Biomass-Fired District Energy:
A Source of Economic Development and Energy Security

Santa Fe Biomass District Energy Project Summary

This Local Energy project combines state-of-the-art technical design with the best methods and practices for local economic development to create a market-driven approach for accelerating demand for new biomass projects. The premise is that the "demand-pull" created by successful demonstration of the economic benefits will greatly increase the implementation rate of biomass projects.

A district heating system will be designed for the downtown area of Santa Fe, New Mexico. The design will be done by the world's most accomplished biomass district energy designer – the winner of the prestigious 2003 Energy Globe Award. The design will be optimized not only for peak efficiency, but for maximum creation of local economic benefit. Every aspect of the project – even the value of the emissions reductions credits, will be considered during the techno-economic optimization. The beneficial impacts on output, earnings, and jobs for the optimized model will be will quantified, and the results will be used to teach other communities how to develop their local economies and improve their energy security using renewable biomass energy.

The specific objectives of the project are:

- To further the state-of-the-art of biomass district energy in the U.S. by bringing the world's most renowned designer to the U.S. to engineer a system for Santa Fe.
- To marry the technical state-of-the-art with best methods and practices for economic development to create a market-driven "demand pull" that can accelerate the growth of the biomass industry, and
- To export the successful model for economic development, enabling other communities to improve their energy security using renewable energy.

We expect the following outcomes for this project:

- An improved understanding of best methods and practices for biomass district energy technology in the U.S.
- An improved model for creating local economic benefit and energy security through the use of renewable biomass energy
- A widespread understanding of how to use these methods, as the result of our outreach program's video, PowerPoint presentation, news articles, lectures, and promotional literature.

This project addresses DOE and USDA priorities for biomass development by encouraging collaboration of diverse experts, lowering the cost of bioenergy, strengthening best practices of engineers, showing how to cost-effectively create dramatic reductions in greenhouse gas emissions, and increasing energy security through the use of local, stable, and sustainable energy resources.

Background

New Mexico's forests are dangerously overgrown with biomass fuel. While a 1993 USDA Forest Resource Assessment estimated the state's annual forest and woodland growth at a volume that could provide over 70 trillion BTU per year, the overburden in forests throughout the state offers a fuel resource many times that size. The removal of this overburden is a high priority for New Mexico due to the widely publicized fire danger that it presents.

Unfortunately, the urgent need to thin our forests in New Mexico is complicated by a difficult economic situation. Thinning projects in our forests can cost upwards of $1,400 per acre according to our State Land Office, and this expense prevents thinning efforts from being carried out at the pace needed to effectively restore forest safety and health. New Mexico's difficult economic situation is exacerbated by the recent increases in energy costs. Wholesale natural gas prices are 70% above last year's level, and continuing to climb on news of record low storage levels, poor drilling results, and high depletion rates in our most productive basins. Everyone suffers from higher energy costs, but New Mexicans are far more vulnerable to energy price hikes because as a percentage of disposable income, New Mexicans already spend more than twice the national average to meet their energy needs.[1]

From the intersection of these two crises – dangerously overgrown forests too expensive to thin, and rising energy costs damaging our economy – comes the impetus for this project. By structuring biomass projects in New Mexico as powerful tools of economic development, we can quickly improve the safety and health of our forests while fostering rapid growth of a stable, secure, and sustainable energy industry. This project seeks to further the state-of-knowledge of that process, and to put it into practice in New Mexico.

With some areas of the City's 7,000-acre watershed overgrown by upwards of 1,500 trees per acre, there is clearly enough fuel for the project. Local Energy has estimated the fuel resource of the overburden in the watershed to be in the tens of trillions of BTU's. Comparing this number to the estimated annual heating load of downtown Santa Fe, there is, conservatively, a 50-year supply of heating fuel in the overburden alone.

This project will also satisfy the City of Santa Fe's commitment to greenhouse gas reduction which it agreed to by vote of the City Council in 1996. The resolution enrolled Santa Fe in the "Cities for Climate Protection Campaign" of the International Council for Local Environmental Initiatives (ICLEI), which requires members to conduct energy and emissions inventories, establish an emissions target, and develop a plan to reduce emissions below baseline levels.

[1] New Mexico's Natural Resources 2002, Data and Statistics for 2001. New Mexico Energy, Minerals and Natural Resources Department.