



CLEAN ENERGY RESOURCE TEAMS

CASE STUDY: BIOMASS | METRO REGION

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Rock-Tenn's Recycling Plant: A Coal Plant's Closure Spurs New Biomass Possibilities

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CERTs PARTNERS

- University of Minnesota Regional Sustainable Development Partnerships
- The Minnesota Project
- Southwest Regional Development Commission
- Green Institute
- Minnesota Department of Commerce

The Rock-Tenn St. Paul mill is the largest paper recycling plant in the Upper Midwest. It recycles 1,000 tons of paper each day and employs approximately 500 people. This large plant has received process steam via a pipeline from the Xcel Energy High Bridge coal-fired power plant in St. Paul since the mid-1980s. However, the High Bridge Plant will close by the end of 2007, forcing Rock-Tenn to find a new source of energy to power its recycling processes.

"They're (Rock-Tenn) a victim of good public policy through the shut down of a coal plant," said Carl Nelson, principal investigator for the Green Institute. It is from this new energy need that the potential for



St. Paul Port Authority

biomass to power the plant arises. An assessment study led by Carl Nelson from the Green Institute and other partners has examined the potential for biomass to fulfill the plant's energy needs.

The final study, "Renewing Rock-Tenn: A Biomass Fuels Assessment for Rock-Tenn's St. Paul Recycled Paper Mill," was published

in March of 2007. The goal of the assessment was to determine what fuel sources the plant has available to it, characterize the fuel sources, and then look at long-term viability of the fuel source to power the plant for the remainder of its lifespan. The assessment covered a wide range of potential biomass fuels, including urban waste wood, oat hulls, corn stover, grasses, and forest residues.

Project Snapshot

Type of project Biomass Fuels Assessment

Technology Biomass Inventory Analysis

Principal Investigator Carl Nelson (contact: next page)

Other Involved Organizations

- Rock-Tenn Company
- City of Saint Paul
- Eureka Recycling
- Ramsey/Washington County Resource Recovery Project Board
- Resource Recovery Technologies (RRT)
- St. Paul Port Authority

Costs \$50,000

Benefits Determining the feasibility of a renewable and cleaner source of energy for the state's largest recycler.

Gaining Support

After gaining biomass experience by researching and planning for a biomass plant in the Phillips neighborhood, the Green Institute approached Rock-Tenn with the idea of a biomass study for their plant. The Green Institute then approached other organizations and government municipalities to be project sponsors. The response was positive from potential project sponsors with each having different reasons to supporting the project. Some project sponsors were most concerned with protecting the 500 jobs at the plant; others were involved to maintain the viability of Minnesota's largest recycling plant and its large recycling capacity; and still others were concerned over air quality impacts from the recycling plant, due to an earlier study by Ramsey and Washington Counties that examined the potential for using processed municipal solid waste, known as refuse-derived-fuel (RDF) to power Rock-Tenn.

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The project sponsors of the assessment are: Rock-Tenn Company, City of St. Paul, St. Paul Port Authority, Ramsey/Washington County Resource Recovery Project Board, Resource Recovery Technologies (RRT), Eureka Recycling, and the Green Institute. The study's cost of \$50,000 was met through project sponsors.

Assessment Findings

Among the assessment's findings were that to meet Rock-Tenn's yearly current energy demand, 225,000 wet tons of mixed biomass of the sources examined in the study would be needed. In the long-term, all available biomass sources combined could account for 138% of the plant's demand. However, no one source of available biomass can alone fill the energy needs of Rock-Tenn.

The assessment recommended that, for financing the project, the company secure a long-term contact with biomass producers to ensure continual supply and stable price and to secure low-cost financing for new biomass facilities on site.

In assessing the cost of using biomass at the plant, the assessment concluded that using 100 percent biomass to power the plant would cost approximately \$4 per MMBtu (million British thermal units), which is greater than the estimated maximum biomass fuel cost of \$3.50/MMBtu to be economically feasible for the plant. More research may have to be done to determine the ideal biomass mix that is economically feasible.

Until a biomass fueling source is secured and a new facility to use the biomass is built, Rock-Tenn will use a combination of natural gas and fuel oil to power the plant. Utilizing these fuel sources for a long time period may not be economically viable and would have negative air quality impacts, especially for the fuel oil, said Nelson. That is why the study's findings are important now for deciding on the future energy direction of the plant.

Challenges

One challenge in conducting the study was estimating the supply of urban waste wood as a biomass resource. There is no "BP of the biomass world," said Nelson. There is no one major player as a source of biomass, and this is especially true when it comes to urban waste wood from tree trimmings, storm damage, tree diseases, etc. Many of the tree-trimming companies in the metro area are small, family-owned

operations that do not always keep accurate records of the tree residue removals nor do they have easy ways to estimate the total number of tons of residue collected per year/. Since tree removals are also seasonal and weather-dependent, the supply variation makes it hard to depend upon as a biomass source.

Successes

One very successful component of the assessment was the early decision to have an advisory committee for the project. The committee was made up of the "brightest minds in biomass" according to Nelson, and it really helped direct the team of investigators as to where to find information and how wide to define the project scope. It made the study more work, said Nelson, but it also insured a better quality product in the end.

Next Steps

With the assessment now completed, Rock-Tenn can use this pioneering study to make biomass power a reality at its St. Paul recycling plant. Next steps for the biomass project include further refinement and investigation of fuel sources, and engineering and environmental studies to determine the final plant configuration. This will be funded through a four million dollar appropriation from the Minnesota legislature. The authorizing legislation also required the creation of a citizen's advisory committee with representation from the surrounding neighborhoods. Along with the Rock-Tenn development team, this advisory committee will play a key role in determining the final fuel mix and technology that is used.

*For more information, contact Carl Nelson,
cnelson@greeninstitute.org, 612-278-7117.*

To view the assessment, visit

http://www.rocktenn.com/Renewing%20Rock-Tenn_Biomass%20Fuels%20Assessment_Green%20Institute_032907.pdf.

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