

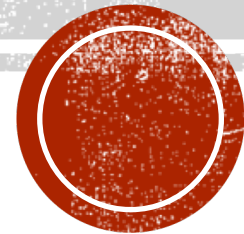
STOVE TECHNOLOGY IMPACTS OF THE 2020 NSPS AND OPPORTUNITIES FOR NEXT GENERATION HEATERS

**Residential Wood
Smoke Workshop**
March 10-12, 2020
New Orleans, LA

John Ackerly
President



ALLIANCE
FOR GREEN HEAT
low carbon, renewable and local



AN EXCITING YEAR TO BE AT HPBA EXPO

- ❖ After years of claims and counter claims, you are among first to see this new generation of stoves.
- ❖ How have they changed? Are they much better? More expensive?
- ❖ Are manufacturers still profitable?
- ❖ Are they REALLY cleaner?
- ❖ Industry is moving more towards gas appliance, BBQs & chimeneas. Booths with wood and pellet stoves no longer dominate the floor.
- ❖ Prioritize what you want to see otherwise you can get lost amongst the spatulas, widgets and gadgets



AN INDUSTRY IN TRANSITION

Comparisons to 2015 stoves:

- ❖ **More catalytic stoves**
 - ❖ 27 of 65 cat stove models are 2020 compliant
- ❖ **More hybrid stoves**
 - ❖ 11 of the 13 models listed as hybrid are 2020 compliant.
- ❖ **Pellet stove**
 - ❖ 91 of 169 pellet models are 2020 compliant
- ❖ **Non-cat stoves**
 - ❖ 64 out of 347 non-cat models are 2020 compliant
- ❖ **Boilers & furnaces on market**
 - ❖ Few models on market and at higher prices



ASTM Cordwood testing on 2020 stoves

- ❖ Rapid adoption of ASTM cordwood method
 - ❖ About 45% of 2020 units tested with cordwood
 - ❖ Average PM emissions of crib and cordwood testing are nearly identical; and the ASTM E3503 cordwood test *includes* start-up smoke whereas crib tests do not!
 - ❖ This result was probably not clear to the EPA's Steffan Johnson, when he approved the ASTM E3503 but industry insiders may have known it was an easier test.

2020 Stoves	Pell	hyb.	cat	n-cats	Crib	Cord (ASTM)
Median grams of PM/hr:	1	.85	1	1.8	1.8	1.5
Average PM				1.6	1.6	1.6
Median efficiency:	73%	78%	77%	71%	71%	71%
Average effic.					70%	71%
Median CO (g/min.)	0.17	2.2	0.6	1.5	1.6	1.4
Average CO					1.6	1.5



INDUSTRY IN TRANSITION

Very large and very small stoves

- ❖ We urge consumers to look at firebox volume, NOT claimed BTU output
- ❖ 10 models that are over 3 cubic feet
 - ❖ Of those 3 are non-cat
 - ❖ 4 models over 4 cubic feet
 - ❖ 6 tested with ASTM cordwood method
- ❖ 12 models under 1.5 cubic feet
 - ❖ All are non-cat
 - ❖ 10 tested with ASTM cordwood method

Regency F5200

Morso 6140



EFFICIENCIES RISING

- ❖ One of biggest consumer benefits of the 2020 NSPS is transparency and rise in efficiencies
- ❖ 13 models of pellet stoves, from 10 companies, offer models that are 80% efficiency or higher. (But also 13 models of pellet stoves 65% efficiency and less.)
- ❖ In both wood and pellet stoves, there is a correlation between efficiency and cleanliness but not always a strong one.
- ❖ Many if not most manufacturers continue to use European heating values on the websites and literature, leading retailers and consumers to think they are far more efficient than they actually are. Only go by the list of EPA stoves to verify efficiency.



THE NSPS & AFFORDABILITY

- ❖ How has technology changed for better and for the worse? Some stoves appear not have changed at all, although their innards may have undergone changes
- ❖ This Pelpro model gets 82% efficiency, has a huge hopper and sells between \$1,000 and \$1,600. It also appears not to have changed much at all in price or design between its 2015 and 2020 models.

AFFORDABILITY — CONT'D

- ❖ Stove prices continue to come in a wide range.
- ❖ The Summer's Heat 50-SHSSW01 made by England Stove Works reportedly did not have to be redesigned and still sells well under \$1,000. (Booth 713)
- ❖ Prices continue to reflect distributor and dealer mark-up and production costs.



