He currently uses a nearly pure biodiesel designated B99. Gilbert said there are also a 5 percent "additive" option and a 20 percent "blend" for those nervous about using the almost pure fuel.

His main source of diesel in Oregon is SeQuential Biofuels, which produces 1 million gallons per year. They have 16 stations in Oregon, mostly along the I-5 corridor. Total Oregon diesel use is at 7 million gallons per year. Gilbert said he is required to have two

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While he does not use it yet in his greenhouse, he is in contact with a Wisconsin manufacturer that is producing biodiesel heating equipment. The more complete he can make his conversion to biodiesel, the more satisfied he is.

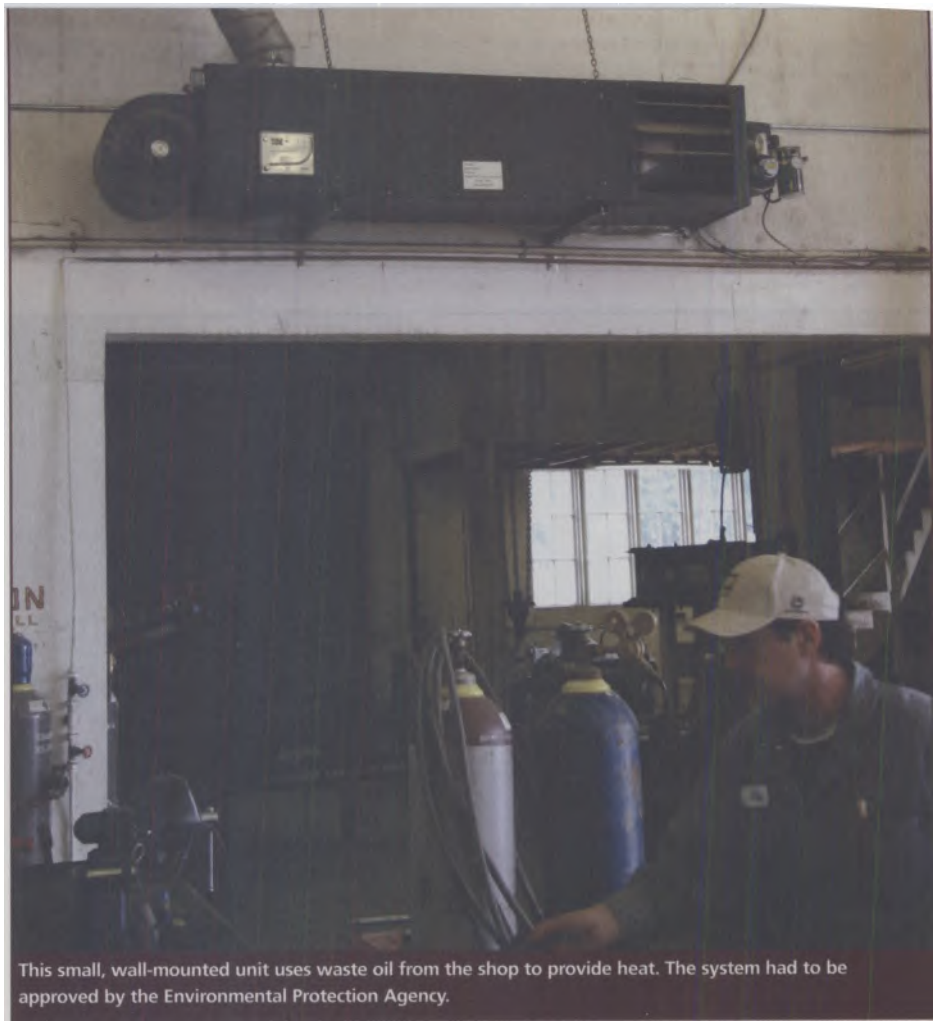
"Anyone interested in biodiesel should feel free to call me and learn how well it works here," he said.

Energy conscious for a decade

While solar and biodiesel may point the way to future energy sources, conservation still remains one of the most cost-effective measures in controlling energy expenditures, as several Oregon nurseries have found.

"Even our headquarters building was designed to consider energy use," said Walter Suttle, technical service coach at Monrovia.

