



ENERGY UPDATE

Sept, 2011

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UPCOMING EVENTS

Bioenergy Harvest Demo at Woodlot Management Workshop

When: September 24, 2011 9:00 AM to 3:00 PM

Where: West Branch Forest, Near Renovo, PA

[click here for more info](#)

Renewable Energy Academy Breakfast Meeting

When: September 29, 2011 8:00 AM to 11:30 AM

Where: Donahoe Center, Greensburg PA

[click here for more info](#)

Webinar: Forest Biomass and Bioenergy: Opportunities and Constraints in the Northeastern United States

When: September 30, 2011 12:00 PM to 1:00 PM

[click here for more info](#)

WELCOME!

The banner for this month's newsletter was taken at Penn State Extension's energy crops display area. We're coming up on harvest time for several crops, and have gained some valuable experience this year that should be very useful for farmers throughout the region.

On another topic, there are several great renewable energy events coming up that Penn State Extension is sponsoring - depending on where you live and what your interests are, you may want to attend several. Some of these events are "webinars" that anyone can attend from anywhere in the world, as long as they have an internet connection. A few upcoming events are featured in newsletter articles below, but don't forget the ones that are listed directly to the left of this little welcome note.

For those of you interested in the alternative energy credit market, be sure to check out the AEC Credit Program website, including their latest newsletter (<http://extension.psu.edu/energy/aec-program>).

The renewable energy world is certainly a bit turbulent these days, what with tight budgets, fluctuating markets and an uncertain future. However, the need for solid, reliable advice and knowhow is as important as ever, and we are pleased to be able to continue our work to help you understand the issues and make smart choices when it comes to energy. This month's newsletter includes a nice range of articles on a variety of topics - I hope you enjoy them.

Cheers!

Dan Ciolkosz
Newsletter Editor

Webinar: Biomass Harvesting Guidelines: Forest Management Issues

When: October 28, 2011 12:00 PM to 1:00 PM

[click here for more info](#)

Wood Energy Short Course - creating success in a dynamic environment

When: November 8, 2011 9:00 AM to November 9, 2011 4:00 PM

Where: State College, PA

[click here for more info](#)

LINKS

[PSU Renewable & Alternative Energy](#)

[Coping with High Energy Prices](#)

[Biomass Energy Center](#)

Renewable and Alternative Energy
Penn State Extension



Avatar Modular Anaerobic Digesters

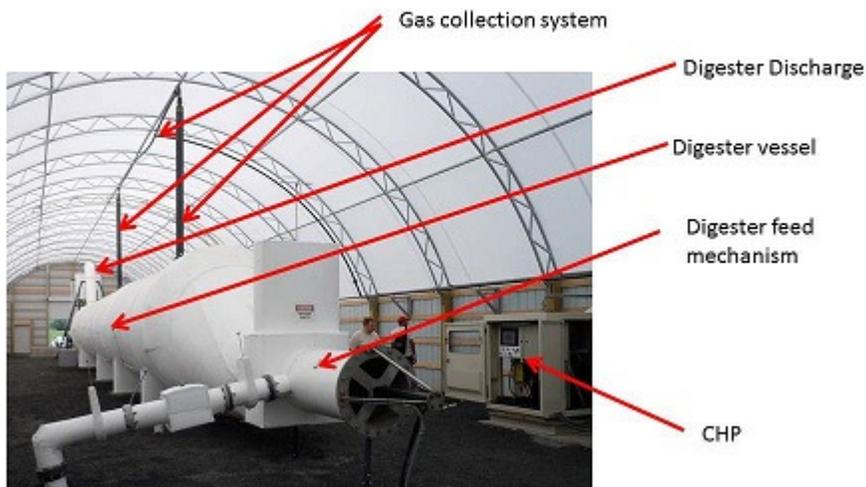
It's the Latest, is it the Greatest?

This past summer I had the opportunity to visit a modular anaerobic digester on a 100 cow dairy farm in Vermont. The unit, supplied by Avatar Energy, LLC <http://www.avatarenergy.com/index.php>, was in the start-up phase. The unit was producing biogas and the day I visited the CHP (Combined Heat and Power) unit was being checked out for operation.

The circular digester vessel is of modular bolt together design that allows convenient transport and also can be varied in length. For large increases in capacity a second unit can be assembled next to the first one and served by common support equipment. There was little poured concrete involved with the digester and its supporting equipment. A large slurry store liquid manure storage and in ground concrete collection tank at the barn were part of the manure collection and effluent storage systems.

The fabric covered hoop structure adds cost but makes working on the unit more convenient during inclement weather. Ventilation, moisture control and corrosion seem like possible problems.

