

Fuels for Schools and Beyond

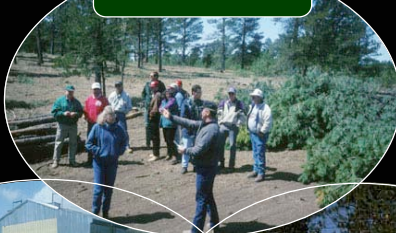
The Role of Forests in Energy and Climate Change

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Sustainability

Community



Economics



Environment



Topics to Cover

- Energy Security
- Climate Change
- How did it come about?
- What are the systems like?
- Air Emissions
- Economics
- Q & A



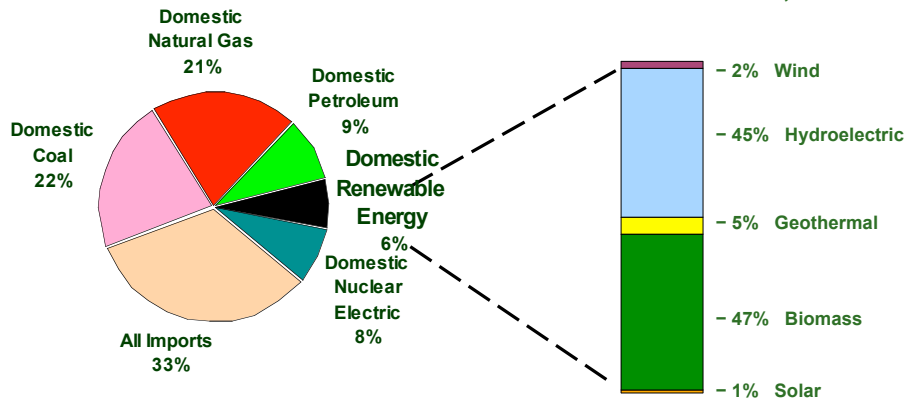
Why "Use It"?

- Reduce cost to improve forest health and reduce wildfire hazard
- Reduce smoke from disposal burning
 - Human/Enviro Health – PM, GHG
 - Airshed Aesthetics – "Smokey Air"
- Save on heat & power bills
- Energy independence - Renewable
- Engage communities in solutions
 - » Create jobs
 - » Small business opportunities



U.S. Energy Consumption Overview

Total = 6.2 Quadrillion Btu, 2004

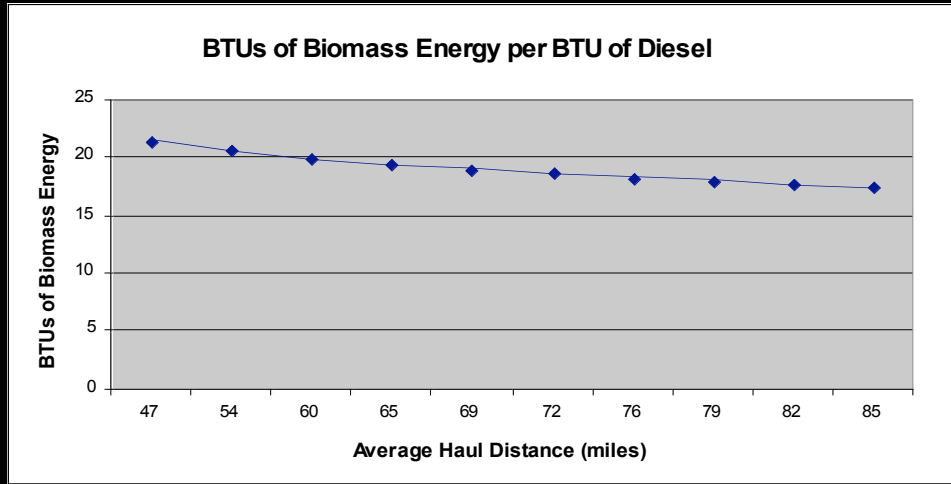


★ 72% of biomass is wood based

Energy

- Reduce dependence on foreign fossil fuel – policy implications
- Peak Oil and Gas – price implications
- Save money – **Not** a higher cost renewable energy
- Revenues stay in the country
 - Balance of trade benefits
 - Local community benefits