SINGLE BURN RATE STOVES

- ❖ A promising way to avoid operator error, single burn rate stoves operate hotter and burn quicker.
- ❖ Masonry heaters are also sophisticated single burn rate stoves that capture heat in their masonry mass. We encourage the EPA to endorse an efficiency calculation method for masonry heaters.
- ❖ The EPA list of heaters does not designate test methods or single burn rate stoves, so its unclear how many are on the market and at what price points. Does anyone have a list?
- ❖ Stove at right, made by ICC-RSF emits 1.3 grams, burns hot and fast, and thus gets 60% (Booth 928 & 4201). Stuv has many single burn rate stoves (Booth 1349)

RSF/ICC-booth



EXISTING INNOVATION

- ❖ **MF Fire**, the first automated, commercial stove in the U.S. Sensors control combustion air. This company took a big risk, innovated and share a common vision with some of you, that cordwood heating can be consistently much cleaner than existing models. (Booth 657)
- ❖ **Jøtul High Flow Combustor** also has continuously engaged catalyst but no automation. The absence of a combustor bypass allows the F 500 V3 Oslo to operate with an engaged cat 100% of the time. Worth seeing on the showroom floor and asking how it handles start up smoke. (Booths 2238 & 4214)



FUTURE INNOVATION

- ❖ True hybrid stoves that burn wood and pellets.
- ❖ When wood load burns out, pellets automatically start feeding. Allows people to enjoy look and feel of wood when they are awake and the cleanliness of the pellets the rest of the night. On the market in Europe, but not in US
- ❖ Enerflex Electrostatic Precipitator (Booth 2625). More ESP models in the marketplace is important as we learn and experiment about this high potential technology.



PELLET STOVE INNOVATION

- ❖ Remote monitoring and trouble-shooting by technicians could drastically improve performance and user satisfaction.
- ❖ Smart technology, paired with heat pumps, could turn on pellet stove when temperatures went very low or during peak electricity periods or when electricity prices were high.
- ❖ All pellet stoves have many sensors but virtually none help optimize combustion to maintain a clean burn.
- ❖ The pellet stove service industry is small and scattered and some brands have very few trained technicians to serve them.



AFTER MARKET DEVICES

❖ Aduro Smart Response

<https://youtu.be/4TZ1FOn1akA>



THE NSPS, CHANGE-OUT & BEST PRACTICES

- ❖ Many change out programs that referenced gram per hour limitations need to be changed.
- ❖ AGH encourages adding or maintaining a 70% efficiency minimum for pellet stoves.
- ❖ With stricter emissions and efficiency, AGH urges programs to find ways to include big box stores that have selected quality stoves to make your program dollars stretch.
- ❖ A clean combo: a mini-split heat pump and a pellet stove offer best of multiple worlds.
- ❖ Educate clients on benefits of hybrid stoves, instead of catalytic stoves



MORE CHANGE OUT BEST PRACTICES

- ❖ Get your state to require energy auditors to inspect wood and pellet stoves using BPI
- ❖ Facilitating energy audits and weatherization as a requirement or recommended action.
- ❖ Consider grants for pellet stoves to go in an operating fireplace without a change out of an old stove.



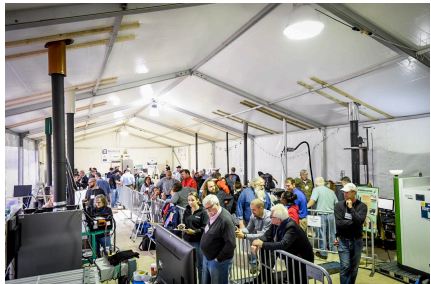


Promoting automation and innovation.

Visit two of the award-winning teams who built automated stoves:

MF Fire – booth 657

SBI – booth 639



SOLAR AND PELLET

- ❖ Smart technology can connect solar thermal, heat pumps and a pellet stove to fully provide water and space heating to a building year-round.
 - ❖ Each source is used when it is cheapest and most effective.
 - ❖ Solar thermal when the sun shines
 - ❖ Heat pump baseload nearly all the time
 - ❖ Pellet fuel during cold nights and cloudy days
- ❖ Coupled with rooftop solar PV or renewable electricity from the grid, a home or building requires no fossil fuel.



HOW QUICK CAN WE ELECTRIFY HEAT?

- ❖ Q. Can the pellet stove compete in a world moving towards electric heat pumps?
- ❖ A. Yes for now, but pellet stoves and boilers may be a bridge technology to complete electrification of heat as solar & wind get cheaper and more abundant.
- ❖ A. We simply won't have enough renewable electricity for at least 10 years in most states to cover heat and transportation.



IRS \$300 TAX CREDIT: BUYER BEWARE

- ❖ The reinstated \$300 IRS tax credit can help change-out programs through the end of 2020, but ...
- ❖ The IRS says only that heaters have a 75% "thermal efficiency rating" and does not specify the LHV or HHV – or weighted average
- ❖ Many manufacturers mislead consumers into thinking they are buying a high efficiency stove.
- ❖ Jotul, HHT and others claim stoves in the mid to low 60s qualify.
- ❖ We urge you to ask these manufacturers how they calculate efficiency and urge them to do so honestly.



AMERICAN ENERGY INNOVATION ACT (AEIA)

- Senators Murkowski (R-AK) and Manchin (D-WV) packaged up dozens of bills that didn't pass last year. Gives boost to a broad range of technologies.
- Would give a 30% tax credit to residential wood heaters with a "thermal efficiency rating of at least 75 percent (measured by the higher heating value of the fuel).
- Could extend the residential biomass tax credit till 2024.



Murkowski

Manchin



Wyden



THANK YOU

John Ackerly

jackerly@forgreenheat.org

www.forgreenheat.org

301-204-9562



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NEXT GENERATION
Woodstove
DesignChallenge

