

Bioenergy and Sustainable Forestry- Outlook for Alaska

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Summary. Alaskan communities, particularly in rural areas of the State, are facing difficult social, economic and environmental choices as a result of rising energy costs. However, the high cost of energy is aligned with interest in developing opportunities for appropriately scaled forest products industries and markets to meet the economic development and sustainability interests of Alaskan communities. In Alaska, as in other regions of the country, the viability of biomass utilization and bioenergy are contingent upon the existence of a primary forest products industry, equipment, a trained workforce, road access, and public support. Although in some communities a firewood/cordwood business and energy system could be established in the absence of a forest products industry. The Alaska Wood Energy Development Task Group, Renewable Energy Alaska Project, and the Alaska Villages Initiative are examples of collaborative efforts seeking opportunities to support and utilize wood energy while responding to forest management needs related to thinning, insect outbreaks, and community wildfire protection.

Keywords. *Alaska, biomass, bioenergy, forestry*

Introduction

Alaskan communities, particularly in rural areas of the State, are facing difficult social, economic and environmental choices as a result of rising energy costs. In some regions, the opportunity to utilize excess woody biomass from Alaska's forests has become a critical component in community plans for survival and sustainability. In both the short and long term, biomass energy holds the potential to save communities money, create local economic opportunities, and address associated issues like wildfire protection. Although rising energy costs bolster support for developing markets for alternative biomass energy, fiscal resources required for the initial investment to transition from fossil fuels to wood/wood-chip/wood-pellet burning infrastructure can be substantial. Coordination of public and private investment will be necessary for biomass to realize its full potential to provide a low cost, stable supply of renewable energy for Alaskans.

Drivers of wood bioenergy in Alaska

A fundamental factor driving the interest in biomass utilization and bioenergy in Alaska is the extremely high cost of heating oil and diesel fuel. Diesel is used to heat homes, for transportation and for heat and power in industry and communities. In the Interior the cost of electric generation, space heating, and transportation has more than doubled in the past four years, and limited roads makes energy delivery expensive. Especially in Alaska, the high cost of energy is aligned with interest in developing opportunities for appropriately scaled forest products industries and markets to meet the economic development and sustainability interests of Alaskan communities.

Woody biomass for energy is one dimension of a suite of renewable and alternative energy options being evaluated through efforts of the Alaska Energy Authority, the Alaska Wood Energy Development Task Group, and the Denali Commission. Alaska does not have a state Renewable

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Portfolio Standard for electrical power production, but the Alaska Energy Authority has the Renewable Power Economic Feasibility Study looking at hydro, wind and biomass options for the state. The State Climate Action Plan is being developed by the State Division of Air Quality and is expected to be released in 2008. In terms of the drivers for expanded bioenergy capacity, these policy mechanisms that are a main driver in other states, currently take a back seat to high energy costs. The opportunities for biomass utilization for energy vary regionally within the state of Alaska, with the southeast more dominated by national forests, and central and interior Alaska more dominated by state lands, BLM and the Alaska Natives Corporation land. Natural gas- mostly in the south central region, hydroelectric- mostly in the southeast, geothermal energy and woody biomass are part of a broader strategy to expand clean and renewable energy in Alaska communities and reduce dependence on expensive diesel fuel.

The U.S. Forest Service is considering biomass utilization and bioenergy opportunities for management of the second growth forests in southeast Alaska in forested areas harvested under previous long term timber contracts. In Alaska, as in other regions of the country, the viability of biomass utilization and bioenergy are contingent upon the existence of a primary forest products industry, equipment, a trained workforce, road access, and public support. Although in some communities a firewood/cordwood business and energy system could be established in the absence of a forest products industry. The economics of biomass utilization and bioenergy demonstrate feasibility when higher value products are part of the mix, and the biomass and bioenergy is a co-product. Reestablishing a primary forest products industry with forest and mill residues that have predictable supply will create a situation where bioenergy investments are more likely to be feasible. Therefore, when visioning expanded wood bioenergy in Alaska, it is necessary to consider that a comprehensive investment strategy in the state's forest products industry could possibly serve as a better mechanism to develop sustainable wood bioenergy than straight forward energy investments.

Public funding for wood bioenergy development

The Alaska Region State and Private Forestry and the Alaska Energy Authority initiated a partnership in 2004 with seven other agencies and organizations to establish the **Alaska Wood Energy Development Task Group**, which seeks opportunities to support and utilize wood energy. Specific goals of the task group are to assist Alaska facility operators decrease heating costs, and to expand opportunities to displace petroleum-based fuels with local wood resources. Beginning in 2004, member organizations of the Task Group contributed expertise and funds to a grant program, seeking statements of interest for feasibility studies of potential wood energy projects in Alaskan communities. From 2005 to the present, the task group has received and reviewed 79 statements of interest; selected 42 projects for further study; completed 34 site inspections and field reports; completed 21 feasibility assessments; 2 projects are in the design stage; and 3 projects are installed and operational. Due to sustained interest in wood energy throughout the State, this program continued in 2008. A total of 18 statements of interest were received, 5 were selected for feasibility studies.

Several other wood energy facilities in Alaska have also been established, including facilities located at wood products mills.

An estimated 10-12 facilities are now installed, including:

- Craig, AK (wood products facility)
- Thorne Bay, AK (wood products facility)
- Anchorage, AK (BLM Science Center)
- Copper Center, AK (wood products facility)

- Delta Junction, AK (wood products facility)
- Kasilof, AK (Ionia residential community)
- Hoonah, AK (wood products facility)
- Dot Lake, AK (community buildings)

At the same time, the U.S. Forest Service and USDA Rural Development provided grants to help develop wood energy projects in Alaska. A recent project was in Craig where funding helped build the biomass heating at the community swimming pool water, municipal building, elementary and middle school buildings. Projects in other communities include installing wood-fired boilers supplementing masonry heaters in community centers, and biomass boilers used to heat a washeteria and a city water system. Additional wood boilers systems are being considered in the Copper River School District and the Su Valley School, and for community biomass heating in Fort Yukon. The Forest Service has provided funding to support wood-to-energy feasibility studies in approximately 40 cities, communities, and native villages.

