Wood Energy Utilization Support
Final Report:
EXECUTIVE SUMMARY

November 2012

Contract 20484
Executive Summary

In 2007, the USDA Forest Service was seeking contractors to work throughout the 20-state Northeastern Region with state and local partners to increase the use of sustainable wood energy. In order to increase the use of wood energy, the Forest Service identified, “a need for independent, third party feasibility analyses to help agencies, communities, and businesses evaluate how wood energy can meet local energy needs; what technologies are available; at what scale and cost; and what benefits could result.” As part of this effort, Yellow Wood Associates (YWA) and Richmond Energy Associates (REA) were selected to identify potential candidates for biomass energy and provide biomass pre-feasibility studies.

Under this contract we developed a 9-step process that helped to achieve the goals of the USDA Forest Service by increasing knowledge about biomass energy and supporting the adoption of biomass energy through:

- Engagement and support of local biomass champions
- Raising awareness of biomass at the community/regional level
- Identifying good candidate sites
- Independent analysis of cost savings and benefits and recommendations for moving forward

The Process

The process we used for this project included the following steps:

1. Select a Region - The application solicitation was targeted to states and regions that have access to biomass fuels (with multiple woodchip and or pellet manufacturers within 200 miles) and are reliant on electricity, fuel oil or propane for heating

2. Identify a Local Champion – to help advertise the solicitation and identify potential candidate sites. The local champion could be a forestry advocate, such as a state forester or biomass utilization forester, a regional or state economic development agency, a state energy office or even a non-governmental organization that is interested in forestry, energy or climate change issues.

3. Issue a “call for applications - We offered no-cost biomass pre-feasibility studies to facilities interested in exploring biomass opportunities through a public, competitive, solicitation. The two-page application included questions about

<table>
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<tr>
<th>Table 1: Summary of Work Completed</th>
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<tbody>
<tr>
<td>Applications Collected/Analyzed</td>
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<tr>
<td>Preliminary Site Visits Completed</td>
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<tr>
<td>Biomass Pre-Feasibility Memos</td>
</tr>
<tr>
<td>Memos with analysis</td>
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<tr>
<td>Biomass Pre-Feasibility Studies</td>
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<tr>
<td>Studies with multiple scenarios</td>
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<tr>
<td>Studies with district energy</td>
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<tr>
<td>Resource Binders</td>
</tr>
<tr>
<td>Follow-up Site Visits/TA</td>
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</tbody>
</table>
basic site information such as type(s) of heating systems, and heating fuel consumption and was available in both electronic and hard-copy forms.

4. Provide biomass education and application outreach – working with the local champion we used a variety of tools to promote the project, including stories through local news channels, workshops and conferences. Application outreach efforts offered the opportunity to educate people who were interested in biomass about what makes for good candidate sites for biomass.

5. Application Summary and Ranking - Once applications were collected they were sorted and ranked using a variety of criteria. Characteristics such as facility type, location, size and historic fuel usage was used to score the likelihood that sites would be good candidate sites for biomass.

6. Preliminary Site Visits - were useful to confirm the accuracy of application information, to gauge organizational interest and to determine physical characteristics.

7. Project Selection – we worked with the local champions and WERC to select the facilities that would receive preliminary feasibility studies based on each facility's application and site visit.

8. Analysis and Pre-feasibility Memo/Study & Binder - Facilities that ranked the highest during project selection received full biomass pre-feasibility studies. Full studies were based on historic fuel use and presented a life cycle cash flow analysis along with information on funding possibilities, biomass benefits and additional issues that facility managers should consider at the same time they are thinking about biomass. Others received memos that provided them with site-specific observations, a preliminary analysis of a biomass heating system at the facility (including potential fuel cost savings and return on investment) and recommendations for how to move forward with a biomass energy project. A *Biomass and Green Building Resources Binder* was provided to nearly all sites that received studies or memos. These binders included information on sources for funding, locally available energy efficiency programs, vendor brochures for appropriate biomass technologies and generic information about the benefits and barriers to biomass utilization.

9. Follow-up Site Visit & Technical Assistance. All facilities that received a study were offered a follow-up site visit during which findings were presented to decision-makers, such as school boards, and any questions decision-makers had about the study were answered. Follow-up assistance to connect facilities with additional resources and help overcome barriers to implementation were also provided.

**The Results**

We worked in 11 states, including, Kansas, Michigan, Missouri, New Hampshire, New York, Maine, Massachusetts, Pennsylvania, Vermont, Wisconsin and West Virginia to
evaluate the use of sustainable wood energy, assessing a range of biomass technologies at a wide range of facilities, including schools, regional agencies, healthcare facilities, industrial facilities, town offices and hospitality and recreational facilities.

