

Utilization of Woody Biomass and Opportunities for the Creation of Bio-energy

Speakers:

Edmund Gee, Woody Biomass Utilization Team Leader
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Ed will briefly discuss national policy and the role of land management agencies (including the USDA Forest Service) in promoting the use of woody biomass for bio-energy.

Catherine Mater, President, Mater Engineering
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Catherine will present her involvement in increasing the use of bio-energy and developing the Coordinated Resource Offering Protocol (CROP) study, which is currently under contract with USDA Forest Service.

Elaine Zieroth, Forest Supervisor, Apache Sitgreaves National Forest
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Elaine will present the White Mountain Stewardship Contracting Project, which spans 10 years and produces mostly low-value woody biomass. Most of the woody biomass produced is used by a variety of bio-energy production facilities developing near the project area.

Robert Davis, President, Forest Energy Corporation
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Rob will describe the process of making pellets from woody biomass for home heating. His company creates pellets from woody material produced by the White Mountain Stewardship Project.

Presentation Abstract:

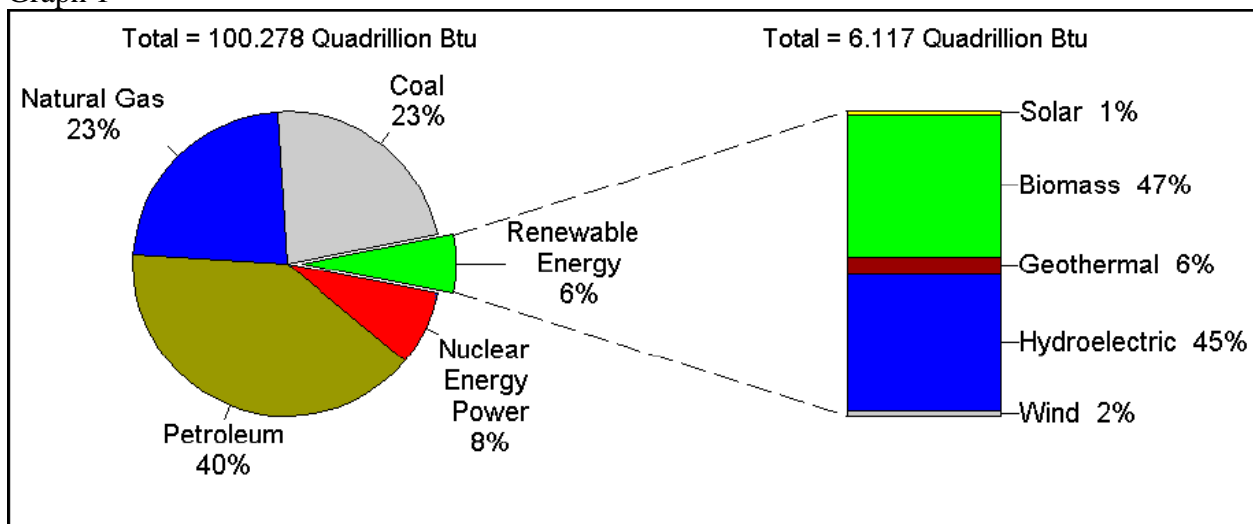
This panel will explore the utilization of woody biomass and opportunities for the creation of bio-energy. The introduction includes an overview of national policy affecting woody biomass utilization. Then there will be a brief introduction on the Coordinated Resource Offering Protocol (CROP), followed by a Forest Service case study examining the use of woody biomass for bio-energy, specifically production of wood pellets.

Introduction

The USDA Forest Service is working diligently with communities, States, tribes, and other federal agencies to decrease one of the greatest threats facing rural communities today—wildfire. The wildfire threat is due to the high number of trees per acre in our nation’s forests. As our nation’s forests are restored, by thinning of trees to acceptable number per acre, these thinned trees can be used to generate bio-energy.

In the “Billion Ton Report” from USDA Forest Service and the Department of Energy, researchers estimate Americans use over 100 quadrillion BTUs of energy annually. Currently, approximately 6% of that total is provided from renewable energy sources. Of the 6.2 quadrillion BTUs provided by renewable energy, 47% is produced by biomass. (See graph 1)

Graph 1



During a recent 25X25 conference James Woolsey, previous CIA Director, stated energy consumption is one of the greatest threats to our national security. 25X25 is a consortium of organizations promoting the use of renewable energy that by the year 2025 at least 25% of all energy consumed in the United States (US) will come from renewable energy sources. The US is by far the largest user of petroleum, natural gas, coal, nuclear and renewable energy in the world. However, there is increasing competition for energy from manufacturing giants such as China and India. Woody biomass currently is an underutilized source of energy. Our panel will explore the potential for reducing US dependency on foreign oil through increased use of woody biomass.