Biomass Energy Return



Woody Biomass Potential

368 million tons annually
Biomass as a feedstock for a bioenergy
and bioproducts industry



Climate Change

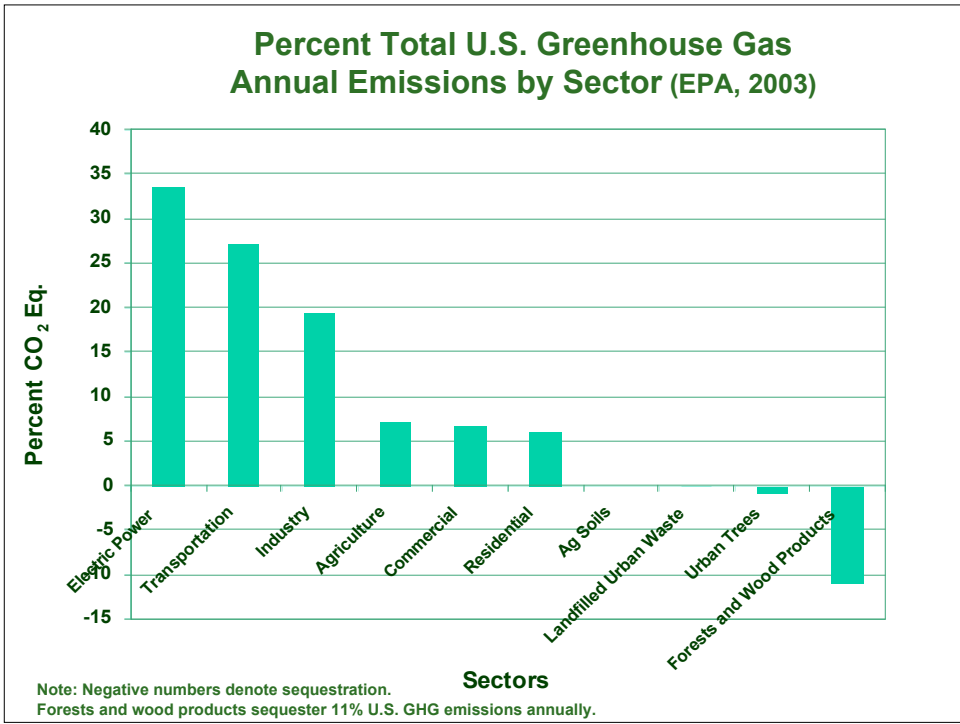
- **Living in a C constrained world**
 - **Energy Sources - Multiple distributed**
 - **No silver bullet**
 - **Forests provide solar collectors with cellulose batteries:**
 - **No mining needed to manufacture**
 - **Native habitat – plants & animals**
 - **Water purification system**
 - **Aesthetically pleasing**



Forest Mgmt Issues

- **Longer fire seasons**
- **More severe fires w/ fuel loads**
 - **Too many trees – disposal problem**
- **Changed snowpack water flows**
 - **Fish**
 - **Irrigation**
 - **Hydropower**
 - **Recreation**
- **Mitigation of CO2**
- **Resilience to new conditions**





Treated vs. Untreated

Rodeo-Chediskeei Fire

Camp 32 Fire 2005

“The sharp line in the aerial photograph is obvious, abrupt and dramatic: black forest on one side, green canopy on the other.”
Missoulian Sept. 2005. Camp 32 Fire Eureka, MT



Fire Hazard & Bark
Beetle Hazard Thinning
Project

Slash, Pile and Burn or
Pay to Thin Remove
and Utilize

Fuels for Schools and Beyond

- **When? - Fires of 2000**
- **Where? W. MT - VT**
- **Why?**
- **Who?**
- **How?**



Who are the Partners?

