

BioMASS COMMUNICATOR



COOK COUNTY LOCAL ENERGY PROJECT

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Biomass feasibility study on schedule

The Cook County Biomass Feasibility Study, initiated in Dec. 2010, is progressing on schedule. Cheryl Miller, project manager for Dovetail Partners, Inc., reports that the study is on track for a presentation of its Phase I report to the Cook County Board of Commissioners in September of this year.

The nine-member study team, consisting of personnel from the University of Minnesota-Twin Cities, Dovetail Partners, Inc., LHB Engineering-Duluth, and Cook County, met on the

campus of the U of MN in early and late May to review progress and compile materials which will be contained in the Phase 1 report to the county board. A preliminary draft of the report was also distributed to the Cook County steering committee for their review and comments.

The report is a comprehensive treatment of areas relevant to biomass utilization including: current and future availability and costs of local biomass; forest operations and management

practices and their relationship to biomass use; logistics, engineering and applications of small, medium and large biomass systems; projected financial performance; environmental permitting and regulations; existing and potential markets for heat and power; and renewable energy incentive programs and financing opportunities.

The next meeting of the project team and steering committee is scheduled for July 19 in Grand Marais.



LCCMR update

Status of the Cook County biomass energy study - Phase II

Funds for an expanded assessment of long-term biomass availability for renewable energy are in limbo, caught up in the state budget crisis that erupted during the recent legislative session.

Projects of the Legislative-Citizen Commission on Minnesota Resources (LCCMR), including a case study of sustainable bio-energy resources in Cook County and Ely, were in-

cluded in H.F. 1010, the "Omnibus Environment, Energy, and Natural Resources Finance Bill." The bill was passed before Minnesota legislators adjourned in late May, but was quickly vetoed, along with eight other finance bills, by Governor Dayton, setting the stage for a government shutdown on July 1.

In vetoing the bill, the Governor stated his objections to budget cuts and policy

changes at the Pollution Control Agency and Department of Natural Resources, many of which particularly impact clean water programs.

As a result of the veto, all state funding remains pending until the legislature is reconvened, appropriations bills are re-passed, and the Governor signs them into law. A special session is expected to be called in midsummer.

Wood Pellets — what they are ...



Wood pellets — a lot of heat energy in small packages

“Heating with Wood — using wood to heat your northern Minnesota home”, is a publication prepared by Dovetail Partners. It will be available free at the **Small Footprint Living Fair**, as part of the lunchtime presentation by Katie Fernholz on Friday, June 24. It offers a detailed discussion of residential wood heat as well as the pros and cons of cordwood vs. wood pellets. The document can also be downloaded at:

www.cookcountylep.org

or

www.dovetailinc.org



Burner unit of a wood pellet-fuelled heater

In the course of the biomass energy study, the possibility of producing wood pellets locally has frequently been proposed as a cost-effective way to utilize local biomass. On the surface, this seems a simple solution. However, there are a number of factors to consider if this is to be viewed in a realistic context. The following article provides some basic background to better prepare for the community discussion that should take place.

Wood pellets— what are they?

Wood pellets are compressed wood particles that are used as fuel. Pellets are already commonly used in some areas of the country, and in other areas they are growing in popularity as primary fuel costs increase and concerns about global climate change build.

Advantages of wood pellets

Wood pellets are very low in moisture (water) and ash content, so they burn hot and cleanly. Fuel pellets are limited to 1 percent (premium grade) to 3 percent (standard) ash. Regular firewood has more ash because of the bark. Wood pellets also are small and easy to handle. They are generally available in 40-pound bags, but in some areas they are available in bulk. Containing much less water than cordwood, pellets are denser and are

more efficiently transported.

There is very little dust and no bark. Many wood pellet-burning stoves have hoppers with feed screws that feed the pellets into the fire when fuel is needed.

Larger furnaces are available that have large storage silos that also automatically feed fuel into the furnace when needed.

Both systems require little maintenance because the pellets burn so cleanly.

Pellets have a number of “environment-friendly” attributes. Pellets usually are made from wood processing byproducts (sawdust, for example), so they are making a valuable product from a potential waste material. More recently, low-quality trees from forest thinnings and salvage operations have been used.

It should be noted that, because of its poor quality, the great majority of logging slash and piles of woody debris accumulated around Cook County would be unsuitable for the production of pellets.

Carbon Neutral?