Input View – Avatar Modular Digester



The company reported having a second unit that has been in operation in British Columbia for the past year. Their systems are set up to allow remote monitoring of performance and operation by company experts. This system is one of many anaerobic digesters on Vermont farms that have been encouraged by state, utility and federal agency programs working in excellent cooperation.

Northeast Wood Energy Short Course, Nov 8-9

Creating Success in a Dynamic Environment

On November 8 and 9, people interested in wood energy will be gathering in State College for the Penn State Wood Energy Short Course. This two day event will teach participants the key skills needed to identify and develop successful wood energy projects in the region.

Wood energy continues to be an outstanding opportunity for saving money, supporting the local economy, and reducing fossil fuel use. Schools, Hospitals, Factories, and Greenhouses are just a few of the examples of projects that are successfully running in the Northeast.

One of the exciting features of the short course will be a hands-on case study, in which participants work in groups to develop a project plan for the Penn State Hotel and Conference Center. Since this is also the venue for the short course, we'll be able to visit the boiler room, examine energy records, and gain a real "feel" for how a wood energy project might work there.

In addition, the two day event will be packed with outstanding speakers, a panel discussion, and a site tour of the new biomass heating plant at Penns Valley Schools. Topics for the short course include:

- The Project Development Process
- Understanding Biomass Supply and Demand
- Picking a winner from the start - successful scenarios
- Pre-feasibility analysis
- Project Economics for Wood Energy
- Project Financing Options and Opportunities
- Community Involvement - Making it Work
- Projects in the Region - reflections and panel discussion on Lessons Learned

This short course will be extremely valuable for anyone interested in wood energy projects in their area. Early registration (by October 14) is only \$160, thanks to support from the Northeast Sun Grant Initiative. Lunches and coffee breaks are included in the registration price.

To read more, visit http://www.bioenergy.psu.edu/shortcourses/11_2011WoodEnergy.asp

To register, visit <http://www.cvent.com/d/3cqi2z>.

Daniel Ciolkosz, Department of Agricultural and Biological Engineering

Ethanol Profitability in the New Economy

Industry Showing Signs of Stability



This Tongue-in-Cheek Sign that Appeared Recently in Clearfield May not be Reflective of the Industry as a Whole.

High crop prices are causing consternation among some livestock farmers and I often get the comment that ethanol plants are all going bankrupt these days due to the high price of corn. I wondered if that was the really the case, so I did some follow up research to better understand trends in ethanol production and profitability. Ethanol production has been fairly steady throughout this year, about 37 million gallons/week <http://ethanolrfa.org/pages/weekly-ethanol-feed-production>, so there has not been much drop off. One indicator related to ethanol profitability is the value of ethanol and co products compared to corn value. The USDA publishes a report on this topic in Nebraska each week: http://www.ams.usda.gov/mnreports/nw_gr213.txt

For the week ending September 16, 2011, a bushel of corn there was worth \$7.08. Processing that corn into ethanol resulted in 2.8 gallons of ethanol valued at \$2.73 for a value of \$7.64. Processing also results in 49 pounds of wet distillers grains valued at \$0.037/pound for a value of \$1.82. The total value of distillers grains and ethanol is \$9.47 or \$2.39 more than the value of the corn. This does not represent the profit potential since there are ownership and operating costs for these plants.

Ethanol plant profitability is tracked by the Center for Agricultural and rural development using current and future estimates ethanol, corn, natural gas and distillers grains prices http://www.card.iastate.edu/research/bio/tools/proj_eth_gm.aspx. In the last simulation done last week, returns over operating costs were estimated at \$0.43/gallon. The authors estimate that capital costs might be about \$0.25/gallon, so the net estimated implied profit would be about \$0.18/gallon.

The Iowa State group projects that corn prices may decline in the future along with corn and distillers grain prices while natural gas prices will increase over the next two years. Under this scenario, with cheaper corn, ethanol plant profitability is actually lower than now. The bottom line is that high ethanol and distillers grain prices ethanol counteract the impact of high corn prices on ethanol plant profitability and it appears ethanol plants are able to be profitable at high corn prices.

Greg Roth, Department of Crop and Soil Science.

Solar Photovoltaic Electricity

Does it Make Sense for You?

Note: This article originally appeared in the August issue of Penn State Extension's "Dairy Focus" newsletter. Since many readers of "Renewable and Alternative Energy" might not get that publication, we thought it might be worth sharing with you.

If you look at a map that shows how much solar energy is available at different locations in the United States, you can't help that notice that Pennsylvania is one of the cloudiest spots in the country. Granted, the southeast corner of the state is a little bit sunnier, but there's no getting around the fact that we get more than our fair share of clouds.

One positive benefit of this is that we are usually blessed with ample rains throughout the year that allow for most farmers and gardeners to avoid costly irrigation. One down side is that solar power struggles to be cost effective in this region. The US Department of Energy's National Renewable Energy Laboratory published an analysis that predicts that the payback for solar photovoltaics in the keystone state can be as high as 60 years or more. This is not a very good scenario for a business investment.