Analysis findings show that across all of the studies, the minimum projected annual fuel savings was $1,500, the maximum was $900,000 and the average was $76,021. The average projected annual pellet use was 146 tons and the average projected annual woodchip use was 1,444 tons. Some analyses showed a return on investment (ROI) of 100% (when the fuel savings offset the cost of the system in the first year) while some showed an ROI of less than 3%. The median ROI was 7%. The average 30-year Net Present Value Savings with a biomass system was $1.9 million. As of October/November of 2012, when follow up phone calls were made, seven facilities that received reports had installed biomass systems, 12 were actively pursuing biomass and nine were continuing to investigate biomass.

Table 2: Summary of Biomass Analyses

<table>
<thead>
<tr>
<th>Activity As of Oct/Nov-2012</th>
<th>30-Year NPV Savings</th>
<th>Fuel Savings</th>
<th>Year 1 Pellets</th>
<th>Annual Green Tons Woodchips</th>
<th>Annual Green Tons Pellets</th>
<th>Median</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>No response</td>
<td>$1,943,014</td>
<td>$76,021</td>
<td>$124,352,912</td>
<td>1,444</td>
<td>46,214</td>
<td>96</td>
<td>24</td>
<td>647</td>
</tr>
<tr>
<td>Not pursuing biomass</td>
<td>$1,022,094</td>
<td>$30,400</td>
<td>$1,690,682</td>
<td>168</td>
<td>647</td>
<td>40</td>
<td>1</td>
<td>647</td>
</tr>
<tr>
<td>Continuing to investigate biomass</td>
<td>$1,943,014</td>
<td>$76,021</td>
<td>$124,352,912</td>
<td>1,444</td>
<td>46,214</td>
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<td>Actively pursuing biomass</td>
<td>$1,022,094</td>
<td>$30,400</td>
<td>$1,690,682</td>
<td>168</td>
<td>647</td>
<td>40</td>
<td>1</td>
<td>647</td>
</tr>
<tr>
<td>Biomass system installed</td>
<td>$30,400</td>
<td>$1,943,014</td>
<td>$76,021</td>
<td>$124,352,912</td>
<td>1,444</td>
<td>96</td>
<td>24</td>
<td>647</td>
</tr>
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</table>

Barriers

- Many people are interested in learning about whether biomass will work for their facility, but they don’t know where to turn for credible information.
- Financing the installation of a biomass system is, by far, the most significant barrier to moving forward for the clients we spoke with following delivery of the studies.
- Other barriers to implementation identified by clients included, permitting issues, concerns about maintenance, difficulty with insurance and public concerns about biomass.

Opportunities

As the country works to decrease our dependence on fossil fuels, biomass has an important role to play in meeting the energy needs of many communities across the United States wherever there is access to sustainably harvested biomass fuel. In the
Northeast where there is a significant reliance on fuel oil, biomass for heating is particularly cost effective.

There continues to be a need for independent, third party, feasibility analyses to help evaluate how wood energy can meet local energy needs; what technologies are available; at what scale and cost; and what benefits could result.

**Recommendations**

- **Grant Funding** - Funding for education, analysis and implementation will continue to increase the number of facilities transitioning to biomass.

- **Cost Sharing** - Although cost sharing was not used in this project, we do recommend that facilities that are selected to receive a study do share in the cost of that study. If facility decision makers are not willing to spend a small sum for such an analysis, it is unlikely they will spend the hundreds of thousands of dollars necessary for implementation.

- **Alternative Funding** - Alternative funding for biomass projects through performance contracts and municipal leasing for schools and municipal buildings, in which capital improvements are funded through energy savings, provide a potentially attractive option for facilities to move forward with a biomass project.

- **System Design** - Most biomass projects currently are individually designed for each site. One way to potentially reduce costs would be to develop a set of generic design documents, including boiler room layout, biomass fuel storage and recommended pollution control technologies for different size systems. Generic designs along with design recommendations such as guidelines for system sizing and the importance of thermal storage that were developed by a trusted third party such as the Forest Service could significantly reduce design costs and speed the adoption of biomass technologies.

- **Policy** - In some states, public school projects are required to bid projects with building documents produced by licensed architects and engineers. If those documents need to be created from scratch every time, it can add as much as 10% to the cost of a project. Generic design documents for biomass installations would be useful in setting a design standard which would reduce design, and ultimately, construction costs.
Conclusions

As the country works to decrease our dependence on fossil fuels, biomass has an important role to play in meeting the energy needs of many communities in the United States wherever there is access to sustainably harvested biomass fuel. In the Northeast where there is a significant reliance on fuel oil, biomass for heating is particularly cost effective.

With fossil fuel prices nearing an all-time high, there are many facilities at which a biomass heating system is a cost-effective investment without implementation funding. However, funding for projects, such as the one developed under this contract that engage local champions, raise awareness and provide education and analysis, will promote the use of sustainable biomass energy when it makes sense.
The Wood Education and Resource Center is located in Princeton, W.Va., and administered by the Northeastern Area State and Private Forestry unit of the U.S. Department of Agriculture Forest Service. The Center’s mission is to work with the forest products industry toward sustainable forest products production for the eastern hardwood forest region. It provides state-of-the-art training, technology transfer, networking opportunities, applied research, and information. Visit www.na.fs.fed.us/werc for more information about the Center.

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