Forest Products Marketplace

Cogeneration as a Defensive Strategy

By Roy Anderson

In today's world of looming cap-and-trade legislation, renewable portfolio standards, and catastrophic wildfire, woody biomass cogeneration projects are most commonly characterized in terms of their environmental benefits. For example, in an October 2009 interview with the *Charleston Gazette*, Tom Loehr, president of American Clean Energy LLC, described his Mingo County, West Virginia project: "We're taking wood that's deteriorating on the floor of the forest and using that wood at the plant. We're not going to be cutting down any trees in the forest. The carbon that's going to be released is the same carbon that otherwise would be released by the trees in the forest."

Similarly, Joshua Levine, project manager at American Renewables LLC told the *North Springs Herald* that a project in Northern Florida would use "the latest technology to create energy that will reduce air pollution and carbon emissions by using a sustainable source—wood chippings."

Despite the common practice of emphasizing a biomass cogeneration project's environmental benefits, developing a cogeneration plant as a defensive strategy against deteriorating mill residue values is an often overlooked, but key motivating factor for cogeneration projects considered by primary forest products manufacturers, especially sawmills.

For instance, on December 31, 2009, Smurfit Stone Container Corporation permanently closed its paper mill in Frenchtown, Montana. The plant, which produced 620,000 tons of linerboard annually, was the only paper mill in Montana and was a cornerstone of the state's forest products industry, providing the region's sawmills with a market for pulp chips and hog fuel. Now, with the loss of that key market, seven softwood sawmills in western Montana are jointly evaluating cogeneration projects in conjunction with Northwestern Energy, the largest utility in the region.

"We decided to investigate cogeneration, first and foremost, because we were concerned about Smurfit Stone," said Tony Colter, plant manager and vice-president of Sun Mountain Lumber of Deer Lodge, Montana. "Unfortunately, our concerns were proven true when Smurfit closed. We experienced a significant drop in the value of our pulp chips. We view cogeneration as a way to diversify our business to help us survive poor times in lumber markets."

Further down on his list of reasons, Colter cited a cogeneration plant as a way for the company to utilize pulpwood and beetle-killed material that would have otherwise been sent to the paper mill.

In many ways, locating a cogeneration plant at a sawmill makes perfect sense. First, a significant portion of the required fuel is already on site in the form of bark, sawdust, shavings, and, possibly, pulp chips. Financiers often look more favorably on projects that have such "captive" fuel supplies. Also, because the mill residues have essentially gotten a "free ride" to the sawmill on a log truck, there is very little transportation cost involved in moving the residues from the mill to the adjacent power plant.

Second, most sawmills kiln dry their lumber. Thus, after the fuel is burned in the boiler, the resulting steam can be used both in the kiln and to generate power. The combination of utilizing heat and generating power improves energy efficiency from the 20 to 25 percent that is typical of straight power generation to 45 to 60 percent for cogeneration.

Finally, because sawmills use large amounts of power, many people believe that the power generated at the power plant is used internally. While it is true the power can be used onsite, in most cases it makes better economic sense for the mill to sell all of the power produced. Biomass-fueled cogeneration is considered "green" renewable power and therefore has a higher value than the "brown" power the mill purchases from its utility. Also, because the mill will operate only one or two shifts, five days a week, it is a poor customer for the cogeneration plant.

Thus, a company that owns both a sawmill and power plant can "sell" sawmill residues to the power plant (thereby preserving mill residue revenue for the sawmill). The company also can earn profits by selling higher-value renewable power to the grid. This has been especially true in recent years as the value of renewable power has increased well above the rate of inflation, and federal and state incentive programs have sweetened the economics of biomass power generation.

Still, in other ways cogeneration as a defensive strategy for sawmills may seem like a poor choice. For example, history has shown that woody biomass–fired cogeneration plants can not afford to buy pulp chips at price levels on par with the prices paid by paper mills. However, this isn't always true, according to Bill Carlson of Carlson Small Power Consultants in Redding, California.

