Wood Energy: The OTHER Renewable Option

“Wood Energy—Renewable, Clean, Abundant, Affordable & Supporting Local Communities”

May 9, 2014

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Why Consider Wood as a Heating Fuel?

- Renewable – Sustainable – Carbon Neutral
- Stable fuel price through heating season & over years. No contingency funds.
- Energy savings substantial compared to fuel oil, propane & electric. Allows saving to make other investments.
- Does not rely on grants to be affordable, but helps.
- Clean burning & technology widely available

Other Considerations...

- Wood from local sources for energy security
- Contribute to local economic development and infrastructure
  - Maine study – for every $1 spent on fuel oil for heating, only $0.15 remains in the local economy.
- Value to school curriculum
- Maryland has 7 wood energy facilities – 6 sawmills and 1 prison. Prison enjoys 63% fuel cost reduction.
- Advanced, clean and efficient wood energy technologies are readily available
- New regulations now allow use of biomass in MD
- Maryland behind other states in NE in application

Where Is Maryland Now Regarding Biomass Use?

- PA Wood Energy Tours – Feb 2013-14
- The Vision
  - Create a whole new industry!
    - A few benefits:
      - Jobs.
      - Better management.
      - Wealth retention.
      - Energy independence.
      - Energy security/reliability.
Highlights from Prospectus for Advancing Biomass Thermal Energy in Maryland – 2/2/2012 – Presented by Jonathan Kays, Chair of Maryland Wood Energy Coalition

**Promise of Wood**

**From Consumer Perspective:**
- Cheap.
- Predictable.
- Clean.
- Sustainable.
- Fuel stays local.
- Reduces social costs.

**From Forester Perspective:**
- Market niche.
- Improved silviculture.
- Ubiquitous: rural - urban.
- Market steady and reliable.

**Promise of Wood**

**From Public generally:**
- Clean.
- Retains wealth.
- Responsible.
- Safe.
- Secure.
- Dispatchable.

**Wood Energy Infrastructure**

More costly for Woody Biomass Boilers

Projects pay for themselves based on fuel savings compared to fossil fuels

**Fuel Cost Comparisons**

If wood chips cost $40/ton, then you could pay no more than...

- $0.57/therm Natural Gas
- $0.80/gal #2 Oil
- $5.02/gal Propane
- $0.023/kWh Electric

Or...

WOOD

- Nat Gas: $0.57/therm = $40/ton
- #2 Oil: $3.25/gal = $162/ton
- Propane: $1.75/gal = $140/ton
- Electric: $0.09/kWh = $155/ton

**Economic Impact in MD**

$90 million could stay in Maryland by using wood for thermal applications in commercial class buildings.
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What Are The Most Appropriate Wood Energy Technologies for Maryland?

- Commercial/institutional scale projects (e.g. “Fuels for Schools” type projects)
- Combined heat & power (CHP) – ~3,000 opportunities exist.
- Many retain fossil fuel boiler for backup & trim

Penn Valley School Project - 2011
Penn, PA (near State College, PA)

- High School – 155,000 sq. ft – fuel oil boiler
- Elementary School – 105,000 sq. ft – electric heat
- Total fuel bill for oil & electric – heat and hot water
  - $610,000 per year

Woody Biomass Boiler Installed 2011

- 10 million Btu’s/hr – provides heat & hot water
- Cost saving for fuel - $250,000 per year (1/3+)
- Project Cost
  - New facility & boiler - 2.7 million
  - Grants 1.5 million
  - Cost to school district 1.2 million
  - Payback period based on $250,000 yr 4.8 years
  - Payback with no grants 10.8 years
- Considerations – fancier facility with extra room to move in other functions. Demonstration site and used for teaching with students.

Sullivan County School District

- Project installation:
  - 2.8 mmBtu/hr biomass gasification unit & boiler
  - 3000 gallons thermal storage tank
  - 450 ft piping to existing facility
  - Total project cost -- $1.65 million
  - First year fuel savings $115,000 -
  - Ten temporary construction jobs created
- Sustainably harvested fuel keeps $825,000 in local economy over project life ($33,000/year)

Hughesville High School
East Lycoming School District, PA
Evangelical Community Hospital
Lewiston, PA
- 350,000 sq. ft plus
- System: 500 hp steam boiler
- Cost: $5 million
- Grants: $1.25 million
- Fuel savings: $600K plus
- Payback period: 6-8 years

Clearfield Middle School - PA
- System Size/Type: 8.5 MM BTU 15 psig steam Wood fired boiler syst.
- Past Fuel Type: #2 fuel oil / natural gas
- Fuel cost savings:
  > $89K / year (natural gas)
  > $138K / year (fuel oil)
- Total: $227K
- Wood Chips: 640 tons @ $35/ton, total of $22,400.
- Savings: ~$205K

Fuel for Schools
The Vermont Experience
- By early 2007, 30 Vermont Schools installed wood chip heating systems.
- Schools range in size between 23,000 ft² and 390,000 ft²; average is 136,400 ft².
- All schools combined use over 18,400 tons of wood chips per year.
- Annual fuel cost savings average $48,000; total statewide savings $1.5 million.
  * "New" systems are averaging 60% savings in fuel costs.

What About Emissions of Biomass Boilers?
Negative perception unwarranted!
Modern systems readily meet standards:
Rural area, <0.23lbs/mmbtu-hr
Urban area, <0.1lbs/mmbtu-hr

Fuel Supply
3 Questions Always Asked:
1. How much wood is there?
2. When will it run out?
3. Who will supply it?

The real question being asked:
"What will it cost tomorrow?"

Sustainability
- 334 million tons of live trees.
- 2.5 million acres (43% of MD)
- Growing 2.6x more than removals.
- Literally grows in your backyard.
- Diverse: Urban & Rural
Suppliers

Supplier network is in place and highly diverse, which is advantageous for price stability and fuel delivery reliability.
- NWWF/Landfills
- Sawmills
- Loggers
- Arborists
- Aggregators

Potential Available Volume

- NWWF 280,000 tons
- Arborists 600,000 tons
- Loggers 86,000 tons*
- Sawmills 160,000 tons
- Aggregators (market response)
- Total 825,000+ tons

...enough for 10 CHPs and 65 schools**

Price Stability

Green wood chips at $40/ton would be equivalent to:
- Oil $0.80/gal
- Gas $0.57/therm
- Electric $0.02/kwh

Moving Forward With School Projects

- Best prospects are:
  - New construction
  - Boilers slated for replacement
  - Replacing fuel oil, propane or electricity
- Simple assessment can be based on:
  - Present fuel costs
  - Square footage
  - Boiler cost
  - Calculate payback period
  - Other factors

On-line Resources

- Financial Calculators for Facilities
  - www.woodenergy.umn.edu/
  - http://michiganwoodenergy.org/
- Fuel Cost Comparison

Other Resources

- Biomass Thermal Energy Council - www.biomassthermal.org/
- Biomass Energy Resource Center - www.biomasscenter.org/
- Vermont Fuels For Schools - www.vtbp.org/energy/kt_energy_schools.cfm
- Pennsylvania Fuels for Schools - www.pafuelsforschools.psu.edu

Questions or Assistance?

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Look! No Smoke!