Allan Elliot shows one of Carlton Plants' many solar-driven, wheel irrigation systems. The solar units are reliable and cost-effective when compared with older, gas driven systems.



This small, wall-mounted unit uses waste oil from the shop to provide heat. The system had to be approved by the Environmental Protection Agency.

tanks, one for "off-road" (on-site) use and the other for on-road use. The off-road fuel is taxed less, saving him $.48 per gallon.

He does warn those looking at biodiesel about pre-1993 equipment having problems with old "rubber" lines eroding. New equipment has synthetic hoses and lines that are not adversely affected.

Other considerations include incompatibility with many water-blocking fuel filters, requiring more frequent changes, and having to change the blend to at least 50 percent regular diesel to prevent gelling when temperatures are lower than 40 degrees F, according the SeQuential information. Gilbert does not experience the gelling until temperatures reach freezing and stay there for at least several hours.

Monrovia uses gravity and extensive tiling to move and capture irrigation water. Any excess water eventually drains into a central ditch that leads back to the collection pond.

He points to the many added windows — some located near the ceilings — that light each room. Even the conference rooms are naturally lit.

"Add light sensors in many rooms, and we are keeping our electrical use to a minimum," he said.

In fact, the nursery won the 1993 Energy Edge Award from PGE. It cited the nursery for "outstanding accomplishments in energy efficient design and construction." The award mentioned the building was "30 percent more efficient than required by code." It won several other design awards, including the "Peoples Choice Award" in 1993, presented by the Oregon Chapter of American Institute of Architecture.

They continue to look for ways to conserve energy, said Suttle. He noted a recent effort where new ponds were installed to let gravity do some of the work. The irrigation runoff flows downhill through drainage tiles that pipe it to larger ditches. All the extra water ends up in a central pond, where a single pumping action takes it back to irrigate the plants and then begin the cycle again.

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Energy Efficiency and Solar Resources for Oregon Businesses

2007 INCENTIVES*

FEDERAL

Federal tax credits for solar electric (PV), solar water heating and other energy projects.

www.energytaxincentives.org/

STATE

Business Energy Tax Credit through Oregon Department of Energy.

www.oregon.gov/ENERGY/CONS/BUS/BETC.shtml

1-800-221-8035

35% tax credit for eligible costs unless otherwise specified

Types of projects:

- Alternative fuels
- Alternative-fueled and hybrid vehicles
- Conservation
- Efficient truck Technology
- Fuel cells
- High performance homes: Tax credit for builders
- Recycling
- Renewable energy projects: Tax credit 50% of eligible project costs
- Rental dwelling weatherization
- Sustainable buildings
- Transportation (Transit passes, etc. to reduce vehicle miles traveled)

ENERGY TRUST OF OREGON

Cash incentives for customers of PGE, Pacific Power, NW Natural, Cascade Natural Gas (Incentives vary; see Web site for details.)

www.energytrust.org

1-866-368-7878

Types of projects:

- Solar electric & solar water heating
- Wind energy
- Biomass energy

Energy efficiency upgrades in new and existing buildings, including:

- Lighting and controls
- HVAC equipment and controls
- Electric motors
- ENERGY STAR® refrigeration and cooking equipment
- Commercial washers
- Packaged terminal heat pumps
- Natural gas space and water heaters

UTILITIES

Customers of electric utilities other than PGE or Pacific Power should contact their utility for other incentive programs.

ENERGY LOANS

Energy Loan Program through Oregon Department of Energy. Fixed rate, low-interest, long-term loans for qualifying energy projects.

www.oregon.gov/ENERGY/LOANS/selphm.shtml

1-800-221-8035

* *Incentives are subject to change. Check requirements of each incentive to ensure eligibility.*

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"No more pumping the water to a storage pond is obviously more energy -efficient," he said.

Many ways to save

While Carlton Plants is experimenting with solar, they have also implemented small steps that lead to larger impacts.

The nursery has been working at energy savings through conservation. changing lighting sources and installing sensing devices. This all goes back several decades.

"We started with PGE 20 years ago, working with their energy program," explained Elliot. "We were designated as a 'cooperator' and agreed to follow their recommendations."