- **USDA Forest Service Regions 1 & 4**
- **6 State Foresters**
- **Schools**
- **Bitter Root RC&D**
- **Private sector businesses**
- **Others!**



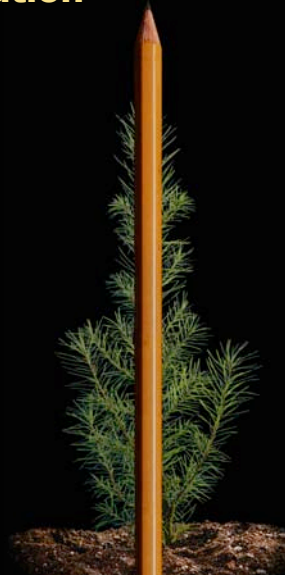
Public Investment-A Catalyst

Three Phase Implementation


I. Demonstration

II. Expansion


III. Private Sector



What does the FFS team do?

- **Integration of Tech Assistance**
 - **Fund/conduct Preliminary Engineering Assessments**
 - **Two-page Form on Web site**
 - **Engineer for a day**
 - **Cost/Savings calculation**
 - **Grants & other financial help**
 - **Supply Issues - suppliers**
- 

Technical Assistance

- **Supply of chips**
 - **Develop contractors**
 - **Sources of material**
 - **Wood manufacturers**
 - **Haz fuel reduction**
 - **Stewardship and Timber sale contracts**
 - **Transportation issues**
 - **“Canned Wood”**
- 

Heating With Wood:

Options:

- Fully automated – large facilities
- Surge Bin – small facilities
- Pellet systems
- Chunkwood
- Combined Heat and Power



