

# Emerging Research on Wood Energy Biomass for the Northern Forest: Connecting Researchers, Policy-Makers and Communities

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**Summary:** In April 2011, 120 researchers, community members, policy-makers, agency representatives, non-profits and businesses from the northern US and eastern Canada met in Burlington, VT to share the latest research on woody biomass energy for the Northern Forest.

Funding support for this project was provided by the Northeastern States Research Cooperative (NSRC), a partnership of Northern Forest states (New Hampshire, Vermont, Maine, and New York), in coordination with the USDA Forest Service.

<http://www.nsrcforest.org>

# Project Summary

Given the high cost of fossil fuel and concerns about climate change, increased attention has been paid to the role of woody biomass energy in the Northern Forest region. Researchers have been examining many environmental, economic and social questions regarding woody biomass energy in our region. At the same time, communities, businesses, institutions and government agencies have been exploring the viability and expanding the capacity of woody biomass to help the region meet its energy needs. As this field evolves, it is important for researchers to communicate with each other and with interested parties outside of the research community.

To inform future research as well as current actions, scientists from the Rubenstein School of Environment and Natural Resources at the University of Vermont partnered with colleagues at the Biomass Energy Resource Center, the Forest Guild, and the Manomet Center for Conservation Sciences to host a research symposium focused on woody biomass energy for the Northern Forest. This symposium brought together researchers, community members, policy-makers, agency representatives, funders, non-profits and interested businesses to present current research, share information needs and build relationships among those working on woody biomass energy issues.

Presentations were solicited in seven interdisciplinary themes: Wood Supply and Demand, Efficient Technologies, Management and Harvesting Practices, Human Health and Air Quality, Social and Economic Analyses, Carbon Dynamics & GHG Emissions, and Sustainability Safeguards. The steering committee placed emphasis on research that was supported by data and rigorous scientific methodology in soliciting and selecting papers. In addition, special sessions sought to clarify and document stakeholder information needs and to facilitate a dialogue among researchers and others interested in woody biomass.

In April 2011, the symposium was held in Burlington, VT. About 120 participants attended, including leading forest scientists in the four northern forest states as well as researchers from eastern Canada, Minnesota, Pennsylvania, and Massachusetts among other states. Invited keynote speakers set the intellectual stage and presentations included a broad spectrum of natural and social science topics, including decision support, conversion technology, air quality, forest growth models and harvest impacts. Two field trips were held in conjunction: one to Middlebury's biomass facility and another to Mt. Abe High School's facility and related forest sites in Addison County.

Symposium evaluations indicated that about 70% of participants felt the presentations were "very good" or "excellent" and that the event overall was "very" or "extremely useful" to their work. All materials from the event are available on the website: [www.uvm.edu/forestcarbon/symposium](http://www.uvm.edu/forestcarbon/symposium).



# Background and Justification

- Multiple benefits of woody biomass energy have been suggested:
  - mitigation of climate change,
  - reduction in dependence on foreign oil,
  - cost-effective energy alternative,
  - improvement of forest management, and
  - economic growth in struggling rural areas.
- Use of woody biomass for energy is expected to increase in this region
  - Use of wood for home heating has increased in the last decade.
  - Most northern forest states have policy incentives for biomass energy conversion.
  - Increase in biomass energy included in state renewable energy initiatives.



# Background and Justification

- Climate and other environmental impacts of using woody biomass for energy are complex and unclear
  - Some policy scenarios attribute no greenhouse gas (GHG) emissions to wood energy because it is renewable
  - Some research suggests that under some conditions burning woody biomass can have greater climate impacts than fossil fuels
- Our region's scientists are studying the potential impacts of inappropriate forest management and biomass harvesting practices cause negative impacts on :
  - biodiversity
  - soil productivity
  - wildlife habitat
  - water and air quality
  - carbon storage and sequestration.



# Background and Justification

- Many community groups, businesses, institutions, grassroots entrepreneurs and policy-makers are currently considering how wood biomass could substitute for fossil fuels, but they have many questions about how to ensure sustainability.
- Many practitioner groups and state agencies are considering sustainability guidelines for harvest operations and wood fuel procurement.
- While researchers in all four states are tackling different aspects of these questions, they are often separated from each other by the silos of their institutions and disciplines.
- Publishing results in the peer-reviewed literature assures a level of quality and accountability, but can take years. Researchers tend to share current research more quickly at academic conferences, however such conferences usually focus on just a few disciplines and rarely include the public.

Therefore this Symposium seeks to create connections among researchers and between researchers and the interested stakeholders to promote and disseminate relevant research in a timely way.

