Biomass Heat: A Bridge to Oregon’s Green Future

These are challenging times for rural Oregonians. The economy continues to limp along and natural resource industries, tourism, and construction have been particularly hard hit. Unemployment remains high and many rural communities have lost population as residents seek better opportunities elsewhere. As state and local revenues decrease, the shortfall has forced public schools and other public entities to seek savings in already thin budgets. Energy efficiency and the high cost of energy have emerged as places to save money and promote green jobs. Beyond efficiency, many institutions are turning to biomass heat as a way to cut their energy costs and take control of their energy future. Taking a page from history, these pioneers are forging a new path; one that connects Oregon’s timbered past with clean efficient technology, locally made renewable fuel, and an independent fiscally sound future.

Oregonians, especially rural Oregonians are clearly tied to forests. Wood products manufacturing remains the economic backbone for many rural communities. Rural residents maintain deep connections to the state’s forests and natural areas – finding their jobs, raw materials, drinking water, food, and recreation in the woods. The rural communities profiled here have turned to woody biomass to heat their schools and hospitals because it offers clear energy savings, independence from rising energy costs, and way to support Oregon’s vital wood products industry.

Sustainable natural resource stewardship is vital but energy, like politics, is local. These cases illustrate why biomass is a smart choice. What motivated these innovators to choose biomass over more traditional fossil fuel alternatives? Energy savings is a key driver. The project champions were seeking ways to reduce their energy costs and biomass proved to be far more economical than heating oil or propane. In many instances, the schools are saving enough on their energy bills to afford to keep teachers in the classroom.

The second key driver is the cost of capital—where will the money come from? In several instances, the American Recovery and Reinvestment Act (ARRA) and the Oregon Business Energy Tax Credit (BETC) provided about half the funds for these new installations. Unfortunately, these funds are no longer available but several new biomass heat installations have recently been built without the benefit of these generous earlier incentives. Each new biomass heat system that comes on line demonstrates that switching to biomass heat is a sound low-risk investment. As these cases show, biomass heat presents a strong value proposition that is attractive to state and local lenders.

Operations and maintenance is the third key factor in a successful system. It would be a false economy to install low cost equipment that overwhelmed the maintenance staff with new duties. These stories show that the maintenance staff proved to be important drivers behind the projects and conducted extensive due diligence on the systems. Add the fact that these systems are fully automated, programmable, and able to be remotely monitored, and biomass stacks up as high performance, low-maintenance solution.

The benefits of biomass heat ripple out beyond the local institutions that install wood boilers. Switching from imported fossil fuels to domestic woody biomass fuel keeps our energy dollars local. This local energy demand puts our neighbors to work in pellet manufacturing and in the woods. As the Blue Mountain Hospital and Sisters High School cases show, building market demand for wood heating fuels can help facilitate restoration of unhealthy forests by creating local markets for the by-products of restoration. Finally, switching from fossil fuels to renewable biomass heating fuels allows us to keep fossil petroleum and natural gas carbon in the ground and out of our atmosphere.

Biomass heat is not a panacea but it makes sense in a lot of places and can contribute to a sustainable future for Oregon. For rural communities that face high energy costs, biomass heat provides a path forward that connects their timbered past to a more cost-effective and independent energy future.
Three Rivers School District, Cave Junction
This year the Three Rivers School District in Southern Oregon faces a $2 million budget shortfall but is turning to biomass heat to help reduce energy costs.

Oakridge High School, Oakridge
The installation of a new woody biomass boiler at Oakridge Elementary reconnected the timber industry and protects the school’s budget against rising fossil fuel costs.

Sisters High School, Sisters
The potential cost savings of biomass and the idea of moving from fossil fuels toward a local energy source both impressed and excited the School Board and its Facilities Committee.

Blue Mountain Hospital, John Day
The new wood pellet heating system earns a triple crown for reducing energy costs, supporting forest health efforts, and advancing local energy independence.

Estacada High School, Estacada
The Energy Savings Performance Contract between the Estacada School District and McKinstry is an outstanding public-private partnership that has achieved diverse benefits.
Case Study 1

Three Rivers School District

This year the Three Rivers School District in southern Oregon faces a $2 million budget shortfall but is turning to biomass heat to help reduce energy costs. The district is installing wood pellet boilers at Evergreen Elementary and Illinois Valley High School to provide the school’s heating and hot water needs. The $650,000 investment in new woody biomass heating systems will take over for two aging heating oil boilers and is expected to save the school district about $30,000 per year in heating bills. Because the value of the energy savings will be greater than the loan payments, the new heating systems will be net-positive to the district’s budget. The district used state grant funding and a low interest loan to cover the capital costs.

Multiple Benefits

Woody biomass heating systems are attractive solutions for several reasons. The fuel is clean burning, renewable, low-carbon, and can be sourced within the state. Sourcing the fuel from the woods can improve forest health and decrease the risk of wildfire. Providing the fuel offers long-term employment for rural communities. As the fuel is produced in state, the systems offer independence from fossil fuel energy price hikes. Perhaps most importantly, biomass heating systems offer a cost savings compared to heating oil and propane systems.