Existing Systems

Chadron State College – 15+ yr



University of Idaho -20+ yr



Wood Products
Industry –
decades

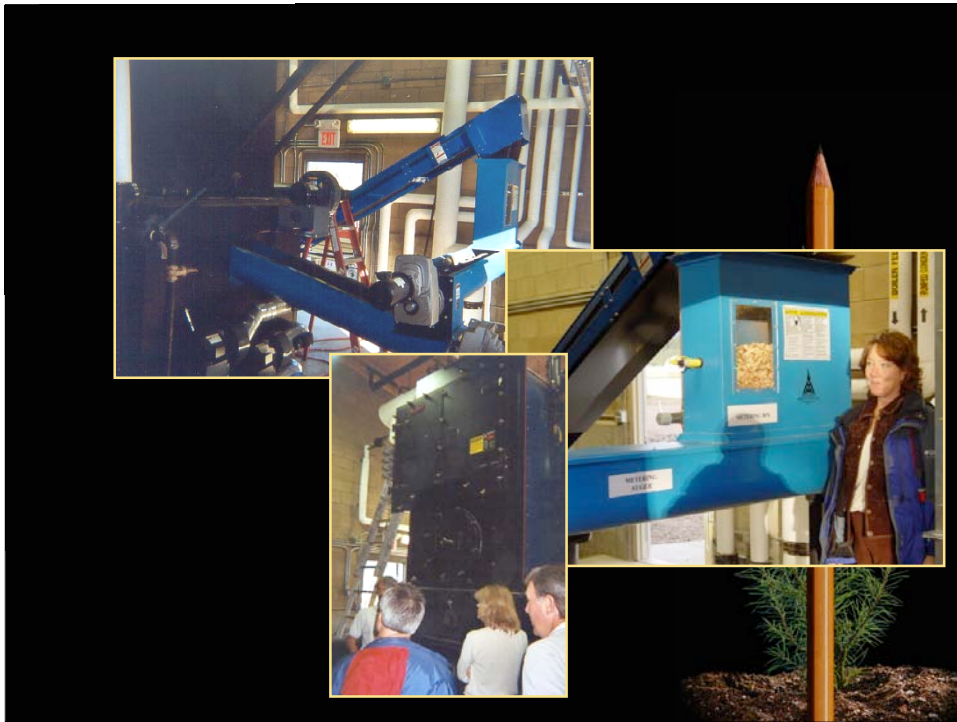


Darby, MT - 5 yr

Automated Facility



Darby, MT



Thompson Falls



Pellet Systems



170 k btu system

- Fuel is twice as costly
- Storage smaller, cheaper
- Boiler smaller, cheaper



Pellet Systems



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Pellet Storage



Garn – chunkwood



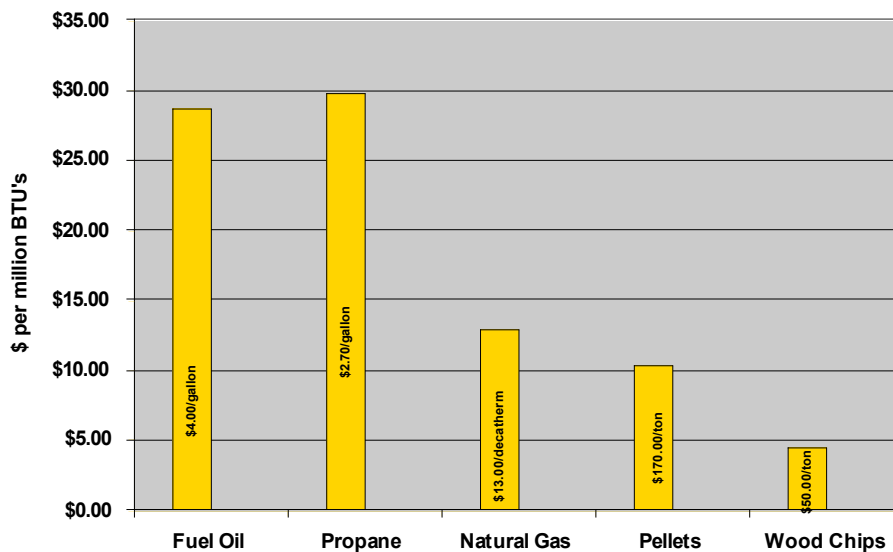
- 15 systems built.
- 3 more underway.
- 200+ facilities w/ completed PEA's.
- Commercialization Studies.
- 20-35 facilities to be assessed in 2007.

Combined Heat and Power

- Two products for the price of one +
- Heat worth more than electricity
- Year round heat load to match w/ elec
- Wood mills
- Prison/college
- Tax incentives
- RPS, REC,
- C credits



Fuel Cost Comparison



Fuel Supply Considerations

- Sources
- Processing, Delivery and Storage – Clustering
- Fuel Quality
 - Moisture Management
 - Ash – clinkers management
- Chips vs. pellets



Sources of Fuel

- Slash from forest management
- Local landfill?
- Residues from manufacturers
 - Post and Pole
 - Sawmills
 - House logs
 - Secondary manufacturers
- Power line clearing



Processing, Transporting and Storage

- **What infrastructure do you already have?**
 - Canned Wood – Roll-offs
 - Chip vans?
 - Chippers – Grinder – size matters
 - Do you need storage mid-winter?
- **Clustering projects**



Small Scale Chippers Urban Interface Fuels Reduction



"Canned Wood"

Report available at:
www.fuelsforschools.org



Storage

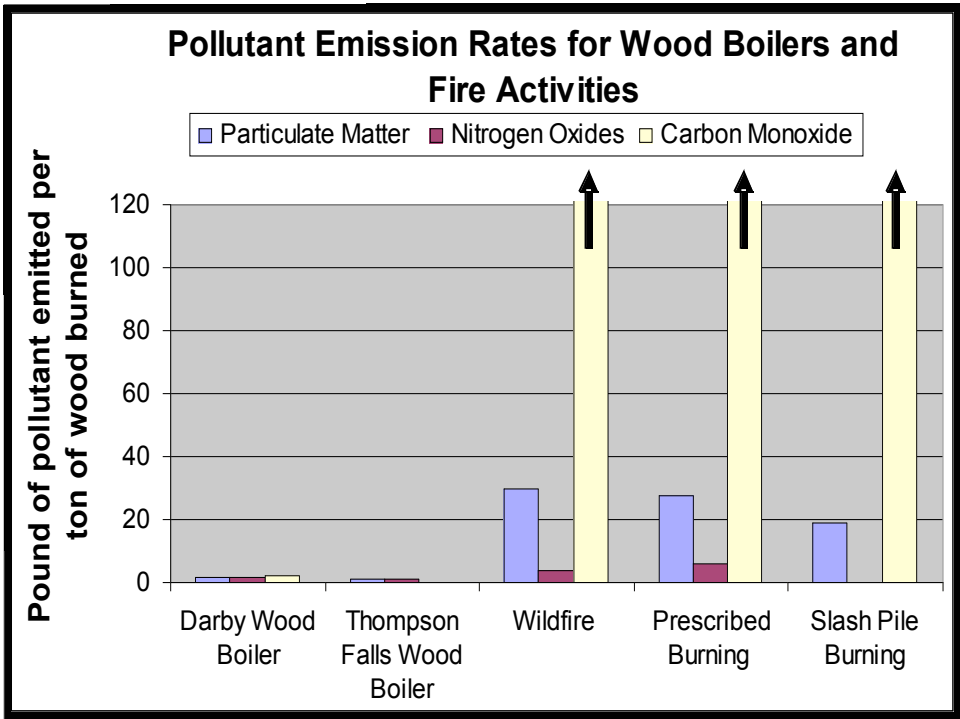
- Do you need it?
- Where to put it?
- Moisture management

