



Biomass Energy—Critical Issues for Consideration in Developing Biomass Energy and Energy Policy in Colorado and the West

© Brett KenCairn—Principal, Community Energy Systems LLC

In the next 12-18 months, a combination of forces may converge that will have huge consequences for both forests and forest dependent communities in the Western US. The combination of exponentially increasing scales of catastrophic wildfire and the rapidly escalating cost of energy have created a confluence of interests that is approaching a near flood of attention to biomass energy strategies among both public land managers and large energy interests. The policy choices made in the near future will likely shape the fate and future conditions of both forests and the communities which rely on them.

Five Key Issues in Biomass Energy Development

Careful consideration should be given to choices made in five broad categories. If current trends in these five choice domains are not redirected soon, we may soon find ourselves committed to strategies with serious unintended consequences in the not-so-distant future.

Scale—Driven in large measure by a sense of urgency and in some cases desperation, some land managers and policy makers are advocating very large scale approaches. In a recent meeting with Forest Supervisors from northern Colorado, Agriculture Undersecretary Mark Ray strongly encouraged these Forests to join in a single stewardship contract offering of over 250,000 acres. In New Mexico, the major utility company in the state, PNM has just closed bidding on a proposed 35 MWe power plant. A plant of this size would require between 40,000-50,000 acres of thinning per year for over 20 years to satisfy plant resource demands.

Landscape-Scale Impacts—Given the intention to try and implement forest treatments at large scales, it is essential that landscape scale ecological impact assessment tools be developed and employed to plan and monitor these effects. Unfortunately, the Forest Service's current emphasis on supply planning tools such as the CROP model (Coordinated Resource Offering Protocol), rely on project level projections that are not derived from a larger landscape scale assessment of impacts. Such efforts are also not rooted in collaborative engagement of a diverse set of stakeholder groups from whom support will ultimately be necessary. This leaves the Agencies vulnerable to legal challenge for failure to consider cumulative effects. More importantly, large treatments that fail to plan for landscape scale effects could result in significant ecological disruptions.

A positive alternative to this approach in Colorado is the "Front Range Fuels Treatment Partnership Fuels Report" which has engaged a broad group of environmental, agency and other interests. A second constructive model is the Lake County Resources Initiative in Lakeview, Oregon where agency, industry and environmental groups have outlined a landscape scale restoration and management plan supported by all of these groups.

Community Energy Systems

PO Box 723

Oak Creek, CO 80467

(970) 846-7344

"Fostering Community Self-Reliance through Renewable Energy"

Technology—One of the most significant factors shaping the choices and scales of technology now being considered is the effort to minimize investment risk while maximizing financial return. While this is a predictable and appropriate behavior for investors, this behavior is currently resulting in the selection of antiquated biomass technology systems which, though reliable, are the least efficient, most expensive (the more money borrowed, the more money made), and often have high levels of pollutant emissions. Most biomass plants currently being designed operate at less than 20% efficiency—4 of every 5 btus of wood energy processed by the plant is lost before it becomes useful energy.

Distribution of Economic Benefits and Costs—With the combination of factors pushing towards large-scale biomass facilities, most rural and tribal communities find themselves once again receiving little or no benefit from biomass development. Most large biomass facilities require harvesting operations using highly mechanized logging operations often conducted by non-local contractors. The majority of materials are shipped to regional processing centers distant from the resource extraction areas. Few value-added enterprises are developed in these outlying communities. Once again, rural and tribal communities could find themselves witnessing the majority of local resources and economic opportunity exported from their areas.

Diversification and Value-added Products—A quick back-of-the-envelope calculation quickly reveals the importance of finding value-added uses for at least some portion of the materials removed in restoration and wildfire hazard reduction treatments. The real cost for wood harvested and processed for bioenergy approaches \$30-\$40/green ton to process and transport to a biomass facilities material (Gila Woodnet—Silver City, NM; Forest Energy—Show Low Arizona). Most biomass feasibility assessments have based their projected resource costs on fuel prices less than half this true production cost. By contrast, wood processed and sold as building logs is worth over 50 times this value. At an average of 10-15 green tons/acre of biomass removed in restoration treatments, wood sold solely to energy plants would only generate \$300-\$400/acre, less than half the cost required for treatment of most of these acres. An integrated operation in which 70% of the material was going to biomass use and 30% was going to higher value products could by contrast generate over \$4,000/acre in product values. Clearly it is essential that any biomass facility be designed to facilitate the development of a constellation of associated value-added wood enterprises.