When the school district began planning to replace the aging heating oil boilers at several schools, it made sense to consider using woody biomass to fuel the new systems. TRSD Board member Jim Weaver spearheaded the idea for the district. A computer programmer who lives in the woods and off the grid, Jim’s leadership for was key to making it happen. He noted, for me, the idea of supporting the local forest sector is part of the big appeal of biomass. We have a big problem with surplus fuel in the forest. We looked closely at chip-based systems because we wanted our heating choice to help foster a market for the by-products of restoration and fuels reduction.

A crane lifts new biomass boiler in a box into place at Illinois Valley High School. This boiler will displace over 20,000 gallons of heating oil and save the district $18,000 per year.
At Risk to Rising Fuel Costs
Late in November of 2008 heating oil prices began to rise steeply and suddenly the district was paying significantly more for heat than previous years. According to Jim Weaver, it really has us concerned, with all the fuel we were burning and looking at rapidly escalating prices, we had no control—we really got caught. In 2008, when crude was shot up to $147 a barrel, heating went up too—that jumped right out at us, it affected our balance for the year. There was nothing we could do about it. The sudden spike in fuel prices put the district’s vulnerability to rising fuel costs into stark relief and the $4 a gallon prices catalyzed them into action.

Improving Forest Health
Many observers view biomass utilization as a way to help clean up forests and reduce the forest fuel that would feed the next wildfire. Called “fuels reduction” by forest managers, this involves removing brush and small trees near communities to help slow the spread of wildfire. With no market for the by-products of fuels reduction, the material is typically piled and burned in the forest. Converting this material to wood chips for biomass heating systems would reduce the risk of wildfire, decrease air pollution, and lower energy costs.

Informational Energy Audit
Contributing to the health of the forest around them is but one challenge facing the school district. Over the past two years, the district’s budget and enrollment at several schools had been falling. The school board and the staff, led by Superintendent Dan Huber-Kantola began seeking ways to save money while maintaining services. “When we looked at our buildings we found that they were pretty big energy hogs,” said Superintendent Kantola. The energy audit recommended replacing several oil-fired boilers that were at or past the end of their useful lives. The district considered installing biomass systems but the pay backs were not attractive enough at that time. “All of us on the board are steeped in the idea of saving money for the district. Nobody had to be convinced about the value of woody biomass, we just needed to make sure it was a sound investment for the district,” said Weaver.
ARRA Funding
For the Three Rivers School District, the extra incentive appeared in the form of grant funding from the Oregon Department of Energy’s (ODOE) State Energy Program. When ODOE announced that funds from the American Recovery and Reinvestment Act (ARRA) were able to support renewable energy projects, the district was ready and the Willamette Education Service District (WESD) was there to help.

The WESD Energy Service Manager, Jim Howell, assists school districts across the state realize energy savings and adopt renewable energy. He knew the district was interested in biomass heat and energy savings. He also knew that they wanted results from their investment. “My job was to help make sure that the equipment they installed work as intended. None of us wanted any surprises—we had to be very sharp with the district’s finances.” So, in the spirit of learning and discovery they did what so many pioneers have done; they hit the road.

“As the facility manager for both schools I wanted to learn as much as I could about these system before we made a decision. I talked to the maintenance guy, the installers, everybody I could—to learn how much work managing these systems would be. What I learned from them really put my mind at ease,” said Jim Bunge of Three Rivers School District.

Pellets as Fuel Source
The long two-state trek proved to be invaluable. After visiting facilities that burned wood. Bear Mountain Forest Products will supply bulk pellets to both facilities from their plant in Brownsville, Oregon.

Grants and Procurement
The district applied for American Recovery and Reinvestment Act funding, through the State Energy Program funding and received $504,353 to offset the costs of installing two pellet boiler systems. The district matched the grant funds with a low-interest

Qualified Zone Academy Bond (QZAB) issued through the Oregon Department of Energy as well as Business Energy Tax Credits. The grant funds lowered the amount of the loan required to the point where the expected energy savings are greater than the a payment, making the whole investment net-positive to the school district.

Many school districts, including Three Rivers, have used Energy Savings Performance Contracts (ESPC) as a cost-
neutral mechanism to finance energy conservation and renewable energy projects. The Three River School District implemented their initial lighting and conservation improvements using an ESPC contract with excellent results. When considering how best to procure the design and installation of two biomass boilers, they looked at both the ESPC and direct procurement models. “We elected to go out for competitive bidding as we thought it would get us a better price. If you have the expertise to know what you are looking for and the funding, then a competitive bidding process may bring you greater value,” noted Superintended Dan Kantola.

The school district selected the Ausland Design and Construction Group of Grants Pass, Oregon to complete the installation and commissioning. Aaron Ausland, CEO, sees that biomass heat could be a new growth area for his company. He noted that, “The project was small and fairly complex but we have a lot of experience with heating, cooling, electrical process work so; this project was a perfect fit for us. Biomass boilers are a niche market but we are excited about helping to broaden its use.”

