Oregon Stimulus Funds at Work in:

# Eugene

**Entity** .....Seneca
**Project Type:**.....VFDs
**Stimulus Funds:** ...$170,000
**Savings/yr:** .....$118,403

## Innovative Oregon sawmill uses its wood waste to produce energy

A tour of the 140-acre Seneca Sawmill site north of Eugene is impressive.

The grounds, mill site and office space are exceptionally clean and tidy in an industry that's dusty and dirty. The 58-year old firm still runs two work shifts a day, four days a week, nine hours a day with 250 employees in an industry that has been hard hit by the US housing recession. And, when the demand for timber declined, Seneca's management actually expanded to grow a new economy tied to founder Aaron Jones' commitment to a sustainable future.

In January 2009, Seneca announced the formation of Seneca Sustainable Energy LLC to build a biomass power plant that will generate enough electricity to light 13,000 houses annually. In April 2011, the $50 million cogeneration combined heat and power plant was fully operational, creating 10 permanent family-wage jobs and producing 18.8 MW of renewable energy.

> "...we have a good story to tell."
>
> Todd Payne
> VP Timberlands Manager

The plant was sized to be fueled primarily by wood by-products and waste material (bark, sawdust, shaving and chips) from Seneca's three sawmills and two planing mills on site and from slash trucked in from its 165,000 acres of sustainably managed forestlands located mainly in Lane and Douglas counties. (This wood by-product is not high enough quality to be used for wood products such as paper.) The plant does accept some outside material, but wanted to ensure that it could sustain its supply internally. Approximately 75 percent of the material is from on-site material.

### Benefits of biomass

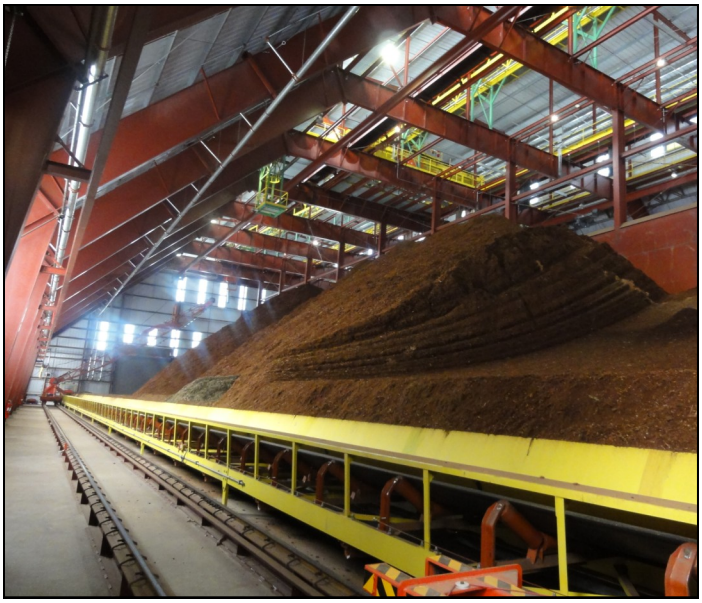
The burning of biomass has advantages. It means Seneca won't have to transport its wood waste away from its sawmill site (estimated to be 4,300 truck trips per year). It reduces the risk of catastrophic fires in Seneca's managed forestlands (forest fires are a major source of greenhouse gas emissions). It creates jobs in the woods and jobs at the power plant that runs 24/7. In addition, approximately 90 workers were involved with construction of the biomass facility from October 2009 to April 2011.

Biomass is also considered a renewable energy resource. It helps meet Oregon's compliance with the Oregon Renewable Portfolio Standards that requires Oregon utilities to generate 25 percent of their energy needs from qualifying renewable energy sources by 2025. Seneca sells the renewable power it produces to Eugene Water & Electric Board (EWEB) to help them increase their percentage of renewable energy.

The heat from the biomass boiler also offsets 679,510 therms of natural gas previously required to generate steam for Seneca's dry kiln. Woody biomass is considered carbon neutral as carbon contained in wood waste would eventually be released through fire or decay, too.

Todd Payne, a 20-year Seneca employee and vice president timberlands manager, headed up the biomass power plant project. A business major and forestry minor from Oregon State University, Payne entered

**Todd Payne, Seneca biomass boiler project manager, left, and Shanda Shribbs, Oregon Dept. of Energy project manager, view the biomass boiler Control Room that is operational 24/7. Seneca hired 10 full-time employees to run the new facility, including several who received their training on similar equipment in the military. Recovery Act funds helped pay for upgrades to seven of the variable frequency drives used in the biomass facility.**



**Biomass material must be three inches or smaller in diameter and a specific dryness to burn most efficiently. The fuel building where the material is stored, has high windows and skylights to keep artificial lighting at a minimum. Seneca takes great care to keep air particulate inside the fuel building at a minimum, even installing slanted wall pieces so nothing "collects" inside the building.**

the timber business when it was being impacted by the spotted-owl issue.

"It was a tough industry at the time," Payne said. But Payne, whose parents were in the logging industry, had learned about Seneca's leadership in forest technology from one of his college professors. Seneca holds more than 22 US and Canadian patents on sawmill innovations. Payne didn't hesitate to enter the industry when Seneca offered him a job upon graduation. Little did he know that 20 years later he would be heading an innovative renewable energy project during challenging times.