A High Value/High Return Community-based Approach to Biomass Development

In contrast to the current momentum towards large biomass facilities that focus on low value commodity (kW) production, a consortium of collaborative community-based forestry initiatives are piloting an alternative approach to biomass development. A centerpiece of this approach is the development of a larger number of smaller-scale integrated biomass and value-added processing centers that operate at significantly higher efficiencies and creates substantially greater economic opportunities for rural and tribal communities. This strategy is built on a foundation of landscape scale ecological assessments that project realistic resource availabilities for 10-20 years based on comprehensive restoration and wildfire reduction treatment programs. With smaller scales and greater diversity of enterprises, these initiatives are more flexible and adaptive to the unavoidable changes that will compel constant modification and adjustment of project implementation strategies.

Despite these concerns, responsible biomass energy development is both possible and viable. The following four case studies illustrate successful projects that address many of the issues raised above.

Case Studies

Continental Resource Initiatives-Beaver, California—Utilizing a former sawmill site, Continental Resources Initiative has recently opened a 7 MWe powerplant in Beaver, California. This site is using forest thinnings from fuel hazard reduction treatments in northern California. There are currently plans to begin developing a number of small value added enterprises co-locating on the facility grounds.

Affordable Housing--Barre, VT—The Biomass Energy Resource Center in Montpelier, VT took the lead in working with the local Housing Authority in Barre, VT to develop a wood heat and hot water project serving 50 apartments in 19 separate buildings. During its first six years of operation, the district heating system delivered heat and hot water for an average cost of \$24/month. This represents a reduction in cost of over \$75/month in comparison to the previous electric heating system costs.

St. Paul, MN District Heating—The City of St. Paul installed a district heating and electrical production system (combined heat and power-CHP) in 1982. The system serves 141 large buildings and 298 single family residence totaling over 23 million sq ft of heated space—75% of the city's downtown. Using condenser technology, the system provides both heating and cooling. The system currently utilizes 275,000 tons of municipal tree thinnings, and clean wood wastes.

Fuels for Schools-Darby, MT—The US Forest Service has taken an leading role in launching the “Fuels for Schools” program which now serves five western states including Montana, Idaho, North Dakota, Utah, and Wyoming. The Darby High School biomass thermal project demonstrates the success of this program. Built in 2003, the wood chip based system has been very successful. In the 2004-2005 school year (the latest report available), the biomass system saved the school approx. \$60,000 in annual heating costs including an unexpected savings of over 50% in operations and maintenance due to the much lower operational needs of the wood chip system in comparison to the fuel oil boilers it replace. More information about the Fuels for Schools Program can be found at: <http://www.fuelsforschools.org/>.

Mountain Parks REA—Walden, (North Central) Colorado--Joe Pandy, General Manager of the Mountain Parks REA is in the process of developing several biomass projects in his district including a biomass heating program for school buildings in the Walden area and work with the Grand County commissioners to develop biomass thermal projects for county buildings in Hot Sulfer Springs. Mountain Parks has also just received a National Woody Biomass Grant from the US Forest Service to design a biomass combined heat power facility (CHP) in the Walden area in co-location with a small local sawmill. This will be the first time that a rural electric coop has developed a woody biomass project. A central goal of this project is to address both forest issues (large scale beetle-kill stands) and a broader economic development program for this economically depressed area.

Recommendations for Policy Guidance for Responsible Biomass Development

Over the coming months, public policy makers will be presented with a variety of proposals for development of biomass utilization facilities. We recommend the following criteria for evaluating where and in what form public investments, contracts, or other incentives are granted for these proposals.

