Developing a Woodchip Heating Fuel Quality Standard for the U.S.

Northeast Biomass Heating Expo
April 27, 2017
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Presentation

- Background: Why a National Wood Chip Heating Fuel Quality Technical Standard?
- The Project:
  - Lead Organizations,
  - Advisory Committee,
  - Stakeholder Involvement
- The Process: Current Status, Next Steps
- How You Can Get Involved

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Context

- Commercial woodchip heating/CHP represents ***significant growth opportunity*** in various regions of the US

- For woodchip heating/CHP to become mainstream energy choice, ***it must be clean and efficient, with high reliability and consistent, predictable performance***

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Elements of Success

Know-how to produce given grades of fuel

Fuel that consistently meets the specs.

State of the art combustion technology engineered to burn specific fuel

Optimal system performance (low emissions, high efficiency, & minimal O&M)

Market and Regulatory Confidence and Trust

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The Current Problem

- **No widely adopted, fully recognized woodchip fuel standard in U.S. market today**

- **Every other major heating fuel, except wood chips**, subject to unambiguous fuel standards certified by recognized agency
  - Heating oil
  - Propane
  - Natural gas
  - Pellets (PFI, ENPlus, ISO)

- **Failure to act could lead to regulators** (e.g. EPA) taking matters into their own hands

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Contributing Factors

- Increased regulation
  - Boiler MACT
  - New Source Performance Standards
  - New particulate non-attainment thresholds
- Greater awareness of particulate issues from wood fuels, especially among state regulators
- Fossil heating fuels against which wood competes are getting cleaner (e.g. ULS #2 heating oil, Bioheat blends)
- Public expectation that wood fuels must be as clean as possible (backlash from OWBs)
- Public health officials increasingly taking dim view of wood
- Sophisticated consumers of fuel insisting on verifiable standard

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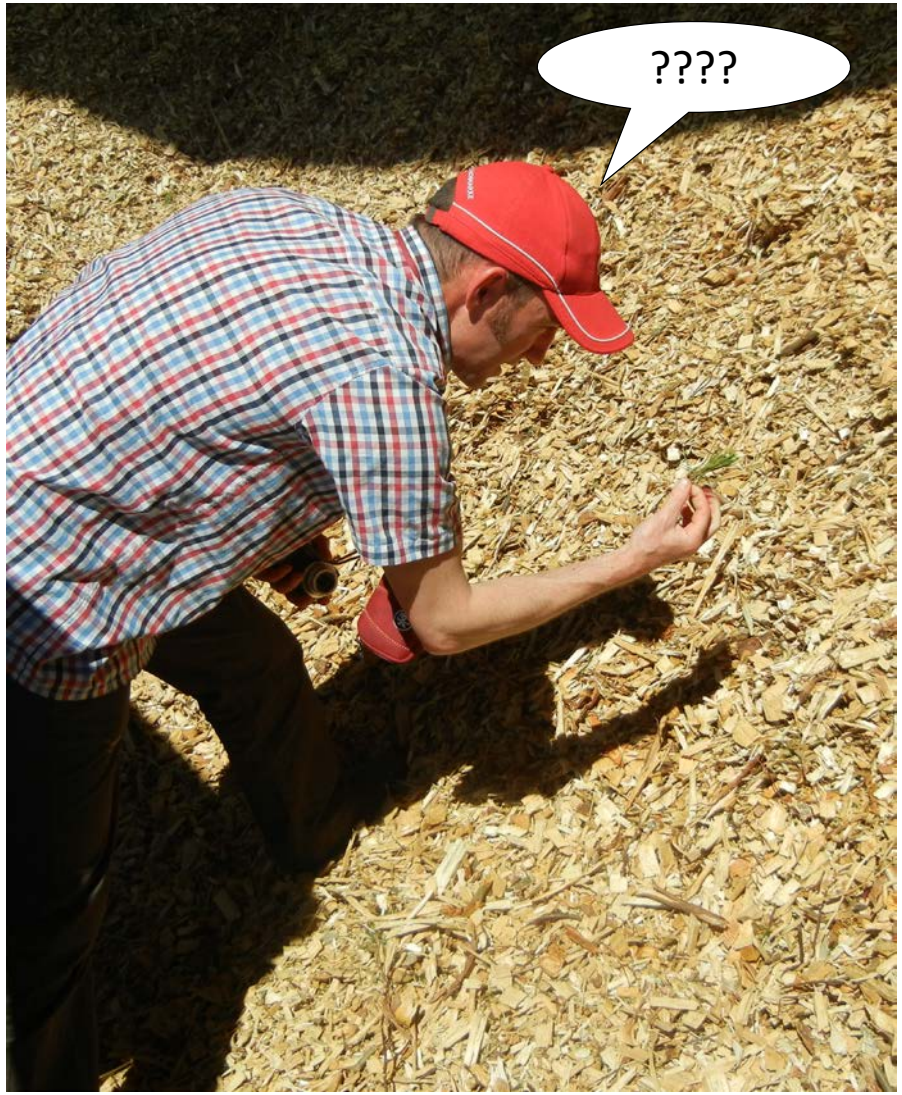
No Standard Terminology for Woodchips as Heating Fuel!

