

**WOOD-TO-ENERGY ACROSS THE
NORTHERN TIER AND BEYOND:
BARRIERS AND SOLUTIONS**

THE U.S. ENDOWMENT FOR FORESTRY AND COMMUNITIES

About the Endowment

The U.S. Endowment for Forestry & Communities, Inc. (Endowment) is a not-for-profit corporation established at the request of the governments of the United States and Canada in accordance with the terms of the Softwood Lumber Agreement 2006 (SLA) between the two countries. The Endowment is one of three entities designated to share in a one-time infusion of funds to support “meritorious initiatives” in the U.S. The Endowment received \$200 million under the terms of the SLA.

Purposes

The Endowment has been chartered with two purposes:

1. Educational and charitable causes in timber-reliant communities; and
2. Educational and public-interest projects addressing forest management issues that affect timber-reliant communities or the sustainability of forests as sources of building materials, wildlife habitat, bio-energy, recreation, and other values.

VISION

America’s forests are sustainably managed to meet broad societal objectives such as marketable products, clean waters, wildlife habitats and other ecological services, while ensuring healthy and vibrant forest-reliant communities.

MISSION

The Endowment works collaboratively with partners in the public and private sectors to advance systemic, transformative and sustainable change for the health and vitality of the nation’s working forests and forest-reliant communities.

U.S. Endowment for Forestry and Communities

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Summary Report

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The U.S. Endowment for Forestry and Communities (Endowment) and USDA Forest Service, State and Private Forestry (USFS) are collaborating in a number of areas to support wood-to-energy strategies that advance healthy working forests and vibrant rural communities ([Woody Biomass Joint Venture](#)).

In January, a group of notable professionals gathered in Manchester, New Hampshire to discuss barriers and opportunities regarding the expansion of woody biomass thermal use.

Participants agreed that the lack of a national energy policy, as well as regionally specific state policies, is a major impediment to this sector's growth. A lack of parity with other renewables (e.g., wind, solar, etc.) in terms of government programs and incentives further hampers expansion as do a lack of industry standards, efficient bulk delivery, American-made technology, and a number of other barriers listed in this summary report.

Discussions focused on opportunities to address barriers. Through a majority vote process, this gathering of advocates chose near-term (1 year) and long-term (3 – 5 years) priorities in each of four primary categories, also identified by the group.

The Endowment and USFS will consider these opportunities in future planning for the Woody Biomass Joint Venture.

Category One – Finance

Short-range goal: Create accessible, low cost finance opportunities for consumers to install efficient thermal wood-using systems.

Long-range goal: Create a financial database on programs, grants, loans, incentives, etc. and provide technical assistance to consumers both residential and commercial.

Other topics considered:

- Create a contest for U.S. manufacturers to build a “better boiler” that results in a significant cash prize going to the winner.

Category Two - Policy

Short-range goal: Develop credible efficiency and emissions standards for all woody biomass thermal technology.

Long-range goal: Achieve parity with other renewable sources of energy and related technology in terms of regulation, incentives, and programs.

Other topics considered:

- Advocate for a national carbon tax
- Build a coalition of thermal woody biomass interests
- Advocate for the use of wood-using systems in public building

Category Three - Supply Chain

Short-range goal: Establish industry-wide delivery and fuel standards.

Long-range goal: Establish efficient delivery systems of fuel.

Other topics considered:

- Promote district energy systems

Category Four - Marketing and Education

Short-range goal: Work with a public relations firm to create positive branding for the woody biomass thermal sector.

Long-range goal: Launch a campaign to produce targeted educational materials and outreach for decision makers e.g. architects, HVAC installers, finance community, state legislators, etc.

Other topics considered:

- Galvanize the thermal woody biomass sector to establish and work toward a unifying approach to advocacy within the sector (e.g., a single trade group or umbrella coalition or establishment of a check-off program. See the [Endowment's site for more about USDA Research and Promotion programs \(a.k.a. check-offs\)](#).
- Conduct broad, community-wide education on the merits of woody biomass thermal.
- Compile a database/clearing house of information useful to all interests, including statistics, case studies, etc.

Thermal Woody Biomass Advocates Survey Results

Prior to the Manchester round table, the Endowment asked participants to respond to a series of questions regarding barriers and opportunities. Responses are summarized below, reflecting all input from participants prior to the meeting.

What are the non-region specific barriers to conversion of commercial and institutional facilities to wood-to-thermal systems?