# Methods

- Established a four-state Steering Committee
  - 21 members from 4 states, mix of universities, agencies, non-profits and disciplines.
  - collaboratively determined the scope, format, venue, and key contacts needed for a successful symposium.
- Issued a call for papers in six thematic areas that was widely distributed in the northeast.
- Reviewed and selected those submissions that met our criteria for academic rigor.
- Solicited panel presentations on specific topics identified by the Steering Committee.
- Invited key note speakers to set the stage from diverse disciplinary perspectives

# Methods continued

- Conducted outreach to non-profits, businesses, community members and state and federal agencies
- Encouraged graduate student participation through direct outreach, discounted pricing and grad student lunch session
- Organized opening reception and two field trips to encourage networking among participants
  - Middlebury College biomass cogeneration facility tour (half day)
  - Addison County wood chip-heated school and forest tour (full day)
- Conducted afternoon discussion to identify research needs from diverse perspectives
- Conducted event evaluation via online survey

# Results/Project outcomes

## The Woody Biomass Energy Symposium for the Northern Forest was:

- A three-day event held April 28-30, 2011
  - Research Symposium: April 28-29
    - Included 2 plenary and 15 concurrent sessions
    - Stakeholder discussion session and Middlebury field trip on final afternoon
  - Wood Chip School & Forest Field Tour: April 30, all day
- Featured over 50 presentations, natural and social sciences (see <http://www.uvm.edu/forestcarbon/symposium/?Page=Presented.html> )
- Attracted 120 participants (<http://www.uvm.edu/~cfc/symposium/?Page=participants.html> )
  - from MA, ME, MN, NH, NM, NY, VT, OR, PA, Ontario, Quebec
  - Includes researchers, faculty, agencies, non-profits, graduate students, community members, businesses, foresters & foundations



# Results/Project outcomes

## **Presentations & panels spanned the following themes:**

1. Wood Supply and Demand, including but not limited to:
  - Forest growth and condition
  - Willingness to harvest
  - Competing and complementary wood product markets
2. Efficient Technologies, including but not limited to:
  - Processing and conversion technologies
  - Life cycle analyses
3. Management and Harvesting Practices, including but not limited to:
  - Ecological impacts and guidelines
  - Harvest logistics, transportation and costs
4. Human Health and Air Quality, including but not limited to:
  - Emissions from conversion systems
  - Science behind regulations

# Results/Project outcomes

## **Presentations & panels spanned the following themes (continued):**

5. Social and Economic Analyses of Bio-energy Projects, including but not limited to:

- Community and livelihood goals and impacts
- Business models and ownership structures
- Pricing, incentives and financing mechanisms

6. Climate Change, Carbon Dynamics, and Greenhouse Gas Emissions, including but not limited to:

- GHG accounting in bioenergy scenarios
- Carbon and GHG dynamics in biomass harvests

7. Sustainability Safeguards, including but not limited to:

- Social, economic, and environmental criteria and indicators
- Policy approaches: incentives, regulation and guidelines
- Decision support; methodologies for feasibility studies
- Science behind regulations

# Results/Project outcomes

**An online evaluation survey sent to Symposium participants shortly after the event found that:**

- 68% reported that overall the Symposium was Very good/Very helpful or Excellent/Extremely helpful
- 73% reported that the quality of presentations were Excellent or Very Good
- 64% reported that the Symposium was Excellent or Very Good at initiating valuable dialogue or connections
- 64% reported that the Symposium was Excellent or Very Good at identifying the principal research questions
- Only 36% reported that the Symposium was Excellent or Very Good for identifying research gaps

# Implications and applications in the Northern Forest region

## **Reflections and Lessons Learned applicable to future events:**

- The high participation rate and breadth of attendees from diverse locations, sectors, and disciplines attested to the importance of this topic for the region.
- A broadly representative Steering Committee was instrumental in creating a successful program and encouraging participation.
- The spirited discussion in some sessions, especially related to sustainability issues, suggests that additional information and analyses are needed for policy applications.
- There was keen interest among implementers (agency & private sector) in the research reported, but some still felt their needs were not fully met.
- The session that focused on identifying research needs should have been scheduled at a time that fostered greater participation.

# Implications and applications in the Northern Forest region

## **Symposium participants suggested the following next steps:**

- 81% recommended another conference that combines researchers, agency personnel, and industry practitioners
- 57% recommended a regional network or collaborative focused on woody biomass energy
- 48% recommended a web-based collaboration space (such as a moderated blog)
- 33% recommended adding sessions on woody biomass energy to another conference
- 24% recommended informal, self-initiated collaboration
- 24% recommended a stand alone research symposium

# Future directions

**Several new research collaborations have grown out of connections made and ideas raised at the Symposium.**

These include, but are not limited to the following:

- A new collaboration between researchers and practitioners at the University of Vermont, University of Maine at Orono, and the Northern Forest Center, NH will study the factors that affect the dissemination of efficient, yet expensive wood heating options.
- Factors affecting wood biomass energy demand among small scale users in the region will also be studied further as part of an interdisciplinary project at UVM funded by the McIntire-Stennis program.
- Additional studies regarding information used in local decision-making and decision support for communities considering wood biomass energy have been proposed but not yet funded.

# List of products

- Symposium Website: <http://www.uvm.edu/forestcarbon/symposium/>
- Symposium Program: Woody Biomass Energy Symposium for the Northern Forest, 2011. URL: <http://www.uvm.edu/forestcarbon/symposium/FullProgram.pdf>
- Symposium abstracts, powerpoint presentations and related documents are available by session at: <http://www.uvm.edu/forestcarbon/symposium/?Page=Presented.html>
- Follow-up bibliography of research conducted by Symposium presenters at: <http://www.uvm.edu/forestcarbon/symposium/WBERS-Bibliography2014.pdf>