- “Hog fuel”
- “Dirty chips”
- “Clean chips”
- “Grindings”
- “Whole tree chips”
- “Paper chips”
- “Screened chips”
- “Bole chips”
- “Microchips”
- “Semi-dry chips”
- “Precision dry chips”
- “Refined dry chips”



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Benefits of Fuel Quality Standards

1. Appropriate fuel for the combustion equipment
2. The consumer knows what they are getting
3. The producer knows what woodchip grade their local market demands, and how to produce, store and distribute that specific woodchip grade
4. Trouble-shooting of operational failures of the combustion system is simplified
5. There is an increased confidence in the equipment and its performance, the fuel and its performance, which ultimately builds the market for woodchip fuel

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Project Partners

BERC
Biomass Energy
Resource Center

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LLC

BTEC
Biomass Thermal Energy Council

ASABE

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Grant Support from U.S. Forest Service, Wood Education Resource Center

Thank You

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Getting Started

- Formed 15 member advisory committee
- Built website: www.woodchipstandard.org
- Built stakeholder list: now over 400 (sign up on website!)
- Introduced project at conferences across the U.S.
- Exposure in *Biomass Magazine*

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Advisory Committee: Fundamental Question

- *Develop new standard for U.S. market?*
- *Adopt existing standard?*
- *Adopt existing standard with modifications for U.S. Market?*

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Existing Standards to be Reviewed

- EN 3505 & 14961
- ISO 17225-4
- ONORM M7133
- Can/CSA (ISO)
- Regionally adopted specs
- Default boiler vendor specs

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Comparison of Major International Chip Fuel Standards

Parameter	ISO	EN 14961	ONORM M7 133
Origin	A1/A2/B1/B2	1.1/1.2/1.3/1.4	
Particle Size (mm)	P16S/P31S/P45S	P16A/P16B/P45A/P45B/P63/P100	G30/G50/G100/G120/ G150
Moisture Content	M10/M25/M35 (for B1)	M10/M15/M20/M25/M30/M40/M45/ M55/M55+	W20/W30/W35/W40/W 50
Ash Content	A1.0 (for A1)/A1.5 (for A2)/A3.0 (for B)	A0.5/A0.7/A1.0/A1.5/A2.0/A3.0/A5.0/ A7.0/A10.0/A10.0+	A1/A2
Bulk density	BD150/BD200/BD250/BD300 (for A2)	BD150/BD200/BD250/BD300/BD350/BD400/BD450/BD450+ (if traded by volume)	S160/S200/S250
Nitrogen	N1.0 (for grade B)	N0.3/N0.5/N1.0/N2.0/N3.0/N3.0+ (for 1.2.2, 1.3.2)	
Chlorine	Cl0.05 (for grade B only)	Cl0.02/Cl0.03/Cl0.07/Cl0.10/Cl0.10+ (for 1.2.2, 1.3.2)	
Sulfur	S0.1 (for grade B only)		
Arsenic	<=1 (for grade B only)		
Cadmim	<=23.0 (for grade B only)		
Chromium	<=10 (for grade B only)		
Copper	<=10 (for grade B only)		
Lead	<=10 (for grade B only)		
Mercury	<=0.1 (for grade B only)		
Nickel	<=10 (for grade B only)		
Zinc	<=100 (for grade B only)		
Net energy content	MJ/kg or kWh/ m^3 l	(LHV)) as MJ/kg or kWh/m^3 l	

