

Vermont Community Woody Biomass Energy Project

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MRV Renewable Energy
Series

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Growing interest

- Fuel oil prices
- Concern for climate change
- Support for “buying local”



Increasing Use

- 15.1% of VT homes heated primarily with wood
 - highest of all states in 2010 Census; 40-60% increase over 2000)
- Schools, colleges, hospitals, government & private buildings exploring/switching to wood
 - Biomass district heating / CHP for towns

Sustainability questions....

Under what conditions
is wood energy green?

Concerns:

Climate impacts

Harvest impacts

Wood supply

Air quality

Efficiency

Equity



Goals of VT Community Biomass Project

- What information, support & resources do communities need to make good, informed decisions about biomass energy?
- What roles might the university play?



VT Community Biomass Project: 2008-2012

2 community clusters in VT:

- NE Addison County “Five Town Forest”
3,845 households
Vermont Family Forests (VFF)
- Mad River Valley (Warren, Waitsfield, Fayston & Moretown)
1960 households
Northern Forest Alliance

**Assess options for “sustainably” producing,
procuring & utilizing local wood for heating.**

UVM + Technical Partners

- Forest Guild
- Biomass Energy Resource Center

Information needs for assessing options

- Wood Demand (Consumption) Survey
- Wood Supply Study
- Landowner Survey
- Local Supply Chains “Logger Study”
- Criteria & Indicators
- Demonstration Projects
- (*but not conversion technology*)

Wood consumption survey

Target group: residents of the 9 study towns

Distributed in January and February 2009
via local schools, town meetings, grocery
stores, vendors and personal networks.

410 responses received (7% of hh)

Wood consumption survey

- 69% heated with wood products (skewed?)
 - 5% pellets; 44% interested in pellets
 - Addison Co: 5.0 cords per hh (n=126)
 - **MRV: 3.7 cords per hh (n=127)**
- In 2008
 - 73% bought firewood
 - 62% harvested themselves
 - 55% from their own land; 22% from another forest
 - Paid \$232/cord dry; \$174 green
 - Spent average of \$456

Wood consumption survey

Harvest :

- Protect environmental quality: 86%
- Protect aesthetic & recreational values: 80%
- Provide “fair” price to landowners & loggers: 78%
- Come from local sources: 66%

Distribution :

- Provide low income access to affordable wood: 66%
- Community Supported Firewood (like CSA): 48%