Scale—Projects should be evaluated based on both the number of acres that can be treated, and the demonstrated capacity to sustain these treatments over the duration necessary to amortize biomass facility investments. Our analysis suggests that fuel transportation costs strongly favors applications located in rural and tribal communities located closest to the resource base. The most efficient utilization would integrate a large number of smaller biomass thermal (wood heating systems) with a series of 5-10 MWe combined heat/power (CHP) plants located within 30-50 miles of the forest area being treated. This strategy would be far more effective ecologically and economically than large regional 30-50 MWe plants that would dominate both forest contracting and treatment strategies.

Landscape-scale ecological planning and monitoring—Proposed resource supplies should be derived from landscape scale (500,000-2 million acre) planning tools that model the effects of treatments on a variety of ecological conditions. These tools are now available and in successful use in both Arizona, New Mexico and Oregon (Ecological Resource Assessment tool, Tom Sisk, NAU—Landscape Assessment Analysis, David Hulse, Institute for Sustainable Environments, Univ of Oregon). These tools provide both ecological insurance and substantially improve public acceptance and support for large-scale treatment programs.

Commitment to Ecological Restoration and Stewardship—A historic collaboration of environmentalists, industry representatives and agency officials in New Mexico has drafted a set of restoration principles that all have agreed to support in all proposed biomass development projects, including a major power utility. Projects which demonstrate this sort of diverse, multi-stakeholder collaboration in developing ecologically defensible strategies should be a basic prerequisite for public support.

Efficiency—Proposed facilities should demonstrate minimum efficiency thresholds of at least 35% or higher. Integration of combined heat and power (CHP) enabling the capture and reuse of otherwise wasted thermal losses should be a basic prerequisite for all projects requesting public support.

Cost—It is essential that projects being proposed demonstrate that they are capable of being economically self-sustaining in current and anticipated markets. At the same time, utilities and utility commissions must be compelled to formulate reasonable cost thresholds and avoided cost rates that are truly “reasonable” given the inevitable escalations in conventional fossil fuels.

A second criteria for consideration in project evaluation is the potential for projects being funded at least in part through local investment. Biomass projects represent an important opportunity for building local capacity and local assets through innovative approaches to the establishment of public utility districts and other vehicles for local asset management and ownership.

Economic Value Generated—Closely related to the overall capitalization costs of a project, value of economic activity generated should also be carefully evaluated. As noted above, biomass projects could be a powerful engine for economic development in rural and tribal areas. Projects

which can demonstrate the highest contribution to local economic development in disadvantaged areas should be encouraged.

Value-added to Resources—The creation of local economic value is substantially effected by the degree to which value-added enterprises are integrated with biomass utilization facilities. Proposals which develop or encourage co-location of value-added enterprises with biomass facilities will generate significantly greater economic value while reducing the total demands on resources. In a recent analysis of the installation of a biomass thermal installation at a BIA educational facility, value-added enterprises associated with the biomass facility generated 6 times more jobs and 10 times more economic value than the biomass facility alone.

Adaptive—Given the highly unstable forest conditions we now face, even the most aggressive treatment programs will not eliminate the continued occurrence of large, highly damaging wildfires. In some cases this will dramatically change the resources available in these areas. Projects which demonstrate that they can be fully amortized in shorter timeframes (5-10 years), and can adapt to changing resource availabilities, should be given priority. In a similar fashion, projects which can readily scale up or down in response to resource availability are the most advantageous to both forests and communities.

Summary

We are presently standing in front of a threshold of change. Once we step across this threshold, through choices made either intentionally or inadvertently, we will set in motion a series of causes and effects that will have enormous consequences for rural and tribal communities and public and private landscapes. It is essential that we consider the widest range of plausible options prior to making irreversible commitments. We believe that community-based, community-scale initiatives have, over the past 10 years, clearly demonstrated that they should be given serious consideration in these decisions. For this to occur, community based approaches must be given a fair share of the resources available for innovation and development. Further, all proposals should be evaluated using a broader set of criteria, one that can realistically assess the long-term consequences of the decisions being considered.