### Short Term Savings Long Term Independence
To Jim Weaver and the Three Rivers School District, the idea of switching to biomass heat makes sense in the short run and in the long-term. Jim highlighted the district’s newfound energy independence, “These pellet boiler systems give us reliable, clean burning heat and we are not at the mercy of fossil fuel prices.” The new systems is expected to be operational in June 2011.

### Key Contacts

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<th>Name</th>
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<th>Email</th>
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<tr>
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The Oakridge School District is installing a new woody biomass boiler at Oakridge Elementary, reconnecting to their timber roots and protecting the school’s budget against rising fossil fuel costs. The new boiler will burn wood pellets and provide the school’s space heat and hot water. The project costs are capped at $475,544 and the new system expected to save the district 11,387 gallons of heating oil per year. The district expects to save over $20,000 per year in heating bills at current heating oil prices. The innovative system allows the district to use propane, heating oil, or wood pellets—which ever is least expensive at the time. The district used a Qualified School Construction Bond of $330,000 to help fund project as well as State of Oregon Business Energy Tax Credits. However, because the value of the energy savings is greater than their loan payments, the system is net-positive to the school district.

Timber Town Back to Roots
Oakridge is the quintessential northwest timber town. The Willamette National Forest encircles the community, making it an island in a sea of public lands. Oakridge grew from a railroad boomtown to a timber town in the mid-1940s when the Pope and Talbot and Hines Lumber Companies built and operated large sawmills there. The industry peaked in the 1960’s and 1970’s when mills in Oakridge and Westfir employed about 1000 workers. The two mills have since been shuttered, but the community remains steeped in timber-culture. School Superintendent Dr. Don Kordosky explained that, “It is appropriate for our history and values that we will be using wood to heat our school.”

Cost Savings Key to Benefits
Woody biomass heating systems are attractive solutions for multiple reasons. The fuel is clean burning, renewable, and low-carbon. Sourcing the fuel from the woods can improve forest health and decrease the risk of wildfire. It can also offer long-term employment for rural communities. As the fuel is produced in state, biomass systems offer independence from fluctuating fossil fuel energy prices. Perhaps most importantly, biomass-heating systems can lower heating and cooling bills compared to heating oil and propane systems. Bear Mountain Forest Products will be supplying wood pellets to the school from their plant in Brownsville, Oregon.
A Rock and a Hard Place
In 2011, the school district was facing a budget shortfall of over $800,000 or about 20 percent of its annual budget. When they began seeking cost savings, it made sense to consider switching from heating oil to woody biomass. Oakridge School Board member and long-time community member Rob DeHarpport championed idea on the school board. He noted that, “Cost savings was our primary driver. We had seen the example in Enterprise and the savings that district realized. We saw that all of our operational costs were going up, especially the cost of fuel.”

Despite the district’s fiscal woes and town’s timber culture, the idea of installing a biomass system faced challenges. Cam Hamilton of McKinstry, the contractor on the project, lauded the leadership of Superintendent Don Kordosky and the Oakridge school board. He observed, The timber and environmental perspectives on the school board did not see eye to eye. Project opponents voiced financial concerns. There is risk with new ideas and innovation requires strong leadership. The school board showed the political will to make a smart decision. The district was facing a fiscal crisis and framing the biomass boiler as a viable long-term investment was important to the success of the project.

Ultimately, the school board reached consensus. The board came to view the biomass boiler as a sound, cost-neutral investment; one that would upgrade their infrastructure and stabilize their long-term heating costs. Kordosky reflected that, “Sometimes, in a district with declining enrollment and loss of revenues it is difficult for the school board to take the long view. In this case, the board made a consensus decision based on the long-term interests of both the students and the district. That is extremely uncommon.”

An ARRA Opportunity
The school district was interested in woody biomass heat before funds from the American Reinvestment and Recovery Act (ARRA) became available. When ARRA funds became available, the district had to act fast. DeHarpport explained, “the timeline to apply for the funds was very tight and we would not have made it without McKinstry. We wanted to convert to biomass before the funding was announced but the ARRA funds helped us pull the trigger.” McKinstry quickly submitted a grant proposal on the district’s behalf and the Oregon Department of Energy funded the project.

ESPC Model guarantees
The district procured their biomass system through an Energy Savings Performance Contract (ESPC) with McKinstry. The contract price is based on the district’s
previous fuel bills and the contract guarantees energy savings to the district. The ESPC model provides the district with price stability in the face of rising fuel costs. Deputy Superintendent Bill Krei noted,

“The ESCO contract gives the district stability in its heating prices. We know what we are going to pay regardless of price increases. This gives us the ability to make informed funding decisions and invest those savings in teachers and kids.”