A considerable amount of the leadership for bioenergy in Alaska is by the State Forester and Alaska Energy Authority. The Forest Service has a cooperative agreement with the Juneau Economic Development Council to allow their wood utilization specialist to expand biomass and bioenergy skills in Alaska and provide technical assistance. The Forest Service was one of the sponsors of the Alaska Wood Energy Conference in November 2007, and funded a full time position to work with the Denali Commission to assist with forestry issue such as wood-to-energy for two years before recent funding constraints.

The priority of biomass and bioenergy for Alaska in Forest Service programs is demonstrated by the Sitka Wood Utilization Research Center, established by congressional direction in 1999 to help rebuild and assist with creating markets for forest products industries in Alaska. The potential for bioenergy in Alaska is being evaluated by the Sitka Wood Utilization Center. The current level of renewable energy use in Alaska will be evaluated, along with analysis of where renewable energy is economical feasible and environmentally appropriate in Alaska. Additional studies are evaluating potential demand for residential biomass heating, potential for bio-oil for rural Alaska, consumer preferences for wood energy (wood pellets), lessons learned from Sweden, Finland, Austria, Germany, and the Netherlands for use in Alaska, and estimates of biomass required to meet the demand for renewable energy in Alaska.

Collaborative development of wood bioenergy capacity

In addition to the priority activities of the Forest Service described in the previous section, there are a number of ongoing collaborative efforts to develop Alaska's bioenergy capacity. These efforts are served by two important projects that provide the informational framework for biomass energy in Alaska. These two projects are the Coordinated Resource Offering Protocol (CROP) Study for Southeast Alaska, and the Alaska Energy Data Inventory. The CROP study includes all of the Tongass National Forest, state lands (Department of Natural Resources, Fish and Wildlife and Mental Health Trust lands), and private corporate/native lands (Sealaska). In addition to the expected removal of wood materials from forested lands for the next 5 years, the study includes anticipate waste residues from sawmilling operations and anticipated volumes to be processed through Alaska mills. The Alaska Energy Data Inventory will catalog all available Alaska energy resource data suitable for electric power generation and space heating, and identify the most economical energy resource or combination of energy resources that could be developed to meet local needs. Biomass opportunities will be compiled along with the other renewable

sources (wind, hydro, geothermal) and fossil fuels. The information will be made available through a web-based interactive map for use in biomass development programs discussed below.

The **Renewable Energy Alaska Project (REAP)** is a coalition of urban and rural Alaska utilities, businesses, conservation and consumer groups, and Alaska Natives with an interest in developing Alaska's vast renewable energy resources. This REAP study proposes a strategy for Interior Alaska, Rainbelt and Southeast recognizing that different areas have different needs, potential and resource mix. Options are identified for attracting new markets such as wood pellets and biofuels, along with combined heat and power or heat only. The Interior Issues Council, Cost of Energy Taskforce, has looked at options to create a sustainable fuel supply, reduce PM2.5, reduce CO2 and sulfur emissions, and address local solid waste disposal issues, and has identified a biomass/coal to liquids gasification as a technology to evaluate that would meet heat, power and liquid fuels needs. A feasibility study is underway.

The University of Alaska at Fairbanks Wood Products Program is a partner with the Forest Service Sitka Wood Utilization Center to evaluate options for chemical and other products from Alaska forest biomass. The proposed **Alaska Strategy for Wood Energy Development** being developed through the Alaska Energy Authority, involves using a woody biomass gasification system that could provide synthetic gas fuel, wood-fired power, and biodiesel, and developing in-state pellet fuel industry, with facilities in Fairbanks and Delta Junction. The **Alaska Villages Initiative** is promoting wood energy programs that are ecologically, socially and economically sustainable and address household, village and regional challenges, and be integrated with wildlife and land management efforts to provide other benefits. The initiative has conducted feasibility study for Interior Alaska looking at opportunities to combine carbon markets with offsetting diesel use in off-grid generators that provide power to villages in rural Alaska. The study concluded that fuel conversion was most viable in 22 small remote villages, and that combined heat and power would provide increased benefits. The initiative recognizes the related economic development opportunities with wood energy development for financially depressed communities, creating local employment and using local resources. The Forest Service is one of many federal, state and native enterprise partners working on this initiative.

Approximately 50 communities in Alaska are covered by community wildfire protection plans, and a small portion of these acres covered by these plans are providing biomass for energy. The "All Lands/All Hands" interagency group on the Kenai Peninsula continues to strive to treatment of hazardous fuels resulting from the large spruce beetle outbreak, and material that cannot be used for lumber is being sold as chips. Bioenergy is being integrated with forest stewardship plans and fire risk reduction activities in Interior Alaska. For example the Gwitchyaa Zhee Corporation of Fort Yukon completed a stewardship plan in 2007 using the Alaska Village Initiatives to covers 210,000 acres, of which 40,000 acres are forested. The focus is to develop forest resources for a community wood energy system for heating and electricity. This effort has benefited the shareholders of Gwitchyaa Zhee Corporation and the community of Fort Yukon with both technical information and employment. It is hoped that this project can serve as a model for wood energy throughout rural Alaska. A second example of hazardous fuel removal is the use of shear-blades to remove Black Spruce biomass near Fairbanks, and evaluating the potential for cofiring the hazardous fuels biomass with coal (Nicholls 2006).

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