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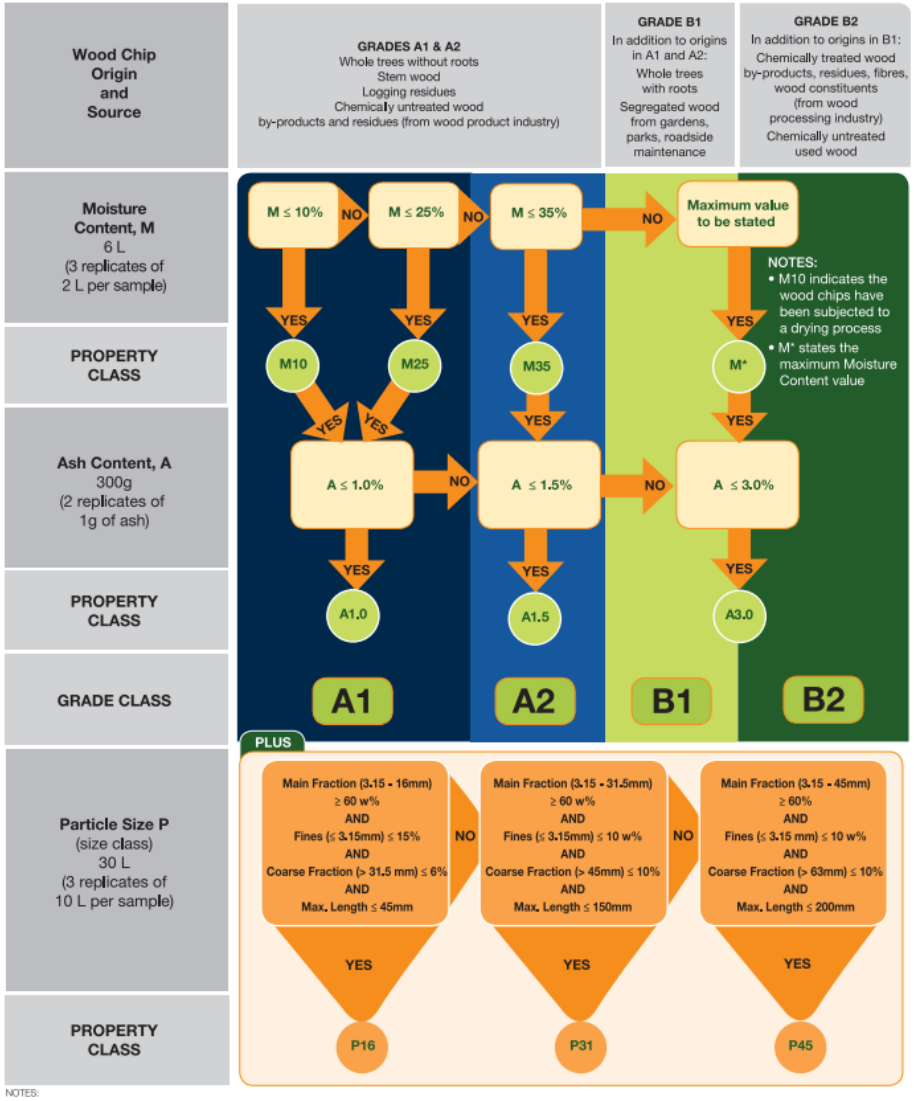
Woodchip standards are easy as….