"A cogeneration plant provides stability to sawmills by allowing the mill to put a floor under the value of its residues," said Carlson. "It's often possible to structure power purchase agreements between the mill and the power buyer, so that during hot mill-residue markets, the sawmill can either curtail its power production or bring in replacement material from the woods and sell more of its residues to other, higher-value markets. You are trying to create a floor on residue values without also building a ceiling."

Second, building a power plant requires a significant capital investment. Depending on the size of the plant, it can

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IN BRIEF

Ethanol Production Record

Two hundred biorefineries produced an estimated 10.6 billion gallons of ethanol in 2009, a record, according to the Renewable Fuel Association's (RFA) annual report (www.ethanolrfa.org). With an annual capacity of 11,877.4 billion gallons as of January 2010, the 200 existing US ethanol biorefineries are poised to set another production record. Cellulosic and other advanced biofuels account for a small portion of total biofuel output. The 28 advanced biofuel companies currently operating and under development have a capacity of about 170 million gallons.

Although some critics assert that US biofuels production results in indirect land-use change in other nations, the RFA notes that, although US biofuel production is increasing, Brazil's deforestation rates have been falling. The association cites figures from the Brazilian National Institute for Space Research showing that deforestation rates have fallen for five of the past six years and fell by 46 percent between August 2008 and August 2009. During the same period, US ethanol production rose by 12 percent.

United States, Brazil Sign REDD MOU

On March 3, US Secretary of State Hillary Rodham Clinton and Brazil's Foreign Minister Celso Amorim signed a "Memorandum of Understanding (MOU) on Cooperation Regarding Climate Change" designed to strengthen cooperation between the two nations in reducing emissions from deforestation and forest degradation plus conservation (REDD+) and promoting low-carbon development.

The MOU "[a]ffirm[s] that the Copenhagen Accord was a significant step forward in addressing key issues for tackling the global challenge of climate change and that both countries reaffirm their political commitments contained therein." As reported in "REDD+ Forest Conservation is Highlight of Copenhagen Accord" (February), the United States and other developed countries agreed to collectively provide $100 billion a year by 2020 for REDD+ and other projects in nations with tropical forests, such as Brazil.

BLM, Forest Service Recovery Spending

The $787 billion American Recovery and Reinvestment Act (ARRA), which was signed by President Barack Obama last year, directed more than $2.2 billion to three natural resource agencies: the US Forest Service, Bureau of Land Management, and National Park Service. (See "Economic Stimulus Bill Funds Projects, Jobs in Federal Forests," April 2009.)

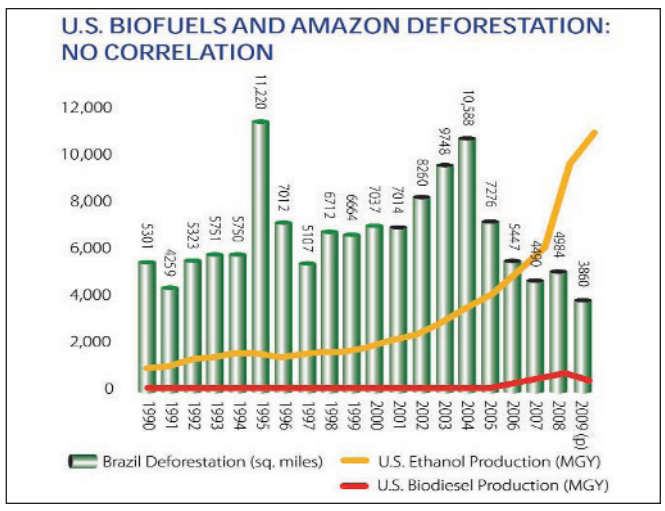
In February, the US Forest Service reported that, one year after the passage of the act, it has spent $500 million to treat more than 134,000 acres of forest to reduce the risk of wildfire and provided $50 million in grants for renewable energy projects that use wood from forest restoration activities as a feedstock.