According to Cam Hamilton, the ESPC model could be useful for many public facilities. “The heating and cooling equipment at many schools and hospitals is nearing the end of its useful life. By using the ESPC model and guaranteed cost savings, we can replace old fossil fuel equipment with biomass boilers and make the proposition cost neutral to the facility. If a facility is going to replace their equipment because it is old and unreliable, it makes sense to consider using biomass as a hedge against a future rise in oil prices.”

Clean Burning and Efficient
The airshed of Oakridge is in non-attainment for particulate due to stagnant winter air caused by seasonal inversions. The new pellet boiler system is designed to maximize air quality through efficient combustion and sophisticated pollution control equipment to capture particulate and emissions. Additionally, the new pellet boiler will be equipped with remote operations that will allow McKinstry to track the system’s performance in real time from a central location.

It’s About the Kids
In the end, the leaders who advocated for the new system were motivated by their desire to serve the students. DeHarpport explained that Oakridge is exploring many renewable options. We have solar panels on the roof of the school but wind and solar are not going to reduce our heating bills. The pellet boiler was a good way of achieving the twin goals of cost savings and sustainability. We only have so much money and want as much of our resources as possible to go directly to educating our kids.

Key Contacts

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This schematic diagram of a wood pellet system shows the components of a typical biomass boiler system including a place to store the fuel, equipment to move it to the boiler and to manage the by-products ash and combustion gas.

1. STORAGE SILO
2. FLEX AUGER
3. BOILER
4. AUXILIARY BURNER
5. PARTICULATE CYCLONE
6. INDUCED DRAFT FAN
7. ASH RECEPTACLE

Courtesy of SolaGen Inc.
Case Study III

Sisters High School

Listening to Sisters School District officials explain anticipated budget cuts in Spring 2009, Benny Benson was inspired to take action. With a daughter in the district, the President of renewable energy company ENERGYneering Solutions Inc. (ESI), began a quest to explore how renewable energy could cut the district’s energy costs. “I assumed energy costs were a significant part of their annual budget. Any energy savings, efficiency, or offset we could provide would go back to the kids through education.” School District officials welcomed the effort and are now celebrating the installation of a biomass boiler that will save the district between $35,000 and $65,000 a year on heating fuel costs. What began as an “aha moment” at a public meeting launched a dynamic partnership that is reducing district energy bills, spurring local forest product employment, and improving the health of surrounding forests.

Initially, ESI cast a broad net. They analyzed solar, wind, and biomass energy potential at the schools in the district. Wind and solar power technologies did not provide short pay backs or significant cost savings because electricity is priced low in Sisters. But the high price of available heating fuels (heating oil and propane) meant that a biomass heating system could save the district money quickly. Switching to biomass would also bring the district greater budget predictability, since the price of pellets has been stable while heating oil and propane prices fluctuate dramatically. According to District Operations Director Leland Bliss, “The cost of oil is so unstable it’s impossible to accurately estimate what the average price will be for a year. We would estimate high and we’d lock that funding up for the entire year to ensure that we’d be able to keep the heat on.”

“Every time the Sisters High School fills its new 30-ton pellet silo it is reducing our dependence on imported oil. The pellets are manufactured by local workers from biomass collected from nearby forest stewardship projects.”
Biomass Fits the Community

Leland Bliss, Superintendent Elaine Drakulich, and School Board members had already heard about biomass heating for a number of years from enthusiastic community members. Intrigued by stories of Fuels for Schools projects in Montana where a switch to biomass had saved money, increased energy independence, and facilitated stewardship of surrounding forests, the District leadership wondered if using biomass could do the same for them. Forests in the Sisters area are similarly overly dense, unhealthy, and at risk from wildfire, but biomass material produced from thinning is frequently piled and burned. Creating a new market for that biomass could help drive down treatment costs and get more work done. Benny Benson was the perfect local champion to move the district from interest in biomass to action. He brought professional expertise, enthusiasm, and innovative financing ideas and the Superintendent and Board Members trusted him because he had a child in the district.

The High School requires more space heat and hot water than other buildings in the district so it presented the best opportunity for cost savings by switching to a lower cost biomass fuel. ESI designed a wood pellet boiler system for the high school that would cost between $300,000 and $350,000 to install and would save the district $35,000 to $65,000 per year, depending on whether heating oil prices are low ($2.60 per gallon) or high ($4.00 per gallon) in that year. A single biomass boiler unit would virtually eliminate the need for four existing heating oil and propane boilers that provide space heat and hot water. Instead of consuming an average of 50,000 gallons of heating oil and 6,400 gallons of propane per year, the High School would require roughly 250 to 300 tons of wood pellet fuel. Overall, this project would reduce the district’s dependence on heating oil by 20 to 25%.