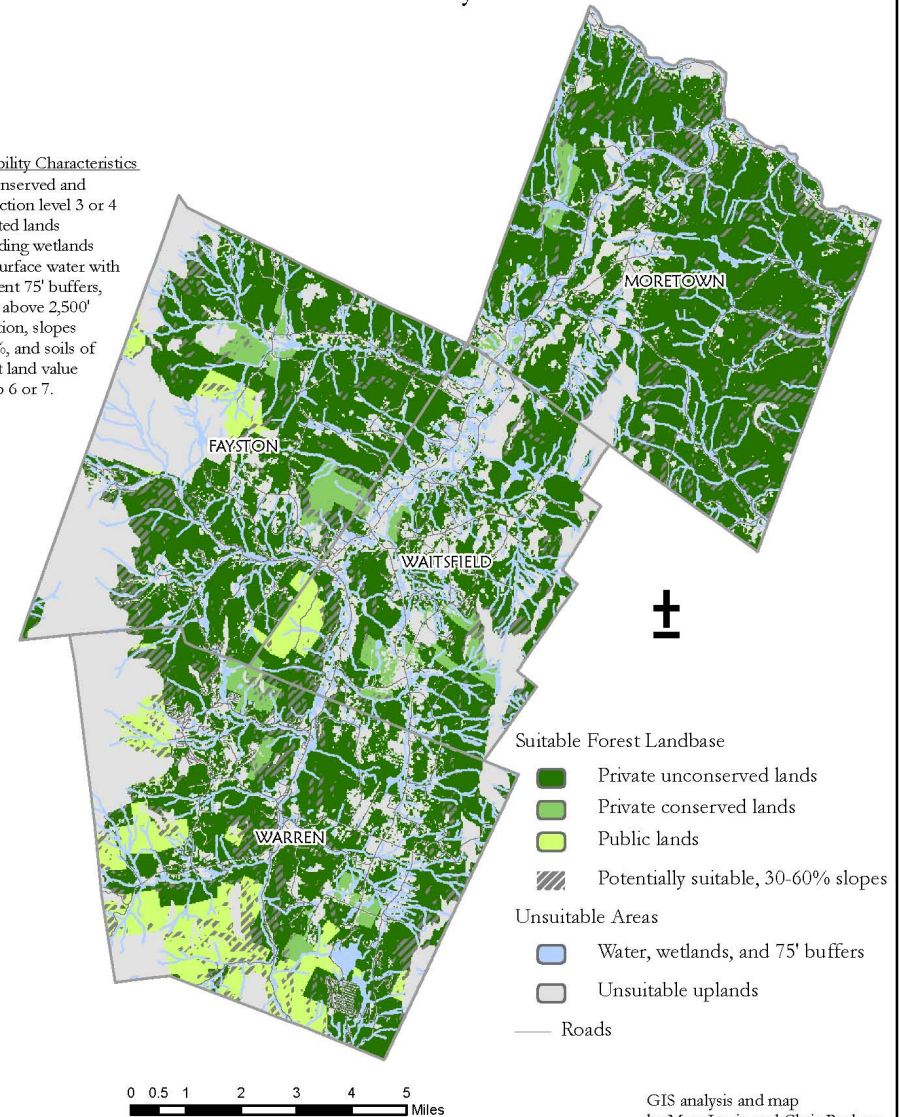
Wood Supply Study

Marc Lapin,
Middlebury College

Figure 2
Forestlands Suitable for Sustainable Biomass Harvesting:
Mad River Valley Towns

Suitability Characteristics

Unconserved and protection level 3 or 4 forested lands excluding wetlands and surface water with adjacent 75' buffers, lands above 2,500' elevation, slopes >60%, and soils of forest land value group 6 or 7.



GIS analysis and map
by Marc Lapin and Chris Rodgers
April 2009

Wood Supply Study

Suitable Forest Land Study, excluded:

- Limited, very limited forestry potential (NRCS)
- Slope >30%
- Water, wetland, 75 ft buffer
- Legal protections from harvest
- 10% for unmapped ecologically significant features & forest access network

Wood Supply Study

Assumed:

- Low estimate:
 - Growth 1.2 green tons/ac/yr
 - 38% of harvest is low quality
- High estimate:
 - Growth 1.7 green tons /acre/yr
 - 58% of harvest is low quality
- 100% of annual growth is harvested

Wood Supply Study

Mad River Valley

- Suitable: 68% of forest land = 50,300 ac
- Growth: 23,000-50,000 green tons/year of low value wood

Addison County

- Suitable: 47% of forest land = 37,800 ac
- Growth: 17,000-37,000 green tons/year of low quality wood

For comparison...

1 green ton ~ 0.4 cords

Annual Production:

- With 1960 households in MRV
 - 23,000 green tons ~ 4.7 cords per household
 - 50,000 green tons ~ 10.2 cords per household

Annual Consumption

- 3.7 (MRV) to 5 (Addison) cords per household
- Harwood School campus = 900 tons
- Middlebury College = 20,000 tons

Additional “screens” for sustainable supply

Social

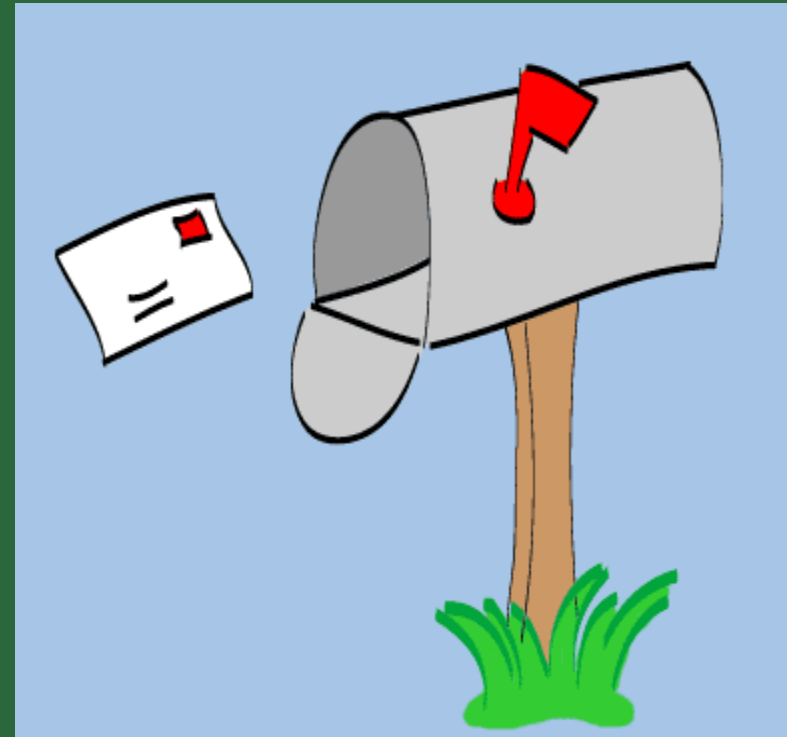
Landowner

Economic viability

Loggers

Landowner Survey

- 1214 surveys mailed
- 238 received
 - 19.6% rate
 - 20% of hh that own >5 ac
 - 4 % of all hh