The BLM received about $305 million in ARRA funding and, so far, has paid out or obligated nearly $115 million in contracts and agreements for a total of 655 projects. The agency reports that some projects were completed in 2009 and others are underway; the remainder will commence by the end of June, and nearly all will be completed in FY 2010

Washington DNR Biomass Contracts

A bill passed in March by Washington's legislature, the Forest Biomass Supply Agreements Combined Bill, will allow the state's Department of Natural Resources (DNR) to enter into long-term agreements to supply forest biomass from state trust lands to energy producers. The bill allows the DNR to enter into contracts of up to five years, renewable for up to three additional five-year periods; contracts of up to 15 years are allowed when a purchaser commits to a investment of at least $50 million.

The bill also authorizes the DNR to lease state lands for the sale, exploration, collection, processing, storage, stockpiling, and conversion of biomass into energy or biofuels, for terms of up to 50 years. The DNR manages about three million acres of state trust land for the benefit of public schools, universities, and other state institutions, and services in many counties.



Data from the Renewable Fuel Association and Brazil's National Institute for Space Research show that deforestation rates in Brazil have been falling even as US ethanol production has increased.

For Young Readers, It's 1491

In his keynote address at SAF's national convention last year, Charles Mann, author of *1491: New Revelations of the Americas Before Columbus* (Knopf, 2005), spoke of his research into the peoples of the pre-Columbian Western Hemisphere. His conclusion, a refutation of the "pristine myth," shows that Native Americans had a far greater impact on the landscapes they inhabited—and managed—than has been recognized in modern times.

Atheneum Books recently published a new version of the book for young readers, *Before Columbus: The Americas of 1491*. According to *School Library Journal*, which included the book on its "Best Books 2009" list for children in sixth grade and older, Mann "overturns the misconceived image of Natives as simple, widely scattered savages with minimal impact on their surroundings."

Editor's Notebook **By Steve Wilent**

A Grand Challenge for Forestry

As editor of *The Forestry Source*, an essential part of my job is keeping up on the latest forestry events, policies, science, and, in general, any new information about natural resources management. One frustration is the sheer number of articles, press releases, and papers that cross my desk: I don't have time to read them all, let alone address all but a small fraction of them in these pages.

Some items get my attention for reasons other than the ones intended by the authors. For example, my initial reaction to the headline of one recent press release from the Georgia Institute of Technology, "Exposing How Sea Turtle Hatchlings Move Quickly on Sand," was to wonder why it took a team of physicists to figure that out. Surely a child could have provided the explanation: they move their tiny little feet really, really fast. A friend who works with a sea-turtle conservation group didn't appreciate my attempt at humor.

I had a similar reaction to a recent press release from the Ecological Society of America regarding new research showing that "[p]lantations can provide the same ecosystem services as natural forests." My first reaction—"Duh!"—was admittedly juvenile, but, to foresters, this is obvious. Of course, research into sea-turtle speed and the ecological value of plantations is certainly worthwhile.

Every once in a while, however, I come across something that gets the rusty old wheels in my head turning. Such was the case with a press release from the American Society of Agronomy (ASA), titled "What Is the 'Grand Challenge' Facing the Future of Agriculture?" The ASA recently released a document describing the challenge and how it might be met (see www.agronomy.org).

My first thought was, "Wow, what a great question!" My second was, "What is the grand challenge facing the future of forestry?"

This is the challenge our brothers and sisters in the ASA have set for themselves:

"Double global food, feed, fiber, and fuel production on existing farmland within the 21st century with production systems that: enable food security; use resources more efficiently; enhance soil, water, and air quality, biodiversity, and ecosystem health; and are economically viable and socially responsible."

Not merely increase food, feed, fiber, and fuel production, but double it. The ASA sees the problem this way: "Food security is critical to overcome poverty and achieve peace among nations. Future populations need access to adequate, safe, and nutritious food. Yet, population growth and rising incomes will require doubling of crop yields on existing farmland. Putting even greater pressure on agriculture will be a requirement that agriculture mitigate climate change and promote good land, air, and water stewardship."