However, in recent years, many farmers and others have installed solar photovoltaic panels on their properties, and have begun generating their own electricity. Why? Well, the bottom line is that people really like photovoltaic electricity for a variety of reasons, and as a result our government is putting a lot of tax dollars towards making it more affordable to install PV. This can come in the form of government grants, tax credits, and government mandated "alternative energy credits", to name a few. As a result, it has not been unusual for projects to have as much as 70% of their installation cost covered by government programs - under those conditions solar PV almost makes economic sense for the investor.

Of course, there are non-monetary reasons to install PV as well, including the simple fact that it's fun to generate electricity, and even more fun to not have to pay a monthly electric bill. Solar PV is generally very low maintenance, and it tends to work without owners having to constantly check and fiddle with the system.

So, if you are thinking that a Solar PV system might be in your future, what kind of things should you think about?

1. Where would you put it?

The ideal location for a stationary PV array is a south facing surface that is tilted at an angle equal to the latitude of your location (in Pennsylvania, that's about 40 degrees up from horizontal). However, you don't have to have the perfect slope or orientation to get good performance. For example, if you have a roof that faces within about 20 degrees of south, and has a bit of slope on it, you'll probably be fine using it as a location for a photovoltaic array.

2. Will it stay in place?

There are few things as embarrassing as having your solar panel blow away in the wind, or worse yet, having the weight of the panels squash your building. Most solar panels are surprisingly light, so little or no structural stiffening is needed to make most buildings "solar-ready". However, if your building is on the rickety side, you should have it checked by a qualified engineer. Most installers are experienced with using good quality mounting hardware that not only holds the panels down, but prevents roof leaks as well.

3. What about the wiring?

The electricity generated by a photovoltaic panel is "Direct Current" (DC). You need to change it to "Alternating Current" (AC) with a device called an "Inverter" before it can be fed into your farm's power system. (Footnote: a few folks use the DC power directly rather than switching it to AC, but that is not really common in Pennsylvania). You will need a spot to install this equipment, preferably close to your solar panels and near the main distribution panel for your electrical system. Some inverters can be installed outdoors, but it is always nice if they can be kept under cover. Safety shutoff switches and lightning protection are also essential elements of the overall system.

4. Can you afford it?

The payoff for solar PV electricity depends on the future price of electricity as well as alternative energy credits. Both of these are highly uncertain. Right now, the credit market is taking a beating in Pennsylvania, but it is sure to rebound. However, nobody really knows what the long term value of those credits will be. Regardless, you should take a close look at the financial side of things and be absolutely certain that, if there is a bad year or two in the credit market, you will be able to get by.

Finally, be sure to talk to people - check with more than one installer, and talk to as many people in the area that you can find who have already installed solar PV. That will probably give you the best idea of whether or not a solar power system would make sense for you.

Daniel Ciolkosz, Department of Agricultural and Biological Engineering

Penn State Extension Launches Renewable Energy

Academy

Westmoreland County Expands Energy Program

The Penn State Extension office in Westmoreland County will kick-off a new endeavor the last week of September when they will be hosting the launch of Renewable Energy Academy (REA). This effort will provide participants and opportunity to learn about renewable and alternative energy technologies in a classroom setting, each session being delivered in a single morning time frame.

One of the goals is to deliver a condensed seminar in a single class of limited duration so that the time away from the usual chores of the day will be short but the class time long enough that the subject matter can be delivered in enough detail to be meaningful and actionable. To make the offer even more attractive participants will be provided breakfast.

Penn State Extension

The kick-off meeting entitled **Introduction to Renewable and Sustainable Energy** and starts at 8:00 am on Thursday September 29 and concludes at 11:30 am. The agenda for the day includes a discussion on the types and classifications of renewable and alternative energy, a comparison of the environmental and economic pros and cons of each, and the fundamentals for choosing renewable and sustainable options over conventional fossil fuels.

By design REA is a series of seminars on a variety of topics that fit into the 3 ½ hour time frame structured to meet the interests and needs of the participants. Class members for the Intro session can choose from a variety of topics that will be offered at future sessions, one each month. Session will be repeated as needed based on the level of consumer interest. Later sessions will cover topics such as Basics of Solar Photovoltaic Systems, Biomass Combined Heat and Power for Institutions and Industry, Geothermal Technologies for Homes and Business, and a number of other subjects.

Ed Johnstonbaugh, Westmoreland County

About Renewable & Alternative Energy Extension

For more information on Cooperative Extension's Renewable and Alternative Energy Resources at Penn State visit our home page at <http://energy.extension.psu.edu/>

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