Landowner Survey

- Harvested : >75%
- Participated in the harvest: 70% (A) & 50% (M)
- Harvested firewood: 66%
- Sold Firewood: 11%
- Gave access for firewood: 40%
- Sold sawlogs, veneer, pulpwood: 34%
- Harvest wood for own use: 67% (A) & 43% (M)

Landowner Survey

Most common plans for land in next 5 years

#1 Harvest firewood: 64%

2 Recreation: 45%

Supply Chain (Logger) Study

15 Phone interviews,
primarily:

- 10 loggers
- 3 firewood processors
- 1 log truck driver
- 1 horse logger



Supply Chain (Logger) Study

- Of 14 who logged
 - 11 small scale, chainsaw, skidder
 - 2 larger scale, employees, mechanized
- Of 3 processors
 - 2 large scale, employees, multiple products
 - 1 works alone, split & deliver firewood

Logger Study

See hand out!!!

- Commercial biomass tied to timber prices
- Scale is important to local benefits
- Small operators: sawlog prices low, turned to “energy wood” to maintain livelihood

Logger Study

- Firewood market: any scale
- Chip fuel market: big scale
 - only heavily mechanized
 - Demand Volatile: on-demand, seasonality
 - Supply Challenges: meeting demand, low sawlog prices

Demonstration: Neighborwood

Goal: Testing viability of local wood energy produced according to S-E-L-F

- Take home message:
 - Achieving SELF goals possible, but may require paying more per cord
 - \$150/cord, 6" log, green, delivered
- See draft fact sheet; longer report to come

Demonstration: School Partnership

MRV: Harwood Union High & Middle School

- Wood-chip heat
- BERC assessment of supply
- Exploration of procurement guidelines
 - Templates, recommendations
 - Meeting with school officials
- Own a school forest ~180 ac

Criteria & Indicators

- Looked broadly:
 - FSC certification
 - Montreal protocols
 - Human health regs
- Looked locally:
 - What is important to community members?
 - Sustainable, Efficient, Local and Fair (SELF)
 - VFF/Town Forest Checklist
- Looked ahead:
 - Forest Guild guidelines
 - VT Bio-E Committee – out for public comment soon!
 - Looked at procurement

Additional aspects of sustainability

- Climate: Carbon Neutral?
 - Timing
 - Technology
- Efficiency
 - Conservation
 - Conversion technology
- Health
- Affordability

Woody Biomass Energy Research Symposium

- Northeast US and Canada – 110 participants
- Topic areas:
 - Wood supply
 - Greenhouse gas accounting
 - Harvest impacts
 - Criteria & indicators
 - Soil carbon
 - Air quality
 - Decision support
- Research Needs – discussion & survey
 - Stakeholder input & useful outputs
 - Data / models for decision support tools
 - Regional collaboration – researchers, agency, industry



Information & resource needs?

- Please indicate questions you may have about wood biomass energy on white cards.

Thanks!

- Project personnel & organizations
- Everyone participating in surveys, interviews and review
- NSRC – Northeastern States Research Cooperative for core funding

<http://www.uvm.edu/forestcarbon/biomass/>

Project Personnel

UVM Personnel

- Lini Wollenberg
- Cecilia Danks
- Susannah McCandless
- Jenn Colby
- Matt Peters
- Kim Coleman

Partners

- David Brynn
- Tara Hamilton
- Bob Perschel
- Adam Sherman
- Marc Lapin
- Ray Daigle

Graduate Students

- Grahm Leitner
- David Kuhn
- Ken Brown
- Jennifer Wright
- Amanda Egan
- Meghan Thompson

Project Partners

- UVM Extension
- UVM Rubenstein School of Environment and Natural Resources
- Vermont Family Forestry
- Northern Forest Alliance
- Forest Guild
- Biomass Energy Resource Center
- Harwood Union High School

Landowner Survey

- Forest land in same town as primary residence
 - Addison: 68%
 - Mad River: 56%
- Size
 - Median: 50 ac
 - Range: 5 – 2500 ac
- Median Income
 - Addison: \$60,000-80,000
 - Mad River: \$80,000-100,000