Payne has been busy the past two and a half years as the biomass plant took shape on six acres of Seneca's property adjacent to the sawmill. The construction contract bid went to two primary contractors: O&S Contractors, a Springfield company which helped design and construct all the fuel handling and storage equipment, and Wellons Inc, a Sherwood company which designed and built the woody biomass-fired boiler system and electrical power plant. They broke ground in October 2009. Other local contractors involved with the project included Olsson Industrial Electric of Springfield, B&R Sheet Metal of Eugene and North Coast Electric of Eugene.

**Incentives**

Payne applied for a Business Energy Tax Credit (BETC) with the Oregon Department of Energy (ODOE). The final tax credit is expected to be $10 million when issued now that the plant is operational. While staying in touch with ODOE staff on his tax credit application, Payne learned about a new grant opportunity for industrial sites using stimulus (Recovery Act) funds.

In the summer of 2010, ODOE issued a solicitation to industrial sites for energy efficiency projects through its State Energy Plan award from US Department of Energy. This solicitation was directed solely at the private sector, according to ODOE Project Manager Shanda Shribbs. The project had to show energy savings, be ready to go and put Oregonians to work.

Payne used the solicitation to apply for just one aspect of the project. The original design standard for the plant called for the use of soft starter equipment which met the demand of various motor systems in the facility. Payne discovered that the actual demands of these systems would vary significantly and by installing seven variable frequency drives (VFDs) at four prime site locations he could match motor speed to changing load requirements and save considerable energy. The locations for the VFDs were at:

- The well water control system - This provides a water supply system to the co-generation site that is based on demand and seasonal fluctuations. This location required three VFDs.

- The co-gen baghouse fan - By installing a VFD, Seneca could run this motor in real time based on actual deliveries which are detected as a truck crosses the truck scale.

- The hog motor controls – A VFD and sensor tied to the truck scale will have the ability to maximize energy efficiency of the large hog motor (500 horsepower) while slowing during wait times.

- The boiler feed water – Two 500 horsepower pumps provide water to the boiler. By installing two VFDs to these pump motors, the VFD will allow reduction in motor speeds in conjunction with the needed water levels to save energy.

The upgrade to the seven VFDs fit the ODOE solicitation. It had significant expected energy savings—7,152 MBtu per year for a 39 percent savings of $118,403 per year. The VFD project was ready to go and Seneca would use Oregon contractors, Olsson Industrial Electric of Springfield, to install the VFDs.

The cost of the VFD upgrade was $245,875. ODOE issued a Recovery Act award to Seneca Sustainable Energy for $170,000. (The VFD upgrades were not included in the firm's BETC application.) While the VFD installation was only a portion of the total power plant cost, Payne saw the upgrades in VFDs as keeping with the Seneca philosophy and an important project to follow through on.

Payne also spent considerable time on the air contaminant discharge permit for the Lane Regional Air Protection Agency (LRAPA).

"We had our challenges with the permit," said Payne. "But we have a good story to tell." The project generated intense public interest and received more than 300 comments. Seneca went well above the required standards in ensuring the plant's effect on air quality is negligible, if not positive. By state regulation, logging companies are required to dispose of slash after it's been created through the logging process. This is mostly done through open-field burning.

"Seneca Sawmills has the finest air quality controls in the state on its co-gen plant," said Monica Jelden, real property coordinator for Seneca who assisted with documentation for the biomass project. All biomass material fed into the plant uses fully enclosed conveyors and duct to a baghouse to remove particulate emissions with 99.9 percent efficiency. Boiler emission controls include a multiclone cyclonic separator, a 4-field electrostatic precipitator and a continuous emission monitoring system, exceeding minimum standards. Of the $50 million total cost for the plant, $12.5 million was spent on air emissions control equipment and technology.

On May 6, 2011, the Seneca Sustainable Energy LLC biomass plant was dedicated. While traditional power generation facilities have efficiency ratings ranging from 35 to 60 percent, Seneca Sustainable Energy's facility will supply power at an 80 percent efficiency rating.

**The co-generation cooling towers are adjacent to stacks of kiln-dried lumber on one side and power transmission lines on the other to show the variety produced at a modern sawmill. Seneca is the sixth largest lumber producer at one location in the US. Today, it also produces 18.8 megawatts (MW) of electricity that is distributed to customers of Eugene Water & Electricity Board (EWEB).**

"Biomass is a great opportunity for Oregon," said Matt Krumenauer, ODOE Senior Policy Analyst and biomass specialist. "Oregon's communities are well positioned to pursue projects like the Seneca Sustainable Energy project because we already have much of the infrastructure in place due to an established forest products industry, we have a well-trained workforce, and we have strong environmental protections. Using biomass for energy provides three key benefits for Oregon: improved forest health, rural economic development, and clean, renewable energy."

Seneca is the sixth largest lumber producer (at one location) in the US which makes Oregonians pay attention to the company. With the addition of the Seneca Sustainable Energy biomass boiler co-generation facility, US industry leaders, energy experts and policymakers take notice of the Lane County business. Now that's impressive.

The Oregon Department of Energy (ODOE) awarded this energy project with American Recovery and Reinvestment Act (stimulus) funds through the State Energy Program. These funds are designated for energy efficiency and renewable energy projects. The U.S. Department of Energy administers the funds, approves the projects and reviews the state's progress. The Oregon Department of Energy received $42.1 million in SEP funding. All projects must be completed by February 15, 2012.

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