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Pros and Cons of Different Approaches

	Using an Existing Standard	Modifying an Existing Standard	Creating a New Standard
Facilitated Trade with other Countries (primarily Canada)	Yes, if ISO standard	Yes, if closely resembles ISO standard	No
Allows for Relatively Easy Adjustments of Standard, Prior to or Post Implementation of Standard	No, would require engagement in the ISO process and engagement of ISO stakeholders	Yes, through ASABE	Yes, through ASABE
Present Absolute Values, Independently Verifiable by Labs and/or Producers	Yes, using existing, standardized measurement protocol	Detailed measurement protocol may need to be determined and published for each criteria modified	Detailed measurement and verification protocol will need to be determined and published for each criteria (equipment to use for measurement, procedures, level of precision, etc.)
Require Producers to Purchase Additional Equipment to Grade their Product	Yes, sieves	Yes, sieves	Likely, sieves. Possibly others
Require Producers to do additional Work to Grade their Product	Yes: sieve, oven dry	Yes: sieve, oven dry	Likely: sieve, oven dry. Possibly others.
Supply Chain and Quality Assurance Protocol Established	Yes	Yes, may need to be modified	Will need to be defined
Legal Obligation to Meet the Standards	Not until the market matures enough	Not until the market matures enough	Not until the market matures enough
Facilitates Woodchip Boiler Manufacturers' Specification of the Proper Fuel	Yes, if ISO, for all European or Canadian	Yes, if closely resembles ISO standard, for all European or Canadian	No, manufacturers will have to understand the new standard for the US market and provide specifications tailored to the US market in addition to the EU and Canadian market
Vulnerability to Void Manufacturer Warranty or Legal Action if Chips do not Meet Grade Advertised	Potentially	Potentially	Potentially
Requirements to Have the Fuel Tested on a Set Schedule or by a Third Party	No	Can be required	Can be required
Offers a Simple, Easy to Understand Standard that Greatly Simplifies the Evaluation and Purchase of a Highly Variable Wood Fuel	Limited	Limited	Potentially
Offers a Detailed, Comprehensive Standard that Classifies Woodchips into a Matrix Covering a Range of Characteristics	Yes	Yes	Potentially

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Advisory Committee Opts to Modify ISO Standard for U.S. Market

- Widely adopted in Europe
- Adopted by Canadian Standards Association without modification
- Focusing on:
  - *Allowance for any processing method as long as resulting fuel can meet specification*
  - *Chip size classifications more consistent with U.S. market (English measure)*
  - *Moisture content classifications reflecting diversity of boiler engineering in U.S. market*

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Next Steps

- Advisory Committee becomes voting body
- Looking to expand voting body with additional expertise, greater geographic diversity
- Formal ASABE process to adopt ISO standard with modifications, now registered with American National Standards Institute (ANSI)
- Public comment in May
- Expect to be complete and adopted by end of year

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Standard only as good as its adoption and use!

- Major education and outreach effort in 2018
- Publish guidance handbook to modified ISO standard
- Promote use of standard with all stakeholders
  - ✓Approach boiler and wood chip fuel processing, conveying and storage equipment to reference standard
  - ✓Consumers
  - ✓Air quality regulators

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Stakeholder Categories

- Wood chip suppliers/producers
- USDA Forest Service
- Boiler manufacturers
- Chipping and grinding equipment manufacturers
- Forestry officials (state and local)
- Consultants
- University
- NGOs
- Air quality regulators
- Boiler safety experts
- Mechanical/ agricultural engineers

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What We Need from You

- General input
- Fuel specs you have used for projects
- Lab analysis for sources and grades of chips
- Visit the website and learn more – www.woodchipstandard.org
- Sign up as a stakeholder & participate in the process

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Thank you

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