Wood and wood pellets are often described as “carbon-neutral” in terms of their contribution to global climate change: all the carbon dioxide

that is released when wood is burned was captured from the atmosphere when the wood was grown in the tree.

While the climate impact of wood pellets continues to be debated, biomass fuels, including wood pellets, are generally recognized as having far lower **net** life cycle carbon dioxide emissions than fossil fuel equivalents, to the order of 98% fewer emissions.¹ Also to be considered are emissions generated during processing and transportation. These tend to be higher for fossil fuels as well.

Cost

Because wood pellets are made from wood, they have many of the same advantages as cordwood: local, abundant, renewable, and relatively low-cost.

While pellets tend to be more expensive than cordwood, they are usually cheaper than fuel oil, propane, or electricity. In Cook County, pellets typically sell for about \$220 per ton (including delivery) when purchased in bulk. Pricing will be higher if purchased in 40-lb bags. This compares to about \$215 for an equivalent amount of heat energy from cordwood (\$120 per cord; 9.4 mmBtus/ton cordwood vs. 16.8 mmBtus/ton pellets).

¹ — McDermott, Matthew (2009-04-14). "Biomass Can Only Offer Major Emission Reductions if Best Practices Are Followed, New UK Report Says". <http://www.treehugger.com/files/2009/04/biomass-can-only-offer-major-emission-reductions-if-best-practices-followed.php>.

... and how they are made

Raw material

The production of wood pellets begins with the generation of the raw material. In most cases, this raw material is a byproduct of some other wood processing operation. Hardwood flooring mills are one good example: they produce large quantities of clean, dry sawdust and small blocks in their operations. This makes an ideal raw material for pellet production; however, as the interest in pellet production grows, some mills are generating pellet-making raw materials from logs, also known as “round wood.”

Drying

The pellet raw material

must be uniformly dried to a low moisture content (below 4 percent on a dry-weight basis). Because of the high temperatures and pressures in the manufacturing process, excess moisture can cause problems. However, this low moisture content is also one of the reasons that wood pellets burn so well.

Processing material

Once the feedstock has been dried, it is fed into a hammer mill that makes the wood particles a consistent size. This helps make the pellets a consistent density so that they provide a consistent heating value.

Formation of the pellets

Pellets are extruded, or formed, using special dies. High pressures (45,000 PSI) and temperatures (200 °F) are generated in this process, which softens components of the wood (the lignin) and binds the material in the pellet together. No additional adhesives are required.

Bagging and storage

Once the pellets are formed and cooled, they can be packaged in bags or stored in bulk. Most people buy pellets by the ton (a pallet of fifty 40-pound bags), or they buy in bulk and a delivery truck places them in small silos outside of the home. Pellets can be stored indefinitely, but they must be kept dry to prevent deterioration.

Capital costs

Feasibility studies have projected the cost of a full pellet production facility from \$4.5 to \$9.1 million, depending on the production capacity. There would also be considerable operating expenses and labor inputs. An industrial pelletizing machine alone can cost as much as \$250,000. Additionally, it has been



Large electric motors are used to power pellet mills, which compact wood particles and extrude them as pellets through small openings in steel dies.

shown that a pellet plant needs to be of significant size to be cost effective.

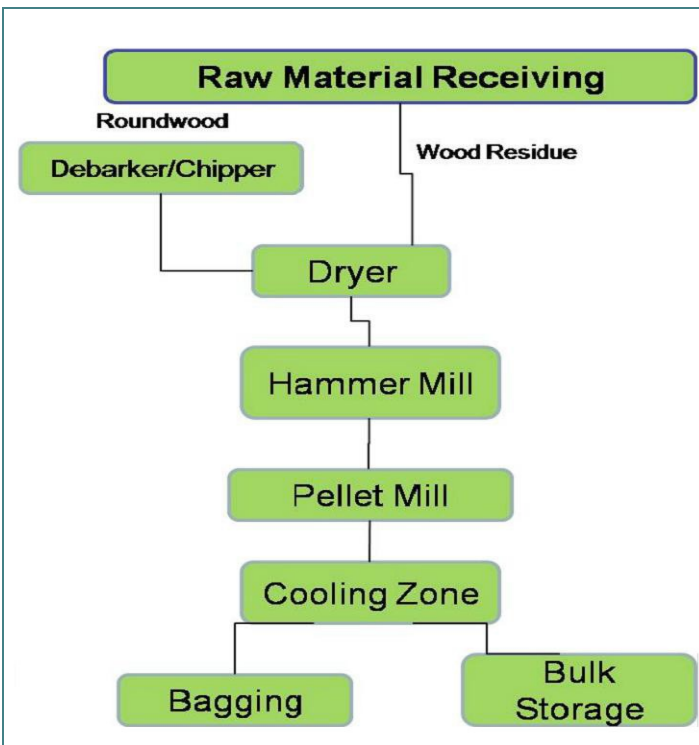
Pellets as an element in the Cook County Biomass Energy Study