Barrier One: Cost

- Ultra-clean, efficient biomass equipment is expensive and complex compared to conventional systems. This limits overall market penetration and achieving economies of scale. Many project developers look at lowest initial cost of installation and are not able or willing to look at long-term costs. Biomass thermal systems typically will result in much lower annual operating costs (including fuel costs, etc – e.g., “total cost of ownership”) beyond 8-10 years, with some installations realizing savings in a shorter period.
- Financial options are limited and impede new capital investments.
- No incentives compared with other renewable technologies.

Barrier Two: Awareness, Perception and Understanding

- There is a lack of understanding of biomass thermal technologies and applications across the development and building technology sector including architectural firms, engineers, design technicians, facility operators, lenders and high-level decision makers.
- Consumers do not understand the opportunities or which technologies are tested and meet performance, safety and health standards. A perception remains that time and costs are not worth the hassle.

Barrier Three: Emissions, Standards and Regulations

- Misunderstandings as well as lack of available information on the environmental and economic impacts of conversion to wood-energy that enable clear comparisons with other heating technologies and between biomass technologies (Problem for both customers and legislators who establish incentives).
- A lack of standards and thus regulatory uncertainty (e.g., EPA air particulate emissions and state permitting guidelines and timetables, which leads to confusion regarding the public health and renewable energy benefits of biomass heating).
- A lack of documented monitoring and evaluation (emissions, energy performance, cost, etc.).
- Poor availability of ASME (American Society of Mechanical Engineers) stamped equipment.

Barrier Four: Infrastructure, Procurement, and Demand

- Procurement practices that inhibit performance contracting for energy needs.
- Fluctuations in demand cause unstable supply flows.
- Lack of understanding the fuel source: wood supply/availability/reliability, cost, history of cost, etc.
- Lack of industry infrastructure (i.e., technology information, vendors, qualified installers, suitable conversion equipment, HVAC firms that are able to specify systems, wood suppliers, and efficient fuel delivery). In particular, it is challenging for fuel delivery companies to convert to biomass pellet/chip distribution due to high capital costs of equipment (e.g., trucks, etc.) and the current low- or dispersed-demand for bulk distribution.
- Lack of a coordinated strategy to build out the biomass thermal sector. This strategy needs to link local use to local supply and help direct the efforts of all involved to ensure that a build out can be supported from the demand side as well as the supply side.

Barrier Five: Policy

- State and federal policy leans toward woody biomass to electricity production instead of thermal production.
- High efficiency systems lack any significant policy support or incentives (e.g., stable state rebate programs and recognition of Renewable Portfolio Standards.)

What regional barriers to conversion exist?

- Aged and insufficient transportation infrastructure (e.g., easy access to roads/highways, and rail lines that enable delivery to large domestic markets).
- High utilization and easy access to cheap natural gas.
- Environmental opposition and misconceptions over the carbon neutrality of biomass.
- Distance to market; transportation costs.
- Timber costs and competition for biomass/fuel supply with pulp and paper.
- Varying regulatory standards across state lines.
- Dependence on public lands for biomass; unstable and unreliable.

What are the enabling opportunities for conversion to wood thermal?

Infrastructure

- Enhanced bulk delivery infrastructure (e.g., silos, overhead loading facilities, shakers, pneumatic pellet delivery trucks) and distribution technology to improve local delivery opportunities.
- Increased scale of servicers, installers, service technicians and boiler suppliers through investment in training.
- Incentivize U.S. production efficiencies and economies of scale.
- Equipment designed to harvest forest residues.
- Fuel aggregators and supply yards – providing clearer fuel procurement opportunities for small users.
- Demand clusters that are supported by smaller pellet production plants sited in more locations. Large production facilities may not be the most efficient.
- Hot water distribution systems are not regulated as steam systems, which could facilitate district heating.
- Equitable buy-back rates for excess electricity produced at biomass sites.
- Categorical approval of power sales between neighboring facilities.
- The demand centers for pellets or other biomass use are distributed and there has not been an effort to cluster facilities using biomass to gain efficiencies and to help support investment in delivery infrastructure.

Finance

- A revolving loan fund with attractive interest rates, or as guarantee for pool of private capital to facilitate creative financing based on attractive payback.
- Public / Private financing tools that can buy down the cost of lending while still providing a return for the private partners, (e.g., state-supported financing program for biomass heating such as the one established by Massachusetts).
- Develop and promote market-rate financing options through traditional and non-traditional lenders.
- Acceptance of performance contracting, particularly in the public sector to develop projects and sell thermal energy to facilities.
- Sustainable wood supply at stable prices.
- Identification of a pipeline of projects and typology of financing needs.
- Train more financing specialists to understand this arena.