Woody biomass utilization for bio-energy is the focus of our panel today. The three components of the panel are (1) an inventory analysis of a leveled supply called a coordinated resource offering protocol (CROP), (2) stewardship contracting a long-term (up to 10 years) contract capable of exchanging goods for services, and (3) a pellet manufacturing plant utilizing woody biomass from the stewardship contract.

CROP and Levelled Supply: A New Planned Harvest Protocol for Public Land Managers in the United States

Passage of President Bush's Healthy Forest Restoration Act (HFRA) in 2002 set into motion major forest restoration efforts particularly in Western states to significantly reduce conditions prone to feeding catastrophic fires similar to those experienced in California, Arizona, Colorado, Montana, and Oregon during the last two years. In an effort to better define and implement collaborative landscape activities based on necessary fuel load reduction and attracting necessary investment to targeted landscape regions, Mater Engineering embarked on a landmark project designing a new model for ensuring resource coordination at landscape scale. The new model called Coordinated Resource Offering Protocol or CROP, initiated in 2002, is a new planned harvest protocol for public land managers. The fundamental tenants of CROP are to:

Coordinate projected resource offering in an **investor landscape** (~ 200 miles) *within federal agencies* (i.e. ranger districts within national forests; BLM districts) and *between all public agencies* (USFS, BLM, state, county, DOT, military installations, etc.);

Within the coordinated removals, **level resource offering** (volume, species, diameter sizes) to reduce investor risk; invite investment within CROP regions; and capture highest value off the resource being removed;

Help **increase trust factor** with industry/environmental stakeholders and the general public through the transparency of the CROP process; and

Create new measure of partnership with forest-based communities in CROP regions through **implementation of a monitoring model** to track the performance of CROP over time.

In 2005, the US Forest Service Woody Biomass Utilization Team, comprised of key officials in Washington DC, released their *National Strategy for Woody Biomass Utilization*, which incorporated CROP as a key implementation tool to achieve Congressional fuel load reduction mandates on public forest lands through economic incentives for biomass utilization across the US. The US Forest Service retained Mater Engineering in 2005 to undertake eight CROP pilots across the US. These pilot projects involve 27 national forests, 84 ranger districts, 35 BLM field offices, multiple state agencies, and almost 200 county jurisdictions. CROP pilot projects are located in Oregon, Colorado, New Mexico, South Carolina, Mississippi, and a multiple-state CROP landscape that includes Vermont, New Hampshire, New York, and Maine. The pilots were initiated in 2005 and are scheduled for completion in 2006.

This presentation will cover the status and results of the CROP pilots projects conducted throughout the US.

Stewardship Contracting

In August 2004, the Apache-Sitgreaves National Forests awarded the 10-year White Mountains stewardship contract to thin at least 50,000 acres of primarily small-diameter ponderosa pine trees, emphasizing Wildland Urban Interface areas surrounding communities in the White Mountains of Arizona. We want to thin at least 150,000 acres surrounding our Wildland Urban Interface communities. The contract was awarded to Future Forest, LLC, a local partnership of WB Contracting and Forest Energy Corporation. This stewardship contract is designed to restore forest health, reduce the risk of fire to communities, reduce the cost of forest thinning to taxpayers, support local economies, and encourage new wood product industries and uses for the thinned wood fiber.

Collaboration with state and local organizations, citizen groups, conservation organizations, and other stakeholders is critical and on-going for the forests. In 1997, a diverse group of community members formed the Natural Resources Working Group to build consensus on forest restoration. The Arizona Sustainable Forest Partnership remains an important discussion group with wood product industry representatives. Community Wildfire Protection Plans, covering all of the communities near the forests, are complete and prioritize forest restoration treatments. Collaboration with citizens and conservation groups has resulted in 70,500 acres of NEPA analysis completed with only 1 objection filed, and the objection resolution process is underway.