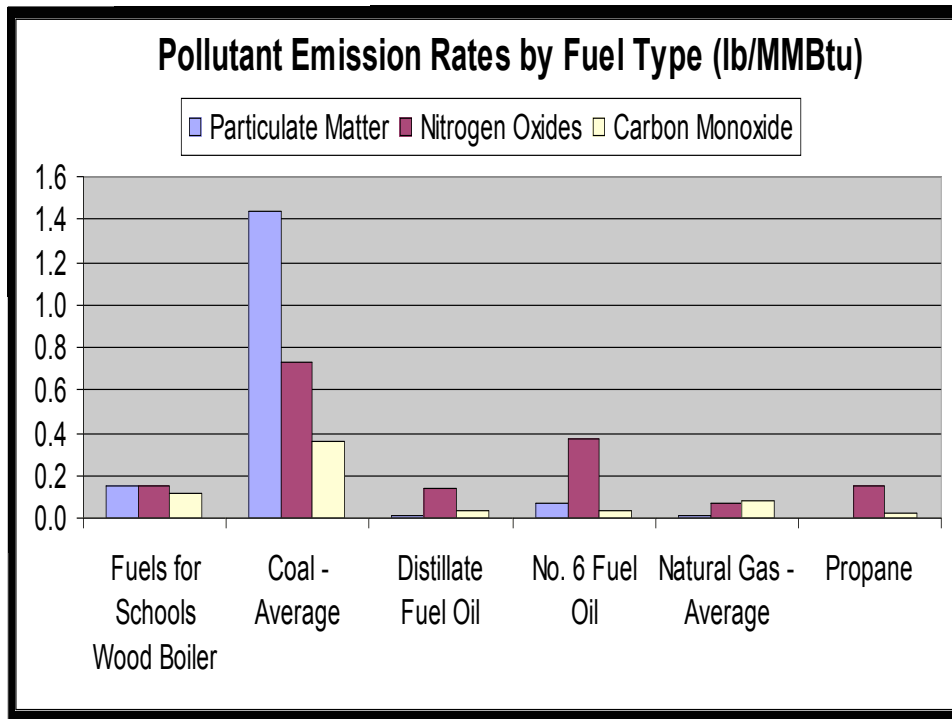


Fuel Quality

- Moisture management
- Ash – Dirt – clinkers
 - Operation and maintenance
 - Si, K, Na content – needles
 - Fertilizer – ash
- Price implications for O&M







Barriers

- **Fear factors**
 - **It is different!**
 - **More complicated O&M than propane or natural gas;**
 - **It is dirtier – dust, ash**
 - **It is going to be smoky like an old wood stove?**
 - **Change, people don't like it!**



Where can I get more Info

- www.fuelsforschools.info

links to:

- **Manufacturers - consultants;**
- **Biomass Energy Resource Center – BERC's publication: Wood-Chip Heating Systems**



Take Home Message

- **Renewable energy source**
- **Carbon Neutral**
- **It's the Economy!**
- **It's the Environment!**
- **It's the Community!**
- **It's Sustainability – Forests are green!**

