



Cooperative Extension Renewable and Alternative Energy



ENERGY UPDATE

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UPCOMING EVENTS

Energy Beet Field Days

22 and 24 September, State College and Gordonville PA.

<http://extension.psu.edu/energy/events/upcoming>

Biomass Production on Reclaimed Land - Field Day

15 October, Clearfield PA.

<http://extension.psu.edu/energy/events/upcoming>

Lancaster County Renewable Energy Breakfast

19 October, Lancaster County Farm and Home Center, Lancaster PA

<http://extension.psu.edu/energy/events/upcoming>

Cellulosic Supply Chains Short Course

11 November, Penn Stater Hotel and Conference Center, State College PA

<http://extension.psu.edu/energy/events/upcoming>

Biomass Combined Heat and Power Short Course

WELCOME!

With the arrival of September comes the first taste of cooler weather in Pennsylvania after a glorious warm summer. It's a time to enjoy the fruits of harvest, and to prepare for the winter to come. That's also the case when it comes to energy.



The colors of fall are on their way

The banner at the head of this newsletter is from the recent groundbreaking ceremonies at Penns Valley School District - one of the examples of work that Penn State Cooperative

Extension continues to support in our commonwealth. In the photo are members of the Penns Valley community biomass committee: Jay House Bair, Chris Houser, Jay Martin Sal Nicosia, George Stover, Ron Fetzer, and Wes Miller. You can read more about this exciting project in one of this month's articles.

Other articles this month include a fascinating look at Osage Orange as a potential biofuel crop, as well as an update on the Renewable Energy Cre market from our state expert. Upcoming events are also featured - be sure to get out to some of these outstanding educational workshops and short courses.

Whether you are a renewable energy producer, end user, or are just interested in the topic, you'll find that extension has resources to educate you on this important subject, and help you make wise decisions about using and producing energy.

Hope you all have a great autumn!

Sincerely,

17-18 November, Donahoe Center,
Greensburg PA
<http://extension.psu.edu/energy/events/upcoming>

Dan Ciolkosz
Newsletter Editor
Renewable and Alternative Energy
Penn State Cooperative Extension

Community Wind Conference

November 30- December 1, 2010 at Penn State
Conference Center and Hotel, State College, PA
<http://www.windustry.org/cwaa>

LINKS

[PSU Renewable & Alternative Energy](#)

[Coping with High Energy Prices](#)

[Biomass Energy Center](#)

Osage Orange for Bioenergy? Penn State Investigating This Promising Option

Is Osage-orange (*Maclura pomifera*) an alternative woody crop to produce biofuel? That is what Penn State Extension Educators Dave Jackson and Craig Altemose are trying to determine. Osage-orange, a small tree native to Oklahoma and east Texas, has been widely planted and is now naturalized from the Mid-West to New England and south to Georgia. It was used widely as a field hedge, before barbed wire was available, and then as a windbreak and component of shelterbelts.

There are a number of characteristics that make this tree a potential candidate for fuel production, the first being the density of its wood. Valued for making bows, the wood is noted for its hardness, flexibility, durability, and resistance to rot. The wood of Osage-orange is twice as strong and harder than hickory. The heartwood is the most decay resistant wood of all North American hardwoods and has more BTU's than any other dried wood.

Another characteristic that makes this tree particularly useful for biofuels production is the fact that it only has to be planted once. Following harvest this tree will sprout prolifically from the stump, a process called coppicing. In a coppiced wood trees are repeatedly cut down, new shoots emerge, and after a number of years the coppiced trees are ready to be harvested, and the cycle begins again.

Finally, researchers looked at the seed of Osage-orange and found it to be similar in size to that of a grain of wheat. This size allowed it to be easily planted from seed at high populations using a conventional no-till agricultural drill. The idea being that agricultural producers would have this type of equipment on hand and could easily plant marginal or highly erodible lands to a woody biofuels crop that could potentially provide periodic income.

In the spring of 2010, an open field, high density, planting using a conventional agronomic no till drill was established at the Rock Springs Ag Progress Days research farm. The area had been site prepared using multiple herbicide treatments the previous summer. Three planting rates were established on a one acre site. By mid-May germination was noted and by late June looked very good. It appeared the no-till planter was successful at planting the seed. Now researchers are waiting to see how the trees handle the weed competition which has become quite severe even with the excellent site preparation work.

No further work is planned for the remainder of the growing season in 2010. A dormant season weed control treatment is planned for spring 2011. At that time seedling growth and survival will be assessed in late winter 2011. Stay tuned, there will be more to come as we harvest and evaluate this interesting energy crop possibility.

David Jackson, Penn State Cooperative Extension, Centre County



Planting Osage Orange at PSU Research Farm

School to Save Money With Biomass Heat Recent Groundbreaking for Penns Valley Heating Project

On September 9th, public officials and the public gathered at Penns Valley School District in Spring Mills to witness the groundbreaking ceremony for a new \$2.7 Million biomass heating system that will heat the high school as well as the adjacent elementary school and district offices. Penn State Cooperative Extension worked closely with the school district, providing a feasibility study for the biomass heating system, and helping the school district apply for and receive over \$1.5 Million in grants for the project.

When completed, the facility will use wood fuel in an advanced, high efficiency low emissions boiler to produce hot water that is piped to the high school, the elementary school, and the mechanical shop where it is used to heat the buildings in the winter. A future community center will also be heated by the biomass system once it is constructed. One of the main challenges in getting the project started was to help people understand just how clean and economical wood heat can be for a large building. Rob Pacella, director of the physical plant at Penns Valley, looked carefully into the matter, visiting many schools, hospitals, and other facilities in the area that are already using wood heat to make sure that this would be a good move for Penns Valley.