District Due Diligence

The potential cost savings of biomass and the idea of moving from fossil fuels toward a local energy source both impressed and excited the School Board and its Facilities Committee. But they had important questions about maintenance requirements, cleanliness, and forest sustainability to resolve before fully embracing biomass. Leland Bliss toured the biomass boiler system at the Harney County Hospital and returned with glowing testimony from the facility manager there about the ease of operation and reliability of the system. When asked about air quality, ESI provided a comparison of wood pellet combustion and heating oil combustion and demonstrated that the wood pellet system would actually reduce emissions of a number of pollutants such as NOx and SOx without significant increases of other pollutants. The Central Oregon Intergovernmental Council (COIC) helped the district understand the availability and pricing of wood pellets in the region and that local forest stewardship was producing plentiful biomass.

Convinced that biomass heat would benefit Sisters schools and the greater community, the district began examining the last pieces of the puzzle - financing, ownership, and operation of the proposed system. This facilities group evaluated an innovative proposal from ESI to build the system and sell the district heat (see next page for an in-depth discussion of the “heat utility” model). While the district would have minimal risk and no initial capital investment costs under this proposal, the Facilities Committee ultimately decided that in this case the district would realize the greatest financial
benefit by building the system themselves using funds from a unique reserve account dedicated to infrastructure investments. The district would use $350,000 from the Lundgren Mill Fund to build the system and will pay back the account with a minimum of $35,000 of annual fuel cost savings per year until fully replenished.

**ESI Maintains Momentum**

While the School District debated financing and ownership options, design and implementation work on the project could easily have come to a halt. But ESI kept the project moving steadily toward construction. The company completed the design and engineering work, lined up the necessary permits, placed the order for the boiler, and began to assemble financing to implement the project if the district selected the heat utility option. ESI arranged interim financing with Enterprise Cascadia, the Bank of the Cascades, and Columbia State Bank for the early purchase of the major equipment. In addition, ESI applied for and secured pre-certification for a state Business Energy Tax Credit of up to $148,000 for the project. ESI’s responsiveness, patience, and persistence helped buoy the School Board’s confidence throughout the process and made it possible to complete construction by August 2011. Now that construction is finished, ESI will continue to support and shepherd the system through its first year of operation under a maintenance agreement with the district.

**Keeping It Local**

A vision of healthy local forests is a big part of what motivated the district to install a biomass boiler. While a wood chip boiler system that could draw fuel directly from local forests was not economically attractive for a building the size of the High School, the district can still promote forest stewardship by leveraging its position as a new bulk pellet consumer. It issued a Request for Proposals (RFP) to wood pellet producers in August 2011 that expressed a preference for pellets made from local source material, produced using protective forest management practices, and ideally coming from local hazardous fuel reduction and forest restoration treatments. As Don Hedrick, School Board and Board Facilities Committee member stated, “We live in the middle of the forest and they are thinning and burning piles within sight of my home. There is no reason not to use this material for energy, especially if it can also help us save money.”

Historically, wood pellet manufacturing in Oregon utilized Douglas fir feedstock collected from sawmills and secondary wood products manufacturing facilities. But institutional scale pellet boiler systems like the one in Sisters are proliferating and

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community leaders increasingly desire to see biomass energy development support forest stewardship and restoration. Some pellet manufacturers in eastern Oregon have responded by developing new products based on locally abundant species sourced more directly from local forest restoration activities. Pacific Pellet, with a plant 20 miles from Sisters, has developed a new pellet product made from western juniper and Ponderosa and lodgepole pine which are targeted for thinning and hazardous fuel reduction projects in Central Oregon. Malheur Lumber in John Day now manufactures a pine pellet made from small pine logs that are the by-product of forest restoration activities. Without this new market, these small logs would be piled and burned in the forest at substantial cost.

Using locally produced biomass fuel also helps to create long term renewable energy jobs. Mac Hay, Sisters’ Economic Development Manager, sees biomass heating as a perfect fit for his community. “The City of Sisters is continually looking to capitalize on our special location to generate employment opportunities. This project brings together sustainable natural fuel sources, jobs and energy cost savings in a unique win-win solution for Sisters and Central Oregon. With this project the dollars we spend on energy stay in our community and become income for the workers who produce biomass fuel.”

Benefits All Around
With the boiler system in place and biomass fuel on the way, the Sisters School District is looking forward to many years of warm comfort, cost savings, and increased budget predictability. The $35,000 to $65,000 of additional operating funds and more budget consistency will add up to better service for students. In a district where over 50% of the elementary school students are eligible to participate in the free and reduced cost lunch program that means a lot. The new boiler system will also provide a living laboratory for students and visitors to learn about renewable energy and how forest stewardship and local manufacturing can reduce our dependence on imported petroleum products like heating oil and propane and provide local jobs. The High School plans to incorporate the boiler system into industrial arts, pre-engineering, and business classes and to offer tours to visiting groups, and soon a website that tracks the operation of the boiler system will be online so people near and far can learn from its example.