PGE's improvement list included replacing florescent lights with metal halides and adding motion sensors to control lights. Elliot said the relationship continued even during new construction, when the company asked for the newest energy-saving technology they could incorporate.

"We later moved on to doing many similar things ourselves," he continued.

For instance, the shop now uses its own waste oil to provide heat with an EPA-approved system. Another simple change was to update old single-speed fan motors for refrigeration to two-speed options. This greatly reduces overall energy use of the cooling system, he said. The new motors also create less heat, requiring, in turn, less cooling.

Sometimes it just means rethinking operational practices. For example, many years ago the company transported crews to the fields by pick-up, Elliot recalled. They changed to buses and now have a fleet of 20. It was more comfortable for the crews — and obviously safer — but surprisingly cost-effective.

"As we expanded the buses, our gas costs remained steady for the last six years," he said. He noted they also re-built their liner trailers with double

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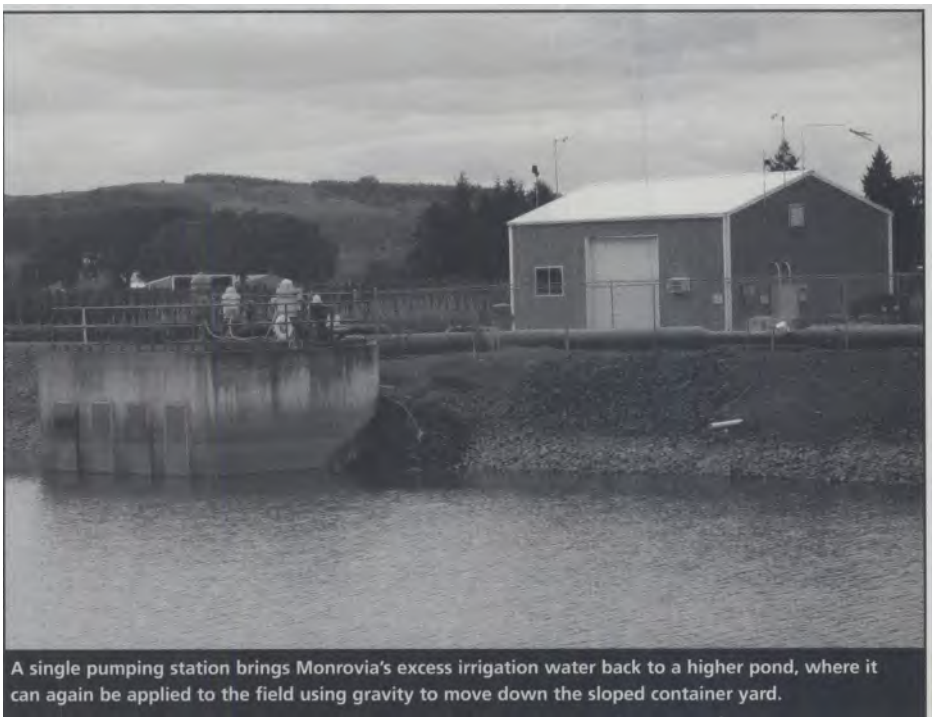

A single pumping station brings Monrovia's excess irrigation water back to a higher pond, where it can again be applied to the field using gravity to move down the sloped container yard.

decks, cutting their trips to the field in half.

Another energy conservation move was switching the coolers from an extensive mist system to a fog alternative. Again, the move was an energy saver.

"With the mist system, the compressors ran 24/7 to keep the desired humidity level in the coolers," he explained. "But, the fog system is run by 1.5 horse-power motors that run as the fog is needed, usually only a few minutes per hour."

At every level, Oregon nurseries are finding ways to either access newer sources of energy, or to be more efficient in how they use energy. Energy Trust of Oregon offers cash incentives and assistance to offset investments in energy efficient improvements and renewable energy systems in new or existing buildings. Incentives cover improvements, including premium efficiency motors, compressed air, natural gas equipment, lighting and controls, refrigeration and more. To learn more, visit www.energytrust.org or. O

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Monrovia's headquarters was carefully planned to use as much natural light as possible, with extra windows located near the ceilings.