

A Conversation on Conversions

October 22, 2014 was the Second Annual National Bioenergy Day, which is a nationwide day of advocacy for using biomass, including forest biomass, to generate energy for projects ranging from large-scale utilities to home heating stoves. The US Forest Service used this day as an opportunity to present “A Conversation on Conversions” at their Lakewood office. The event focused on local opportunities for using forest biomass to provide heat and electricity.

Dr. Mike Eckhoff, Regional Biomass Coordinator for the USDA Forest Service, outlined the national situation regarding wood use. Biomass is the largest domestic source of renewable energy providing 48% of the total (2006). Paper and wood products manufacturing facilities account for 62% of the renewable biomass energy consumed by all manufacturing facilities. Wood currently provides 3% of the national energy requirement, but has the capacity to supply 10%

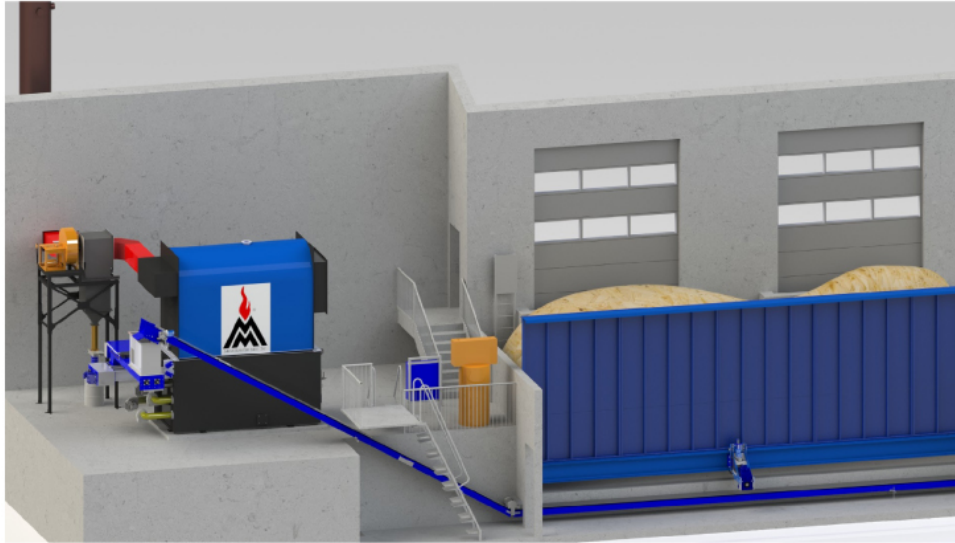
There are 6.9 million acres of available forests in Colorado. In the 1980s Colorado consumed 1.1 million cords of firewood (a cord is a volume of 8’ by 4’ by 4’), but by 2003 this had dropped to 30,000 cords, of which a third was imported. Today, the average wood burning house uses 2 cords of wood per year. The wood burning plant in Gypsum, Colorado provides 11.5 megawatts of electricity, enough to supply 10,000 houses. The feedstock comes from a 75-mile radius around Gypsum. A benefit of wood burning is that it is very efficient, while the cons are that wood use requires storage and is not as convenient as natural gas, which is currently selling at low prices. Several examples of local biomass use followed.

Dr. Kurt Makes, Associate Professor at Colorado State University, discussed the Salvation Army Camp near Estes Park, Colorado. This camp borders Rocky Mountain National Park and contains 440 acres, of which 300 acres are forested. The 8,100-square foot dining room had been heated with propane, but was replaced with a \$56,000 wood system, which is fueled with 40-50 lbs of wood, 2-3 times per day for a total use of 10-20 tons per year. The estimated fuel savings is \$7,000 per year with a payback time of 8 years. It is important to fine tune the system to reduce emissions, but it has worked for 5 years without problems.

Dave van Buren is Executive Director for the Mountain Park Environmental Center in Beulah, which is located west of Pueblo on 611 acres owned by the city. The Center was built by the WPA and was largely non-insulated. The facility uses 2 biomass burners to heat 14,000 square feet of the building. These burners, which cost \$130,249, use 30-40 cords per year, which is gathered by prisoners. 95% of the wood is Ponderosa Pine. The payback time is estimated at 4 years.

Bill Paulman, Facilities Manager at the Gilpin Road and Bridge Facility near Black Hawk, Colorado, discussed the county's 21,000 square foot facility heated with a Messersmith

Boiler. The heating system cost \$200,000, compared with the overall cost of the facility of \$4 million. The boiler burns 300 tons of wood per year and generates 15 gallons of ash per week. (For reference, a cord of Lodgepole Pine weighs about 1 ton.) The entire system is hydronic (floor heat) and the approaches to the building entrance are also heated to melt snow. The boiler uses an automatic feeder, which involves an auger in a chip pit. A minimum length of 8 feet for their timber is required to facilitate handling.



Messersmith Biomass Boiler System

Boulder County Parks and Open Space provided a DVD to illustrate the use of their Messersmith Boiler, which has been in operation for 10-15 years. The system uses 60 acres of surrounding forest for feedstock and has a bin capacity of 1 ½ to 2 weeks supply. Forest clearing and wood chipping is performed in the summer in preparation for winter use. Ash clean-out is done once or twice a week. A gas furnace provides back-up for additional heat. The system is located near the Boulder Municipal Airport, but the discharge causes no visibility problems. Payback is estimated at 20 years.

Carol Dollard, a Professional Engineer, discussed the biomass boiler at CSU's Foothills Campus in Fort Collins. Like Boulder and Gilpin County, the system uses a Messersmith Boiler, which has been in operation since 2009.. Biomass was an obvious choice for energy as there is a plentiful supply from both waste diversion and forest management by the Colorado State Forest Service, which partners with CSU. Currently the system uses woodchips at a cost of \$40-\$50 per ton, and there is a 5-6 day's storage in the chip pit. The system is particular in that it requires woodchips about the size of a matchbox. A larger system would be able to accommodate more various feedstock. Production is 1 ½ million btu per hour. Ms Dollard pointed out that the greatest safety risk is fire. A water sprinkler system is installed above the chip pit in case flames travel back from the furnace and has already proved effective. Low natural gas prices have made the economics of the plant more challenging, and a larger system would be more cost effective.

Dr. Eckhoff summarized by listing resources to assist in converting to forest bioenergy, including an app for a biomass financial calculator available from the University of Minnesota (<http://woodenergy.umn.edu/BiomassCalculator/>). The US Forest Service has collaborated with the University of Tennessee to produce a database of biomass facilities.

There is an upcoming funding opportunity for wood use from the U.S. Forest Service. Amounts are up to \$250,000 for two to three years (up to five years if the project is of greater complexity) and eligible applicants include for-profit entities; State, local, and Tribal governments; school districts; communities; not-for-profit organizations; or special purpose districts (e.g., public utilities districts, fire districts, conservation districts, or ports). For more information, visit: <http://www.gpo.gov/fdsys/pkg/FR-2014-10-27/pdf/2014-25514.pdf>