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To Buy A Boiler or To Buy Heat: Sisters School District Model

School Board members could see the logic of investing in a system that reduced annual fuel costs and paid for itself in as few as six years, providing the District with extra operating funds for decades afterwards. But at a time when the School District was reducing its operating budget it was difficult to justify a large capital investment. Benny Benson wanted those savings for the District and did not want the initial capital costs to present an insurmountable barrier. So he proposed a scenario where his company would design, build, and operate the biomass boiler system and sell heat to the District at a cost lower than what they would have paid to buy heating oil each year. In this way, with ESI essentially acting as a heat utility for the School District, the two entities would share the annual fuel cost savings. The School District would have minimal risk and no initial capital investment cost. After about 10 years, when ESI had recovered its costs, ESI would donate the system to the District.

This zero initial capital cost “heat utility” scenario had many benefits. But as Leland Bliss and the Facilities Committee developed a contract to implement it, a handful of factors emerged that made the School District reconsider financing and owning the system outright. First, the District’s legal counsel determined that if the School District was ultimately going to acquire the biomass energy system the law required it to be built using prevailing wage rates for labor - even if ESI was going to own the system for several years. This requirement added to the construction costs that ESI would have to absorb up front under the “heat utility” scenario. Second, the Sisters School District has a unique reserve fund called the Lundgren Mill Fund dedicated to capital improvement projects that could be tapped for an energy infrastructure project such as this. Given ESI’s need to finance the initial investment and pay substantial interest under the “heat utility” scenario, using the Lundgren Mill Fund for an outright purchase by the School District was an attractive option to bring down overall project cost and reduce interest payments.

After many meetings to analyze financing and ownership alternatives, the Facilities Committee recommended to the School Board to use funds from the Lundgren Mill reserve account to build the system for $350,000 and pay back the account with a minimum of $35,000 of annual fuel cost savings per year until fully replenished. The Board estimates the fund will be replenished in six to ten years, depending on heating oil prices.
Blue Mountain District Hospital

Case Study IV

Few sources of renewable energy can claim to be less expensive than their fossil fuel alternatives, and fewer still can support forest health efforts. The new wood pellet heating system at the Blue Mountain District Hospital earns a triple crown for reducing energy costs, supporting forest health efforts, and advancing local energy independence. The new system will save the hospital in excess of $36,000 a year on heating bills.

As CEO of a critical access hospital, Bob Houser has to keep a close eye on finances. Hospitals must maintain a constant flow of air and hot water year-round 24/7, and have greater energy needs than other buildings of similar size. Recent increases in energy costs began to take a larger share of the hospital’s budget which prompted Mr. Houser to explore alternatives. As a long-time community resident, Mr. Houser was also intrigued by the unique possibility of sourcing wood pellets from the new pellet manufacturing facility in town, thereby helping to sustain forest restoration efforts on the surrounding Malheur National Forest.

Successful Model at Hospital

Mr. Houser watched as the nearby Harney District Hospital switched from heating oil to wood-based heat in 2007. While the potential energy savings intrigued CEO Houser, the idea of a cleaner, more efficient boiler piqued the interest of Facility Manager Steve Hill. Both traveled to Burns to experience the system first hand and came away impressed. Mr. Houser was encouraged by how evenly the building’s heat was distributed: “Until I was on-site, I didn’t really believe a biomass heated building would be comfortably and evenly heated.” The visit also put to rest Mr.
Hill’s questions about cleanliness and maintenance. He remarked that “the new wood boiler burned more cleanly and required almost no maintenance.”

**A3 Energy Identifies Savings**

Soon after those initial visits, Rolf Anderson and Andrew Haden of A3 Energy Partners contacted Mr. Houser and suggested an energy audit for the hospital based on several factors: use of heating oil as fuel, the size and consistency of heat load, and potential for cost savings. Houser agreed and A3 Energy identified the potential for large cost savings if the hospital switched its fuel source to wood pellets. Although the envelope of the hospital building had recently been rebuilt, the original oil-fired boilers from the 1950’s were still in place and were oversized and inefficient.

A3 Energy used the current price of heating oil to identify potential cost savings. With the outdated boilers in place, Mr. Houser purchased around 36,000 gallons of heating oil per year. Producing an equivalent heat load of 1.6 million BTUs with wood pellets would save the hospital at least $36,663 per year.

**Leveraging Funding**

A3 Energy estimated that construction and installation of a new biomass heating system at the hospital would total $425,000.00. This overall cost included a containerized wood pellet boiler, pellet silo, container pad, and interconnection with the existing heat delivery system. With A3 Energy’s assistance, Mr. Houser applied for and obtained some public funding through the Oregon Department of Energy’s State Energy Program (funding seeded by the American Recovery and Reinvestment Act (ARRA) or “stimulus bill”), Oregon Business Energy Tax Credits (BETC) and local support from the Blue Mountain Healthcare Foundation whose purpose is to support hospital improvements. In total, these public investments totaled $222,152 and were critical to financing the project and helping the hospital realize energy savings sooner.

**Regional Bank Provides Financing**

After grants and tax incentives, Mr. Houser needed to finance an additional $212,147 to take the project to construction. Mr. Houser approached the hospital’s bank – the Bank of Eastern Oregon – with which the hospital had an existing line of credit to discuss a loan.