According to the ASA, the key to achieving this ambitious goal is finding solutions to such questions as, "How can yield potential and yield stability of crop production systems be maximized in the face of a decreasing water supply, changing climate, and multiplying abiotic and biotic stresses?"

The suggested remedy, says the ASA, is "an integration of ecology, physiology, and genetics to develop new technologies, crop cultivars, and cropping systems that can achieve the required productivity and stability."

Covering the vast distance between the questions and the outcomes is a daunting prospect, to say the least, but the act of writing them down alone is sure to stimulate much thought and discussion among agronomists—and, hopefully, action.

We in the forestry community also need to formulate such a Grand Challenge as our roadmap for the next century. We'll need to think long and hard, as the ASA has done, about our capabilities and responsibilities, about the partners we'll need to work with, about our place in the world. In short, we need a statement that encapsulates and quantifies our contributions to society in the coming century. Merely saying that our mission is to advance the science, education, technology, and practice of forestry is no longer enough.

Changing just a few words in the ASA's statement may be a place to start:

Double global timber, fiber, fuel, and bioenergy feedstock production on existing forestland within the 21st century with production systems that: enable wood-supply security; use resources more efficiently; enhance soil, water, and air quality, biodiversity, and ecosystem health over the long term; and are economically viable and socially responsible.

According to ASA President Francis J. Pierce, of Washington State University, the agronomist's Grand Challenge statement was prompted by a request from the Obama administration to think critically about identifying the top research questions that would result in advances to overcome the challenges of achieving global food security, sustainable biofuel feedstock production, meeting human nutrition requirements, and mitigating and adapting to global climate change.

President Obama's request is for us, too. Are we, the Society of American Foresters, up to the challenge? Read more about the ASA's Grand Challenge at www.agronomy.org and let me know what you think. wilents@safnet.org.

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cost between $2.5 and $4 million per megawatt (MW) of capacity. A 10-MW plant can easily require a $30–35 million investment. Granted, the investment may be offset, in part, by the federal government. The American Recovery and Reinvestment Act offers a one-time tax credit equal to 30 percent of a project's eligible capital cost, and the tax credit can be taken in the form of a grant. Thus, the owner of the project can receive a cash payment within 60 days of the day the plant is commissioned equal to 30 percent of the eligible capital cost. To qualify for the grant, the project construction must begin before the end of 2010 and operations must begin before the end of 2013.

Third, the current spate of bioenergy projects will require the utilization of a significant extra volume of fiber, which could cause supply uncertainty. Consider a report from Forisk Consulting LLC; in an 11-state region ranging from Texas to Virginia, current pulpwood and chip demand is 122 million tons per year. In addition, the firm reports that 129 bioenergy projects have been announced in the same region that will require an additional 47 million tons of fiber annually. Most of these new projects will use proven technology, but only about 40 percent of them are far enough along in the financing, engineering, permitting, power purchase agreement, and supply agreement process to be considered currently viable. As these bioenergy projects are developed and supply levels tighten, the projects in the strongest competitive position will be those that can rely on their own captive fuel supplies—that is, sawmills.

Fourth, to capture economies of scale, many independent developers seek to build biomass-fueled power plants upwards of 50 megawatts in size. In contrast, plants at sawmills are typically 5–20 megawatts. On the surface, that may seem to put sawmill cogeneration plants at a disadvantage, because all of the fixed costs need to be covered by a smaller production volume. However, unlike coal- or gas-fired plants, where the average per-unit fuel cost typically decreases with plant size, increasing a biomass fueled plant's size means increasing its average per-unit fuel cost. As a plant's size increases and nearby fuel sources are exhausted, hauling feedstocks from greater distances drives up the average fuel cost. In many cases, the increased fuel cost at a large plant is greater than the cost savings associated with economy of scale. Other factors that may work in favor of a smaller plant are permitting processes that may be less complicated or risky and incentive programs often are capped at a certain dollar or production level, which can make the incentives less beneficial to larger plants.

While cogeneration at sawmills is not without risks, it is certainly a strategic investment worth considering for mills with shaky residue markets. Sometimes the best offense is a good defense.

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