Recent Developments
IN BIOMASS ENERGY
Presentation Outline

The Minnesota State Wood Energy (SWET) Grant
  ◦ What the grant accomplished and where information produced via the grant is located.

Recent Change in Wood Energy Markets

Four Wood Biomass Projects in Various Phases from Operational to Construction and Planning
  ◦ Lonza Inc.
  ◦ Itasca Community College
  ◦ Fond du Lac Band
  ◦ Camp Ripley

MN Incentive Opportunities/Wood Biomass Resources
  ◦ Agribioincentive Program
  ◦ Regional Biomass Work
  ◦ Heating the Midwest Conference
Statewide Wood Energy Team

22 member team comprised of Minnesotans from state, federal and non-profit organizations focused on promoting high efficiency wood energy systems

- $250,000 from USFS for three years to drive the installation of wood energy systems
- Targeting facilities without access to natural gas that have a heating load of 1-5mmBTU (nursing homes, schools, community centers, etc.)
- The grant has two major components:
  - Outreach and education on the benefits of high efficiency wood energy systems
  - On-site assistance for technical evaluations
The Minnesota State Woody Energy Team worked to implement commercially available high efficiency wood energy systems by strategically identifying businesses and government facilities that: 1) were currently using high cost propane or fuel oil for heating and were not connected to a natural gas grid, 2) were located in an area of the state with sufficient biomass resources and in need of forest market expansion and/or wildfire mitigation, 3) were technologically compatible with contemporary wood heating technologies, and 4) were financially committed to appropriately-scaled thermal wood energy options.

The MN SWET utilized a three staged approach to accomplish the work. First was to identify and accelerate initial project scoping. Second was to do initial feasibility assessments to get designs for 15-20 commercial and institutional facilities. The third phase was to complete advanced engineering and financial analysis for 6-10 of those facilities. The ultimate goal of the grant funding was to initiate construction of three or more wood energy systems.
What is a Wood Energy System?

The use of woody feedstocks to make thermal energy (hot or cold) including:
- Space Heating
- District Heating or Cooling
- Industrial Process Heat
- Combined Heat and Power
What are the Benefits of Wood Energy Systems?

Benefits include but aren’t limited to:
- Increases opportunities for forest management activities
- Reduced risk of forest wildfire
- Provide additional markets for forest products
- Reduce greenhouse gas emissions
- Grow MN manufacturing jobs
- Provide a source of renewable energy that allows rural communities to:
  - Develop jobs locally
  - Retain economic wealth
  - Help control costs with local influences and infrastructure.
The “New” wood stove

Wood burning technology has improved drastically over the last 25 years. Now systems are more efficient, cleaner burning, safer and more convenient to use.

Advancements include:

24 hours of unattended heating

New firebox designs that burn wood more completely and efficiently

Today’s EPA-certified wood stoves emit 70% less particle pollution

50% more efficient than wood stoves manufactured before 1990.
Grant Products Created and Outreach Completed

Grant Products Created
- Media publications
- GovDelivery List Created
- White Papers
- Online Webinar
- Directory of facilities
- Initial Feasibility Studies
- Full Feasibility Studies

Outreach/Education
- 40 Facilities that received on-site visits and used the finance app.
- 13 facilities that received contracted feasibility assessments
- Participation or Support for 5 annual Heating the Midwest Conferences
- MN TurkeyGrower Association
  - Webinar/White Papers
- Grand RapidsMN Bioenergy Day
  - 25 attended
MN State Wood Energy Grant (SWET) Information

Grant was active (2014-2017)

 Archived Information Is currently available online at the
 MN State Wood Energy Team Webpage

http://www.dnr.state.mn.us/forestry/biomass/swet.html
Wood Energy Market Changes in 2017/2018

Loss of Xcel’s power purchase agreements (PPA’s) with Benson Power and Laurention Energy Authority
Recent Wood Biomass Projects

4 Projects in various phases from planning to construction and operating phases

- Lonza
- ICC
- Fond du Lac Band
- Camp Ripley
Lonza, Inc. (Operational)

Lonza Inc.’s Cohasset MN plant produces larch arabinogalactan, an ingredient for food and dietary supplements in human and animal nutrition, and used in personal care products.