Bank Vice President Bob Quinton was interested in the development of local energy both as a bank executive and as the Mayor of John Day. Because the hospital had a proven track record with the bank, Mr. Quinton felt very comfortable offering additional financing. “This is an example of community banking at its finest.” He also observed that because a local bank has

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<td><strong>Blue Mountain Healthcare Foundation</strong></td>
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<td><strong>Avg. Annual Oil Consumption (Pre)</strong></td>
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<td><strong>Annual Oil Consumption Reduction</strong></td>
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a stake in the growth of the town it has a direct interest in promoting community development.

Mr. Quinton offered the hospital a bridge loan to minimize interest accrual during the one year construction period and a four to six year take out loan to be paid back using the energy cost savings from the project. Mr. Quinton is careful to point out that the project would be cost-neutral to the hospital. “We were very confident in the hospital’s ability to repay the loan from energy savings; otherwise we wouldn’t have done it.”

Locally Pellets Support forests
Like many other rural communities across the West, residents of John Day have maintained a strong connection to surrounding national forests and a reliance on forest sector for employment. For much of the 1990’s and early 2000’s, Grant County Judge Mark Webb witnessed disagreement about forest management impacting his community. He began to see how a focus on thinning and forest health could bridge the disagreements. In 2006, the Blue Mountain Forest Partners (BMFP) – a group of diverse stakeholders – began building a shared vision of active stewardship on the Malheur National Forest. The focus of their work has been to reduce the number of small-diameter trees to reduce the risk of uncharacteristic wildfire and improve associated ecological attributes.

Based on the progress of the BMFP, Malheur Lumber Company seized an opportunity to diversify their business to utilize woody biomass removed during forest restoration. As Mr. Houser and A3 Energy were getting the capital costs organized in November 2010 for the new hospital boiler, Malheur Lumber opened a new production line through a joint venture with Bear Mountain Forest Products to produce wood pellets and bricks. From this central location, Bear Mountain Forest Products can deliver in bulk to hospitals and schools, including both hospitals in Grant and Harney County. The new production capacity at the mill allowed Malheur Lumber to add 13 jobs and provided a market for the by-products of forest restoration on the surrounding Malheur National Forest.

A Model for Others
The Blue Mountain District Hospital, the Bank of Eastern Oregon, and Malheur Lumber are acting as catalysts within their community and region, demonstrating the potential for near-term energy savings, forest restoration, and local jobs. Blue Mountain Hospital is leading the way for other facilities in Eastern Oregon by committing to clean energy and local natural resources in a way that retains dollars in the local economy, increases energy independence, and strengthens long term community resiliency.

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Estacada High School

Success breeds success at the Estacada School District.

After an initial energy efficiency partnership resulted in significant cost savings, 10-year veteran School Board member Mark Greene turned to McKinstry Company to explore an alternative to the District’s dated and costly heating oil boilers. Gabe Johnson of McKinstry suggested the District could realize significant cost savings by converting to a woody biomass-fired boiler system using an Energy Saving Performance Contract. The resulting project leveraged state and Federal incentives and provided jobs for local manufacturers and contractors to make a true Oregon success story.

Located in the northwest corner of Oregon, the Estacada School District educates 2200 students distributed amongst three elementary schools, one middle school, and a high school. Like many others, the District faced budget challenges in 2011 that led to an approximate $50,000 shortfall. Mr. Greene believed they could address this challenge through innovative cost reduction strategies outside of the classroom. Now, a newly installed woody biomass-fired boiler will provide guaranteed energy savings for the first year of operation to the District of $11,000 per year.

Groundwork Laid

Drawing on his professional experience with electricity and lighting, Mark Greene championed energy efficiency upgrades as the path to securing the district’s financial health. In 2006 Board Member Greene encouraged the School District to seek the services of an Energy Services Company (ESCO) and the partnership with McKinstry was born. Under an Energy Savings Performance Contract, McKinstry functioned as a ‘one-stop shop’ to identify, evaluate, recommend, design, and construct energy efficiency and renewable energy upgrades that would be financed through guaranteed energy cost savings. The initial exploration resulted in lighting upgrades and digital controls at individual schools and promised to save $50,000-$70,000 a year.

Wood Provides More Savings

Encouraged by this success and faced with their current budget shortfall, the District
sought further opportunities to reduce energy costs. The skyrocketing cost of heating oil made the District eager to find alternatives to its oil boilers. Gabe Johnson, Account Manager for McKinstry, suggested the District consider an efficient, clean burning woody biomass-fired boiler that would save the District money on every unit of fuel they used. In addition, Mr. Greene was excited about the potential of using a local fuel that had a strong connection with the forest sector heritage of the community. Based on the initial feasibility, cumulative energy savings for the potential project through fiscal year 2030-31 are projected at nearly $770,000.