While it is not the purpose of this study to explore the feasibility of pellet production in Cook County, the team recognizes that wood pellets do play a role in the potential utilization of biomass. With this in mind, the study will address a number of the issues relating to pellet production including potential future demand and the availability of suitable feedstocks.

References:

“Wood Pellets: An Introduction to their Production and Use”, David Jones, Mississippi State University; David Harper & Adam Taylor, University of Tennessee, 2008

“Wood pellet” - Wikipedia, the free encyclopedia.htm (retrieved 2/23/11)



Wood pellet production flow chart

Cook County Biomass Feasibility Study

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www.cookcountylep.org

or

www.dovetailinc.org/cookcounty

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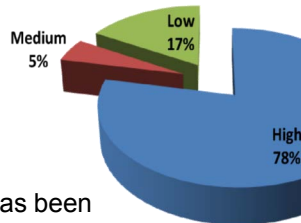
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What, who, why and how –

The Cook County Biomass Feasibility Study is a collaborative effort between Cook County Commissioners, the Cook County Local Energy Project (CCLEP), Dovetail Partners, Inc. and the University of Minnesota. CCLEP is a citizen-driven non-profit organization that began in April 2008 and whose mission is to facilitate energy efficiency and local renewable energy development in Cook County. Dovetail Partners, Inc. is an environmental firm based in Minneapolis, which has been contracted to oversee the study.

The study consists of two phases. The first phase is funded by the county and assesses feasibility of converting to biomass energy at different scales of operation. Its emphasis is more on current energy demand and the technological options (stand alone, district heating, combined heat and power (CHP)) for meeting it, including costs, biomass use, etc. The second phase is more in-depth analysis of longer-term biomass availability and costs and the environmental and life cycle impacts of preferred options. This phase is funded by the state through the Legislative-Citizen Commission on Minnesota Resources (LCCMR) and is intended to provide communities and policymakers with information about implications of biomass energy conversion on forest resources (positive and negative).

Survey says ...



The study team has been conducting a survey to assess the importance county residents place on various outcomes related to the utilization of biomass. The survey has been distributed via email throughout the county and is online at the Cook County Local Energy Project (CCLEP) web site

www.cookcountylep.org/survey.html. Hard copies are available at the Java Moose in Grand Marais, and also at the Small Footprint Living Fair, June 24 at the Cook County Community Center.

If you haven't already completed one, we encourage you to do it soon. As an added incentive, all those who complete the survey (and include their name) will be part of a drawing for one of two \$10 gift certificate to the Java Moose. You don't drink coffee? They've got great sandwiches and soup, too.

The drawing will be held on Friday, June 24 during the Small Footprint Living Fair as part of the lunchtime presentation by Katie Fernholz of Dovetail Partners. Don't miss it!

A report by Dovetail Partners, Inc.

Limits to Global Petroleum Production

A 2010 report from the U.S. Defense Department Joint Forces Command included a sobering observation: "Assuming the most optimistic scenario for improved petroleum production through enhanced recovery means, the development of non-conventional oils (such as oil shale or tar sands) and new discoveries, petroleum production will be hard pressed to meet the expected future demand of 118 million barrels per day."² The report went on to indicate that global surplus oil production capacity could entirely disappear by 2012, and that as early as 2015 a shortfall of 10 million barrels per day could develop.

For those interested in more on the recent findings of leading energy forecasting organizations regarding future petroleum availability and consumption, check out a recent report titled "Limits to Global Petroleum Production", prepared by Drs. Jim Bowyer, Jeff Howe, Steve Bratkovich, Sarah Stai and, Kathryn Fernholz. To download the report:

<http://www.dovetailinc.org/files/>

[DovetailPetroLimits0511.pdf](http://www.dovetailinc.org/files/DovetailPetroLimits0511.pdf)

² — 2010 Report: Joint Operating Environment – U.S. Joint Forces Command; www.jfcom.mil/newslink/storyarchive/2010_JOE_2010_o.pdf