- Looking for a way to utilize wood fines and utilize material from their manufacturing process to provide heat and stem for their processes and facility.
- The boiler is fed by -6 mesh fraction of wood fines recovered from the spent tamarack wood chips.
- The biomass boiler operates as the lead source of steam and process heat with a natural gas boiler available on a standby basis as backup.
Itasca community college campus heated with a woodchip steam system in the past and recently completed a $1.7 million project to upgrade and modernize their campus central heating plant. The project included the demolition of the old steam equipment, retrofitting a new woodchip fuel bin, installing a new biomass boiler and two new gas boilers and all the mechanical connection work.

**Location:** Grand Rapids, MN

**Campus size:** 240,000 square feet

**Connections:** 12 buildings

**Boiler type:** Hot water

**Wood fuel:** Local woodchips

**Date installed:** 2015-2016

Source: BERC Minnesota Fuels For Schools Program Concept Paper
Fond du Lac Band of Lake Superior Chippewa (Operational and Under Construction)

Currently have a cardboard recycling bundling facility.
- Installed a Minnesota-made Woodmaster biomass boiler.
- Heated by wood pellets

Working on installation of a 1.7 MMBtu biomass boiler spring 2018 to provide a majority of the heat to the Sawyer Community Center;
- The facilities include a gymnasium, weight room, library and other community space. The center has recently been doing some remodeling.

Gwaaba’igan Oodenawensing Biiwiga’iganan Asanjigoowigamig = Sawyer Community Wood Chip District Heat Building;
- Building is up, install of the boiler is set for this Friday.
- There is an air drying floor that will reduce moisture problems associated with wood chips
- Looking to be fully operational Fall of 2018
- Will be providing a tour during the Heating the Midwest Conference on May 1st.
Wood Biomass Project at Camp Ripley MN
Timeline of activities in pursuit of biomass district heating

2013
- USFS Wood Energy Resource Team Preliminary Feasibility Study
- LCCMR Proposal

2014
- MN Statewide Wood Energy Team Assessment
- DoD Energy Conservation Investment Program Funding Proposal

2015
- National Renewable Energy Laboratory Engineering Analysis
- USFS Wood Innovations Grant
- MN Guaranteed Energy Savings Program

2016
- DoD Energy Conservation Investment Program Funding Proposal
- LCCMR Proposal
DESCRIPTION:

Project will install a biomass combustion unit and hot water boiler for facilities in area 11 and 17. Buried pre-insulated piping will be installed to connect a central biomass plant to the existing heating systems at each building. The balance-of-plant will consist of day bin storage with live floor for automated biomass fuel feeding and at-grade bulk storage building for long-term wood chip storage. The biomass boiler sized to cover the majority of heating loads and the natural gas boilers provide full backup, peaking, and coverage of low demand times.

- The Project scope is for 7 facilities with a cost estimate of $3.6 million.

Funding:

- $1,000,000 Legislative Citizen Commission on Minnesota Resources
- $2,500,000 Energy Conservation Investment Program
- $750,000 Federal Modernization
- $250,000 Federal Sustainment
Incentive Opportunities/Wood Biomass Resources

- Agribioincentive Program
- Regional Biomass Energy Work
- Heating the Midwest Conference
Agribioincentive Program

Administered by the MN Department of Agriculture; https://www.mda.state.mn.us/grants/agri/bioincentive.aspx

Established by the Minnesota Legislature in 2015, provides production payments to encourage commercial-scale production of advanced biofuels, renewable chemicals, and thermal energy production from biomass (see Minnesota Statutes, 41A.15, 41A.16, 41A.17, 41A.18, and 41A.19).

Production payments are available for three types of biomass-related products:

• Advanced Biofuel

• Renewable Chemicals

• Biomass Thermal Energy
Biomass Thermal Energy

- New or additional production of thermal energy not in place before July 1st 2015 obtained from biomass is eligible for the incentive program
- Thermal energy production from biomass combustion, gasification, or anaerobic digestion qualifies for the incentive
- Production facilities located in MN
- Facilities must produce at least 250 MMBtu per quarter to qualify
- *(80%) of the raw materials must be sourced from Minnesota
- $5.00 per MMBtu of production; Total payments for an eligible producer may not exceed 30,000 MMBtu of production in a fiscal year; Total payments to all producers are limited by statute to 150,000 MMBtu of advance biofuel.
- Awards will be made on a first come, first served basis within the limits of available funding.
- Biomass Harvesting Requirements Apply.