The project is expected to reduce the school's annual heating bills by over \$150,000 - a savings that will be a welcome help during these difficult economic times. In addition to lower heating costs each winter, the project will benefit the community by providing business to local forest products suppliers. Also, the biomass boiler is manufactured in Pennsylvania - another way that this project is contributing to the economic and ecological growth of the Keystone State. Penn State and Penns Valley plan to continue to work together to make full use of the educational potential of the project for the benefit of students as well as the surrounding community.

Cellulosic Supply Chains Short Course

Advanced Training to be Held at Penn State

People that work in the area of bioenergy soon realize that one of the key challenges facing the bioenergy industry is not the growing of feedstock, it is the efficient harvest, transport, and processing of the biomass. This combination of systems is called the "supply chain", and it is an area of intense interest and work in the industry right now. In November, national experts in biomass supply chains will be gathering at Penn State for the "Cellulosic Supply Chains Short Course". Topics to be covered will include:

- Supply Chain Configurations,
- Pre-processing options,
- Harvest Technologies,
- Transport Alternatives, and
- Regional Inventories.



The short course will be 1.5 days in length, and will include an optional "pre tour" of bioenergy plots at the Penn State Experimental Forest. [click here](#) for the event website, including program and registration information.

Dan Ciolkosz, Penn State Department of Agricultural and Biological Engineering

Energy Credits in Pennsylvania

PA Alternative Energy Credit Market Continues on Path to Maturity

As the year 2010 moves into the fall season and the eventual transition to 2011 the Alternative Energy Market in Pennsylvania continues to evolve and grow. The impact of the financial commitment from the PA Sunshine program in the growth of Solar generation capacity in the state has ramped up significantly but still falls short of earlier estimates of the capacity required to meet future demand. As the year draws to an end the phase-in of the four remaining major electric utilities could cause pricing instability as yet unseen in the PA market.

The absence of transparency in the marketplace has helped to keep the waters on price muddy. As of this writing the interstate platform used to track information, the Generation Attribute Tracking System (GATS) indicates an installed (Active) capacity (registered in the system) of 24,568 kW. The weighted average price for Solar originated credits peaked at \$398.70 in April but sits at a low for the year of \$306.14 at last check. There remains, however, some question as to the accuracy of the information which is voluntarily reported. Also, now that the market has been differentiated into two distinct "vintages" (2009/2010, and 2010/2011) each with its' pricing based on the relative shelf life, using a weighted average that doesn't distinguish difference is less than reliable.

Market participants who have not opted or don't have access to long term fixed contract pricing, which is an option limited to large scale systems (500 kW or greater) will have to ride the ups and downs of market demand as the demand for Alternative Energy Credits finds equilibrium. One thing these smaller system owners can do to help with price stability and to maintain some amount of agility to respond to the market is to aggregate. Aggregation groups have existed from very beginning, mostly to serve as a means for system owners to register systems, originate Alternative Energy Credits in a timely manner, and as market development has permitted sell credits in bundles. Buyers interested in the purchase of significant volumes as a means to reduce transaction costs and simplify market participation look to these groups for this service.

Today aggregation groups like the Pennsylvania Alternative Energy Generators Coop group, administered by the Cooperative Extension in Westmoreland County, provide just such a service that permits alternative energy project owners to receive the financial benefits the program provides without the need to remain an expert on the intricacies of the program, all for a nominal fee. The current fee structure is equal to or less than 10% of the value of each transaction. The current group consists of 45 project owners with a combined capacity of over 300 kW and have begun to establish market clout which, as individual stand alone systems they wouldn't have.

Ed Johnstonbaugh, Penn State Cooperative Extension, Westmoreland County

Energy Beets - A Crop for the Future?

Penn State Hosting Field Days this September

Another potential energy crop for our region are beets...sugar or fodder beets. Beets have not been in the forefront of many local discussions on energy crops, but they do have a number of interesting attributes. First, they have a high energy yield per acre. At an ethanol yield of about 25 gallons/ton and a potential yield of 30 tons or more per acre, ethanol yields of 750 gallons or more are possible. Another advantage is the high potential returns per acre. Beets could be a high return energy crop, unlike some other feedstocks. For example, a recent North Dakota study <http://ageconsearch.umn.edu/bitstream/61235/2/AAEA-Article050110.pdf> suggested ethanol production could be viable at a beet price of \$42/ton. Beets also have some drought resistance, being able to go dormant in the summer, but then take advantage of late season rains in late August and September. Beets also grow well across a range of maturity zones and actually do well in the cooler areas of our state. Processing technologies are fairly straightforward and in some of the new proposed processes, some of the non sugar residues are used to generate energy for the processing plant to minimize the carbon footprint. Beet pulp can also be generated as a co-product animal feed. Water requirements are lower for beet than



corn ethanol processing. Beet ethanol could be classified as an advanced biofuel. A beet processing plant may also be able to handle sweet sorghum as a feedstock. Lack of infrastructure in equipment and storage is one challenge here in PA. Beets have relatively high harvesting and hauling costs, so processing must be done on a local level. It could be possible to do juice extraction at satellite sites and then ship the feedstock to a fuel production facility. Harvesting can cause some soil disruption at harvest-but beets are pulled, not dug like potatoes. Beets are also sensitive to some corn and soybean herbicides, so it takes some management to avoid herbicide carryover. Our stony and rocky fields are not good beet fields. We have two field tours scheduled on September 22 in State College and September 24 in Gordonville, Lancaster County if you have interest in learning more about this crop. For more details on the programs see: <http://cmeg.psu.edu/pdf/beet-field-day.pdf>

Greg Roth, Penn State Department of Crop and Soil Science

About Renewable & Alternative Energy

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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