Innovative Financing
Mr. Johnson conducted an initial feasibility analysis for the District and identified a woody biomass-fired boiler at Estacada High School as the best opportunity to reduce the District's budget woes. Although the analysis demonstrated significant long term cost savings, the District was unsure it could assemble the funds to construct the project. Their own financial constraints required that the project cost no more than they were spending annually on heating oil and require no use of general funds.

Based on his experience with similar projects, Mr. Johnson suggested a potential funding package that would leverage a suite of bonds and public investments, including the Oregon Department of Energy’s State Energy Program (funding seeded by the American Recovery and Reinvestment Act (ARRA) or “stimulus bill”) and the Oregon Business Energy Tax Credit. In total, these two public sources contributed almost 50% of construction costs and were critical to the project. Project proponents were adamant that this project could not have achieved its cost-neutral distinction without the public investments.

With the vision now close to a reality, Estacada School District Business Manager Donna Cancio delivered the last critical financial detail. She secured a Qualified School Construction Bond at a rate low enough that annual debt service payments and biomass fuel costs added up to less than historic annual heating oil fuel costs. Savings from the project will allow the District to pay off the bond in 15 years.

Public-Private Partnership
The Energy Savings Performance Contract (ESPC) between the Estacada School District and McKinstry is an outstanding public-private partnership that has achieved diverse benefits and outcomes. For small rural school districts that already face financial and staff resource challenges, ESCOs can provide critical technical skills that are necessary for project development and ultimate success. Through an ESPC McKinstry was able to provide all of these

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<td>Qualified School Construction Bond – debt obligation covered by guaranteed energy savings (starting at $12,784 at 3% escalation per year)</td>
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services in a timely and cost-effective manner that reduced consulting fees and project costs for the District.

While the initial capital investment requirements were significant, the remarkable efficiencies and reduced fuel costs of the new biomass boiler were more than enough to support the long-term investment. Presented with this tremendous opportunity and a path to making it a reality, the District asked McKinstry to move forward on the project.

Oregonians Benefit
Meanwhile, McKinstry moved forward with design and construction. After reviewing potential options, they selected SolaGen Inc., an Oregon-based company specializing in heat generating burner systems, as the contractor to provide and install the wood pellet fired steam boiler system. This ensured that all of the project labor and manufacturing would occur within the state of Oregon.

In addition, Oregon has a strong wood pellet industry with 5 companies manufacturing product in the state. The initial fuel supply contract for the Estacada project was secured by Bear Mountain Forest Products with facilities in Cascade Locks and Brownsville.

The 25,000 gallons of heating oil that were used annually in the original school boilers would be replaced by just 211 tons of pellets after the retrofit. Not only would the school enjoy substantial cost-savings, but the project would also provide tremendous air quality benefits. The emission reductions of offsetting the use of 25,000 gallons of petroleum-based fuels is equivalent to removing over 33 cars from the road or planting over 80 acres of trees each year.

A Bright Energy Future
True to Mr. Greene’s concern over ever-escalating heating oil prices, the District is already expecting “bonus” savings for the project for the first heating season. When McKinstry delivered its original analysis, cost-savings estimates were calculated assuming $2.22 per gallon heating oil. At publication, prices had already increased to $3.00 per gallon resulting in an additional $15,000 savings per year.

Mr. Greene summarized the project outcome eloquently when he noted that when these opportunities are available, as a society we have to ask ourselves where we want to go. The response of the Estacada School District was to take bold, strategic, and innovative steps that will provide a legacy of fiscal, environmental, and operational leadership. Building on that legacy, the District is already looking towards its next set of energy efficiency and renewable energy projects. The District is also considering incorporating the biomass boiler into its classroom curriculum, and using the on-site technology as a valuable resource for the high-school’s higher level science classes.

Most importantly, through a public-private partnership, a new woody biomass-fired boiler gave Estacada School District the opportunity to establish a secure future for the community and pave a path forward for other institutions to follow.

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ABOUT THESE CASE STUDIES

The five projects showcased in this document were part of a special group of biomass heat projects that were installed in public facilities across the state of Oregon in 2010 and 2011.

Marcus Kauffman (ODF and East Fork Consulting), Chad Davis (Sustainable Northwest), and Phil Chang (Central Oregon Intergovernmental Council) developed these case studies after extensive interviews with the boards of directors, executive officers, facilities managers, energy service providers, fuel producers, boiler manufacturers, financiers, and others who made these projects happen. Our goal was to highlight the benefits of switching to biomass heating fuel and to illustrate what it takes to make these projects happen. We would like to thank all of the project champions who helped get these biomass heat systems to operation for sharing their time and insights, and the following organizations for contributing the funds that allowed us to research and write these case studies.

Bear Mountain Forest Products
McKinstry
USDA Rural Development
Lane County Community and Economic Development
Oregon Forest Resources Institute

West Oregon Wood Products
Solagen Incorporated
Frank Lumber
Pacific Pellet
R&W Engineering

We would also like to extend a special thanks to Matt Krumenauer from the Oregon Department of Energy who provided substantial review for these case studies, compiled additional data to strengthen the stories, and offered encouragement and support throughout the process.

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