Transportation

- Intermediate distribution facilities that support belly dump trailers and move pellets into local delivery trucks.
- Bulk delivery with pneumatic delivery trucks to ensure dust-free delivery.
- Dependable, affordable rail service.
- Increased federal and state trucking load limits.

Marketing/Education/Leadership

- High profile regional public awareness campaigns, focused on job/economic opportunity, wealth retention by displacing demand for imported fossil energy, and connection to sustainable forestry/agriculture and preservation of working landscapes as hedge against future conversion. Campaign would include public policy development (regulatory/energy policy/incentives), standards development, and technical and economic analysis to support public and environmental benefit assertions.
- Increase consumer education on high-efficiency wood boiler technology, operation, and infrastructure by developing simple marketing tools that describe where to get a boiler and which ones work best based on the setting, etc.
- Develop a branding effort to raise industry profile with common messaging to counteract misinformation in the public and media.
- Enforcement of product standards in the wood pellet industry.

- Complete regional market assessments that identify the current use of propane, fuel oil, and other thermal energy sources to provide backdrop for industry and government to assess the opportunity and develop business plans and incentives to target appropriate areas.
- Develop a public database of stack tests, emission factors, and performance information for the systems that are available. Use this to help provide additional information about the clean performance of these systems
- The insurance industry has little loss history for facilities heated solely with biomass equipment and is sometimes reluctant to write policies for such buildings. Ensure insurance carriers (homeowners/fire/etc) allow specific wood-energy systems to be fully covered under policies.
- The banking industry has little history with the value of real estate heated primarily with biomass equipment, so the large secondary mortgage markets may be unwilling to underwrite buildings with such heat.
- A decision making procedure to help entities determine if wood biomass is the right fit (e.g., see [Where Wood Works by Dan Bihn](#) or North Country RC&D "[The Community Roadmap To Renewable Woody Biomass Energy-A Step By Step Decision Making Tool for New Hampshire Communities.](#)").

Technology

- The most critical need is an affordable, advanced boiler. Private sector innovation will develop one, but only in response to market opportunity.
- Integrated monitoring of multiple, high-efficiency boilers and systems to increase reliable information on actual boiler performance in the U.S.
- Develop pellets and boilers capable of using residue biomass materials.
- Bring European technology to U.S. markets or cultivate highly automated, highly efficient boiler/burner manufacturing technologies in the U.S.
- Develop U.S. made aeration beds for wood pellets.

Policy

- Removal of critical regulatory impediments and adoption of standards, such as boiler efficiency standard and universally accepted testing protocols.
- Adoption of modest demand-side incentives to help bring down capital cost of advanced systems.
- Recognition of thermal renewable energy in state Renewable Portfolios Strategies.
- Federal and state tax credits for all high efficiency biomass installations.
- Amend rules to allow specific wood-energy systems in publicly funded housing.
- Ensure forests are considered 'agriculture' by policy and rule makers.
- Promote use of biomass thermal energy in state and municipal facilities.
- Better integration of energy and forestry policies to encourage sustainable biomass harvest practices while maintaining forest services.
- Standard regional air emission regulations for small biomass units.
- Create legal and financial disincentives to use oil in all new or renovated public buildings, publicly funded buildings, and buildings over 10,000 feet.
- Study all heated buildings in the region for potential conversion to biomass heating before installing, replacing or upgrading an existing system. If conversion studies were done, it would produce concrete and sound answers in regards to the cost savings which would otherwise be unknown.
- Level the playing field with other renewables.
- Align energy incentives to promote the highest value per BTU (British Thermal Unit).
- Develop pilot renewable thermal programs that include biogas, solar thermal, geothermal and biomass thermal.
- The federal definition of outdoor wood heating systems creates unnecessary bureaucratic impediments to the installation of staged boiler systems in externally mounted boiler room/pellet storage units by defining the installed boilers as outdoor wood heaters simply because they're in an unoccupied building.
- Rebates to encourage bulk distribution of wood pellets/chips.
- Streamline and standardize codes for bringing European technology to US markets.
- Large federal agencies have inconsistent policies about funding of buildings in which biomass heating is the primary heat source. Advocate consistent policies.
- Standardize quality assurance of materials including chip moisture, sizing, ash, and heat produced to ensure the success and repeatability of all biomass materials sold for heating.

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