More information online at;
http://www.mda.state.mn.us/grants/agri/bioincentive/thermal.aspx or

Contact Kevin Hennessy with MDA’s Agriculture Marketing &Development Division
Regional Wood Energy Promotion and Resources

USFS Wood Innovation Grants
  ◦ Funded the MN SWET
  ◦ Have wood energy teams in a number of states across the U.S.

Midwest;
  Wisconsin Wood Energy Team
  Michigan Wood Energy Team
Heating the Midwest Organization

Our Mission
Heating the Midwest’s mission is, “To advance biomass thermal heating in the Midwest for a more sustainable future, while improving the economic, environmental and social well-being of the region.”

http://heatingthemidwest.org/

How To Get Involved;
Join our Email List
You’ll receive our monthly e-newsletter and stay informed with periodic news from Heating the Midwest. Click here to join.

Support HTM Financially
There are several ways to support Heating the Midwest financially. You can be a sponsor for our annual conference, or make a financial contribution online at any time.

Endorse the Vision
Show your support for renewable biomass by endorsing the Vision.

Join an Action Team
Members of our Action Teams work together to develop information and resources for specific Heating the Midwest initiatives. You can learn more about action teams and how to get involved here.

Upcoming Event
◦ Annual Heating the Midwest Conference May 1st thru May 3rd 2018 held at the Black Bear Convention Center in Carlton MN
◦ Register online; https://www.eventsquid.com/event.cfm?id=3099&notRegistered&mbm=0
Biomass Opportunities Moving Forward

**OPPORTUNITIES**
- Successes Stories to Highlight Further Opportunity
  - Lonza
  - Itasca Community College
  - Fond du Lac Band
  - Camp Ripley
- Incentives Available
  - AGRI Bioincentive
  - SWET Grant products are available for future reference

**THE FUTURE**
- Need for Education and Outreach
  - Policy work can be done
  - Wood is a green energy choice that has advantages over wind and solar

- Regional resources available
  - Heating the Midwest Group
    - Annual Conference May 1st - 3rd 2018
      - Black Bear Casino Carlton MN
  - WI and MI Wood Energy Teams
Thank You & Questions?

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U&M website; http://www.dnr.state.mn.us/forestry/um
Viking Company: Biomass for Poultry

Bill Koenig – Farmer
Viking Company – Albany, MN
CERTs 2018 Conference
Today's Talk

• About Viking Co.
• About the project
• Results!
• Questions?

Look!
It's me!
About Viking Company
• Viking Company - a limited partnership family farm

• Been raising broiler chickens for nearly 40 years!

• Contract grower for Gold n’ Plump…then GNP Company…and now Pilgrims Pride

• ≈ 635,000 to 640,000 birds/yr, about 25 million chickens in total.
Conventional Poultry Heating

Gas flame heaters over wood chips and feathers
What could possibly go wrong?!?!
Contract Poultry Production

**Typical Arrangement**
- Grower gets a bonus for beating the average cost of production on a square foot basis
- Incentive: use less LP gas or find a lower cost method

**Viking Project Arrangement**
- Viking Company (Bill) receives the margin between his wood costs per flock and the fuel cost average (LP) on a square foot basis
Two-story broiler chicken barn. Pic of the NEW addition to house the woody biomass furnace
About the Project
Identical Side-by-Side Barns

Control

Test
The Viking Project

L to R – Fresh off the truck. Putting it together. READY TO FIRE!
Test Barn 5% humidity vs. Control Barn 15% humidity
Wood Chips!

- White Oak, 15% M.C. $95 ton
- Furniture Material, 8% M.C. $50 ton
- Trim/Moulding, 10% M.C. $38 ton
- Recyc. Construction, 15% M.C. $70 ton
Results!
Data & Economics

- Twelve flocks across two winters - still collecting data
- Hardwoods with moisture content under 15% and chipped 2 inches or less
- Fuel blends: furniture byproduct, trim/moulding, dry white oak, recycled construction wood
### Data & Economics

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<th>Flock</th>
<th>Wood Tons</th>
<th>LP Offset</th>
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<th>$/ton wood</th>
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$76.67/wood ton $\approx$ $0.84$ gal/LP
$49.39/wood ton $\approx$ $0.53$ gal/LP
Questions?