

# THE ENERGY OBSERVER

Energy Efficiency Information for the  
Facility Manager

Quarterly Issue – September 2006

## Introduction to Renewable Energy Options- Vol. 2

### The Energy Observer

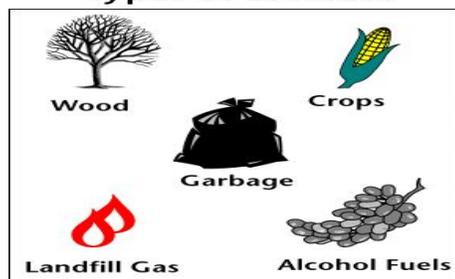
summarizes published material on proven energy technologies and practices, and encourages users to share experiences with generic energy products and services. This quarterly bulletin also identifies informational sources and energy training for facility managers and staff. *The Energy Observer* is a service of the Energy Office, Michigan Department of Labor & Economic Growth.

Improving building energy efficiency is typically your first and best cost reduction strategy. However, those that have already invested heavily in upgrading energy efficiency may want to consider renewable energy options. Listed in this edition of the Energy Observer are several biomass energy options to consider.

### BIOMASS ENERGY

Biomass energy technologies use renewable resources such as crop and wood residues, animal and municipal solid waste to produce an array of products including electricity, heat, liquid, solid, and gaseous fuels and bio-based chemicals and other materials.

#### Types of Biomass



Biomass can be combusted directly to produce steam for electricity or, through the use of a gasifier,

Energy	Average Cost of Fuel	Efficiency Factors	Cost/decatherm *
Electricity	\$.0684/kWh	95%	\$21.09
Fuel Oil	\$2.00/gallon	80%	\$17.86
Natural Gas	\$9.87/Mcf	85%	\$11.27
Wood Chips**	\$45/ton	65%	\$4.16

\* (1 decatherm=1 million Btu)  
\*\*(Based on 15%moisture content)

Note: Avg. MI utility rates taken from the Energy Information Administration. (June –August 06)

converted into a gas to power a combustion turbine or fuel cell.

Renewable energy accounts for 6% of our energy needs, with roughly 47% of that contributed to Biomass Energy. The following link includes a map detailing the biomass resource availability in each state.

<http://www.nrel.gov/gis/biomass.html>

### APPLICATIONS

There are a number of applications for biomass energy. Following are some of the more common measures used today.

#### • Direct/co- fire systems

Typical biomass energy systems use a combustion or co-firing approach. These operate in the same manner as a fossil fuel system, except that biomass materials (usually wood or corn) are used to fuel the system. In the case of co-firing, biomass products are substituted for a portion of the existing fossil fuel. One of the best proven methods has been direct fire wood chip heating systems, which have been installed in Michigan schools and across the country.

The main source of savings in such systems is the price of fuel. Table 1

lists common fuels and associated costs to produce energy. The cost associated with wood chips does not take into account the varying charge associated with delivery, however, the basic fuel cost makes this option a very attractive choice.

If a direct/co-fire system will be implemented, be mindful of state permitting and pollution control regulations. Requirements vary by the size of the system and type of biomass fuel required, but an analysis of the emissions is typically necessary. The Department of Environmental Quality (DEQ) has set standards for facilities to adhere to, which can be viewed on their website at [www.michigan.gov/deq](http://www.michigan.gov/deq).

#### • Biofuels

Biomass can also be converted to ethanol or biodiesel fuels. *Ethanol* is produced by fermenting a biomass source high in carbohydrates (primarily corn to date), which is then used as a fuel or fuel additive. Another renewable alternative fuel is made through a simple chemical reaction called transesterification.

This reaction removes the glycerin molecule from vegetable oils, fats, and cooking greases, leaving behind methyl esters, or what we call *biodiesel*. Biofuels significantly reduce emissions, making them an attractive alternative to fossil fuels.

One way of incorporating biofuels into your facility is by switching your fleet of diesel vehicles/buses to a biodiesel blended fuel. Biodiesel's higher lubricity index compared to petrodiesel is an advantage and can contribute to longer fuel injector life. Biodiesel is a better solvent than petrodiesel and has been known to break down deposits of residue in the fuel lines of vehicles that have previously operated on petrodiesel. However, biodiesel can degrade rubber components so take caution and research compatibility with your vehicles before switching fuels. Models manufactured prior to 1992 may or may not have gaskets and hoses made of the synthetic Viton, which is non-reactive to biodiesel.

### In Action

*The Darby School district located in Montana has been a big success story and stems from a project called 'Fuels for Schools'. A biomass burner replaced two older steam boilers and a hot water boiler. This project uses about 300-500 tons of wood chips/year. On average, the facility paid \$30/ton from various suppliers. The facility is 82,500 square feet and is saving approximately \$70,000/yr on heating*

*costs. With a construction cost of roughly \$840,000, this project has an estimated payback of 12 years.*

*St. Johns Public Schools, located in St. Johns, MI estimated to have saved \$1,750 each of the past two years by using biodiesel fuel for school buses and other maintenance vehicles. At the time of the school's implementation of a 20% biodiesel blend (B20), it cost on average about 22 cents a gallon more than regular diesel. Wayne Hettler, the head mechanic for the facility, said the district is saving money because of fewer oil changes and engine problems. He even estimated that the fleet of buses averaged almost 1 full mpg higher using the biodiesel blend. According to the U.S. DOE, the average price of B20 is currently \$.01 less than petrodiesel!*

### Incentives

The Legislature is currently examining bills to provide tax credits to individuals and companies investing in alternative energies. There are also numerous grant opportunities available to assist in funding a renewable energy project. To view a complete list of grants, as well as a comprehensive list of state and federal incentives promoting renewable energy, please visit <http://www.michigan.gov/biomass> or <http://www.dsireusa.org>. (Database of State Incentives for Renewable Energy)

### Buying Green

The option of 'buying green' is a great way to employ the use of renewable energy resources. Michigan now allows every company to choose their energy provider. Renewable Energy Credits (RECs) are available for purchase to supplement the use of conventional fuels. For more information on available options in the state of Michigan, go to <http://www.green-e.org>.

#### **Rebuild MI Community Partnerships RFP**

Public and non-profit organizations may submit proposals for grants up to \$24,900 to form a Rebuild MI community partnership in their community.

#### **Public Housing Commission Rebuild MI Community Partnerships RFP**

Public Housing Agencies may submit proposals for grants up to \$24,900 to promote & establish with other partners, including other MI Public Housing Commissions, a Rebuild MI community partnership with the State Energy Office.

Proposals for both grants are due September 18th, 2006. To request a copy of the RFP, contact Tom Krupiarz at (517)241-6184 or [takrupi@michigan.gov](mailto:takrupi@michigan.gov)

For a complete list of grants and services, visit: [www.michigan.gov/energyoffice](http://www.michigan.gov/energyoffice)

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