

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

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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**



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***

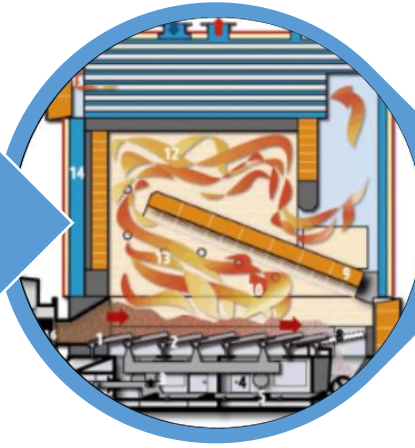
Elements of Success



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

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**

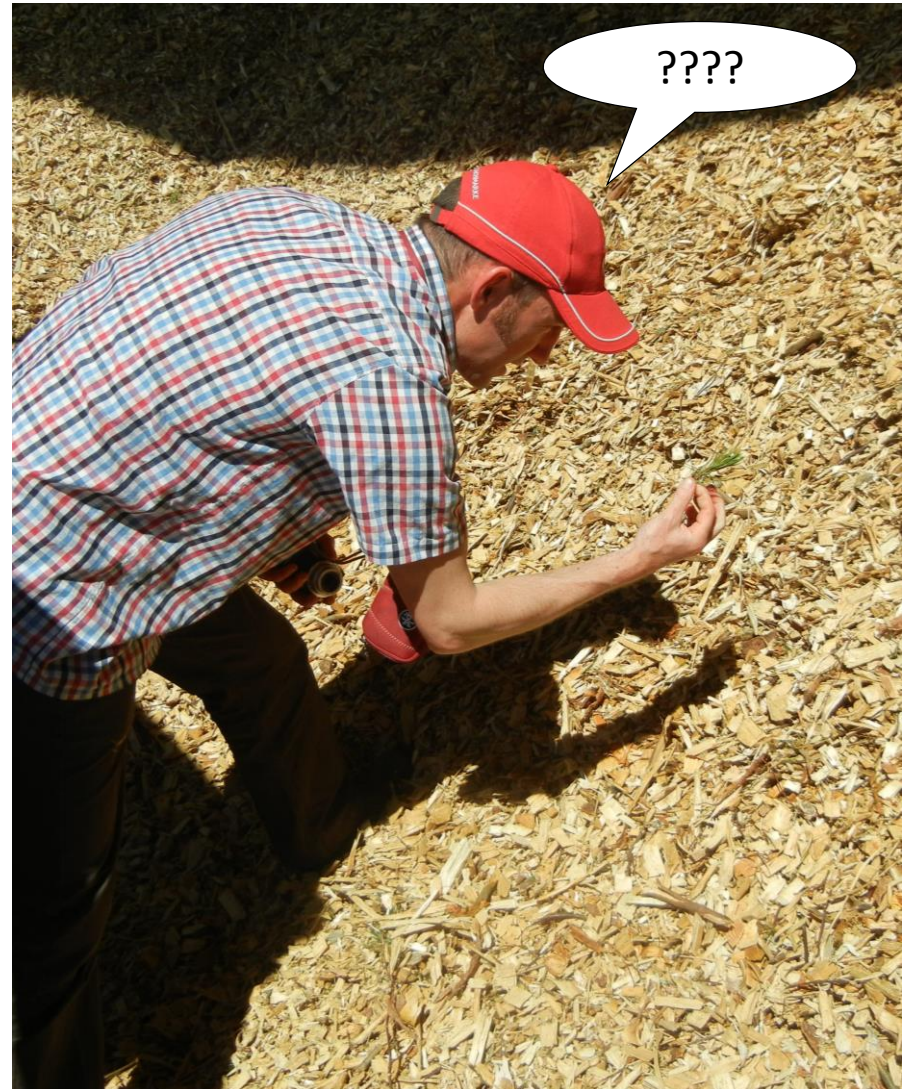
Contributing Factors

- 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



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”



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

Project Partners



BERC
Biomass Energy
Resource Center



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



Thank You

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*



Advisory Committee: Fundamental Question

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

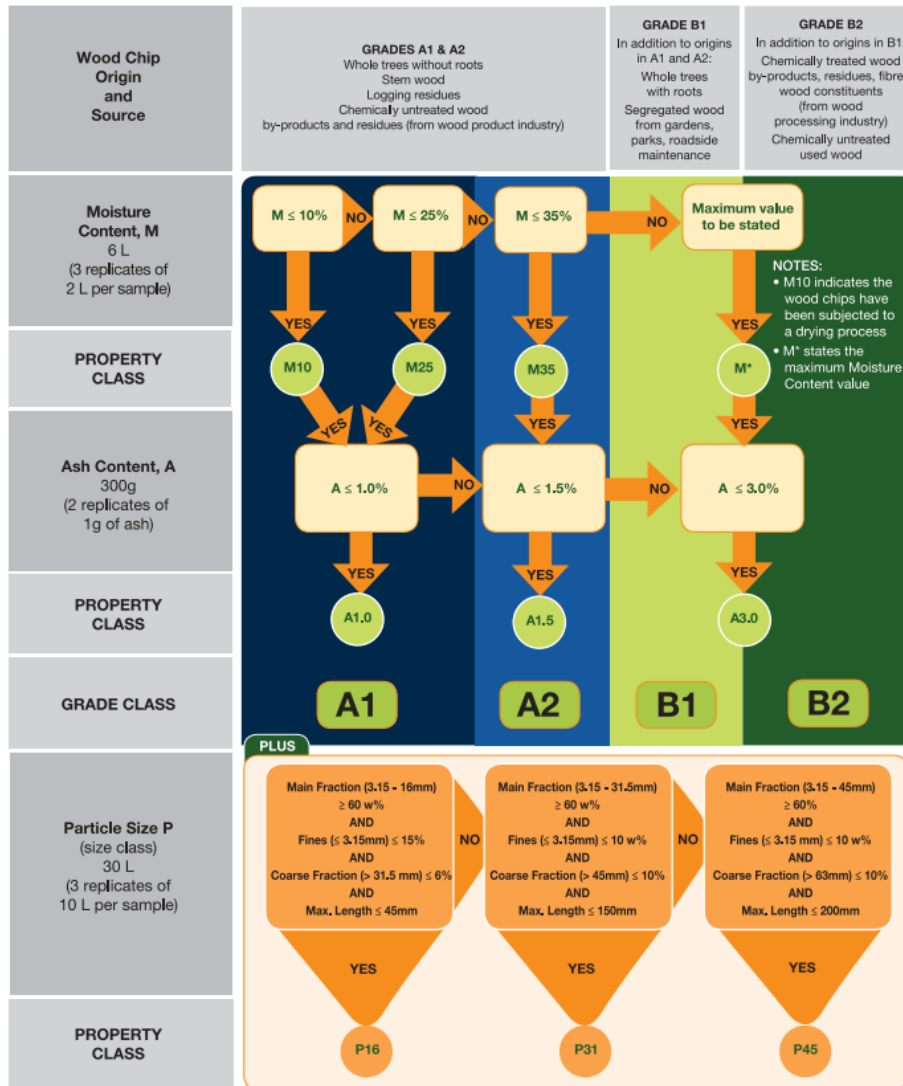


Existing Standards to be Reviewed

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

| 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/W50 |
| 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 | |

Woodchip standards are easy as....



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 |

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*



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



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

Stakeholder Categories

- 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

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

Thank you

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