The 10-year guaranteed supply of wood fiber enables wood product businesses to invest in equipment designed specifically to treat and mill small diameter wood. Six Forest Products Laboratory grants of \$250,000 each have been awarded to White Mountain-based businesses in the last two years. These grants are a vital source of “seed-money” to purchase equipment and technologies to utilize and manufacture value-added products from small-diameter wood. One half of the trees being thinned are between 5” and 9” in diameter. On some task orders, 50% of the wood fiber thinned is 5” inches in diameter or less. The federal funds invested in these enterprises reduce the cost of forest restoration treatments and make landscape-scale treatments possible. Prior to the stewardship contract, forest restoration costs were up to \$1,100 per acre. That cost is now from \$350 to \$550 per acre, depending upon the treatment prescription.

As of September 2006, task orders for the thinning of over 30,000 acres have been issued, 15,000 acres completed, and 350,000 green tons of biomass treated. Products created from the thinned wood fiber include wood pellets for home and industrial heating, animal bedding and compost materials, wood molding, structural lumber, paneling, wood pallets and biomass to generate electricity. Show Low-based Forest Energy Corporation increased their wood pellet mill capacity by 50% and recently doubled their supply contract with the Home Depot. Several industrial wood pellet heating customers are on line, including the towns of Eagar and Springerville offices, and the Apache-Sitgreaves Supervisors Office.

The 3 mega watt Eagar bio-energy plant opened in 2004 and uses 50,000 green tons of limbs, tops, and small trees, annually. Arizona power companies have contracted with a local company to add a 20 megawatt bio-energy plant in Snowflake that will use 170,000 green tons of biomass, annually.

The stewardship legislation authorizes the USDA Forest Service to work collaboratively with a multi-party community monitoring board to assess the economic, social, and ecological impact of the contract. The first year economic and ecological assessments are completed and the social assessment will be available in late June. The assessments were conducted by independent contractors.

University of Arizona economic development professor, Dr. L.J. Gibson, just completed the first year economic assessment of the stewardship contract. His analysis reveals that the 13 businesses directly working on the stewardship contract support 450 full-time jobs in Arizona and 318 of those full-time jobs are in the local area. These 13 businesses spend over \$12 million for goods and services in the local White Mountains region.

Utilization of Woody Biomass and Opportunities for the Biomass Heating

The White Mountain stewardship project has presented an opportunity to extend our knowledge of residue volumes available from thinning, costs of their removal, and utilizing the low value residues for biomass energy, specifically pellet production. A majority of the materials from ponderosa forest restoration projects result from trees smaller than 5" dbh, tops, limbs, and slash. No customary products of value can be produced from this material. Bio-energy and specifically, heating with biomass does present an opportunity and market that can create value added product to help pay for the restoration and maintenance of the forests as well as creating a new, stable, local industry. In addition, benefits are also derived from the reduction in greenhouse gas emissions. The efficient use of this resource and energy dollars stay in the community.

The markets in North America are currently limited. Growth has been slow in the residential market until the past three years, and the commercial markets are just beginning to gain acknowledgment as a potential solution. Even with the unusual growth due to the jump in fossil fuel prices over the past year, existing production capacity is very close to existing demand and both are growing. The markets for the same systems and biomass fuels in Europe have surpassed the North American market by 5-fold in the past 10 years. Improvements in their technology over the last 20 years have resulted in efficiencies averaging close to 90% and emissions approaching those from natural gas in most categories. Especially with the outlook for fossil fuel prices, this industry is poised for tremendous growth in the residential markets, but especially in the commercial and industrial markets. Biomass should play a significant role in our energy future and pellets offer advantages in many situations for the storage, handling and transportation of biomass.

Although the technology is not totally new for either the production of pellets or the combustion heating systems, the utilization of forest thinning residues to produce pellets is somewhat new in the world. Forest Energy began using this resource in the late 90's and now acquires 70% of their raw material from forest thinning. The standard raw material source for pellet production has been a by product from a sawmill or other wood manufacturing operation. This provides a somewhat consistent feedstock. The utilization of materials from forest thinning offers

challenges due to the variation in species, size, moisture content, green vs. dead trees, etc. Forest Energy has 6+ years of experience utilizing thinning residues as well as by-product use. Both green and dead trees and 8- 10 species have been and are currently being used to produce both a premium grade pellet fuel and a commercial pellet fuel.

Connecting the need to restore the health of our forests, the prudent uses of the residues to pay for healthy forests, and our countries' need to gain some degree of energy independence may be the key to success of them all. A consistent long-term national energy policy and forest management policy and the funding for both are critical. Biomass from our forests should be an important part of a long-term sustainable solution.