

Comment on Proposed Area Source Boiler Rules
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The Biomass Thermal Energy Council (BTEC) and its membership appreciate the opportunity to submit comments on the U.S. Environmental Protection Agency's (EPA) Proposed Rule for Area Source Boilers. BTEC is a nationwide industry association representing the views of biomass feedstock producers, fuel refiners, appliance manufacturers, vendors, non-profits, and end users: it is dedicated to advancing the market for biomass thermal energy and promoting the use of high efficiency products and locally produced renewable biomass.

Biomass thermal energy today is a growing industry. Roughly one million American businesses, citizens, and institutions use biomass to meet their space heating, cooling, or process heat needs. BTEC supports the EPA in setting emission standards for biomass boilers that push the industry to produce clean-burning, high-efficiency appliances.

However, EPA's analysis in determining the biomass boiler emissions limits used an incomplete dataset, overestimated the health impacts of biomass combustion, and underestimated the economic impacts to small businesses and communities. Nonetheless, BTEC is confident that these issues can be addressed in a common-sense, data driven approach that both achieves significant improvements in biomass boiler emissions and balances the needs of communities and small businesses.

BTEC offers the accompanying critique of and recommendations for an improved Area Source Boiler rule:

- EPA's data set is incomplete and inaccurate regarding available technologies, boiler sizes, biomass fuel types, and health effect estimates. Moreover the fact that no boiler in the dataset can meet the dual emission limits of PM and CO shows the proposed standards are unreasonable;
- The rule's high compliance costs will discourage renewable biomass use and disproportionately damage rural economies;
- BTEC recommends initial minimum performance standards of Carbon Monoxide (CO) – 1,164ppm (@ 7% O₂) and Particulate Matter (PM) - 0.23 lbs/MMBtu for all boilers, with reductions thereafter driven by data collected during the first two years of the rule's implementation;
- The rule should institute an initial third party certification test with required annual tune-ups without ongoing costly stack testing. Once a boiler (or range of boilers) is tested, that boiler would be approved for installation until a change was made in the boiler design.

INCOMPLETE DATA SETS

EPA data reveals no systems overlap in CO and PM categories

Out of EPA's estimated total population of 10,958 biomass boilers, the Maximum Achievable Control Technology (MACT) CO and PM limits were determined by only 65 boilers (0.6%) and 20 boilers (0.2%), respectively. The biomass boilers that achieve the PM standard are not the same boilers that achieve the CO standard. The six biomass boilers in the dataset that are able to meet the Generally Achievable Control Technology (GACT) standard for PM have an average CO emission of 1,164 ppm, which is more than 11 times higher than the proposed CO limit for new boilers. The eight biomass boilers in the dataset that are able to meet the MACT standard for CO have an average PM emission of 0.23 lbs/MMBtu, which is more than seven times higher than the permitted PM limit (See Table 1 and 2 below).

Table 1: EPA 'Best in Class' Boilers for CO

	Facility	Fuel	Boiler size	Control Technology	CO (ppm)	PM (lbs./MMBtu)	CO Top 12%
1	Simpson Door, WA	Door manufacturing residues	34.5	none	29.2	0.21	Yes
2	North Country Hospital, VT	Wood chips	15.6	Multiclone	38.6	0.15	Yes
3	Thompson Falls, MT	Wood chips	1.6	none	66.5	0.14	Yes
4	Burlington High School, VT	Wood chips	10	Multiclone	79.5	0.2	Yes
5	Columbia N, OR	Dry biomass, Hog Fuel	12.5	none	81.6	0.33	Yes
6	Travis Lumber #2, AR	Green wood waste	29	Multiclone	96.1	0.1	Yes
7	Council, ID	Hog Fuel	1.9	Cyclone	98.6	0.5	Yes
8	Douglas County, OR	Hog Fuel	115	Cyclone/ESP	104	N/A	Yes
9	Darby, MT	Bole Chips	3.3	none	110	0.2	No
Avg. of top 12% of CO MACT Boilers					74.3	0.23	

Table 2: EPA 'Best in Class' Boilers for PM

	Facility	Fuel	Boiler Size	Control Technology	CO (ppm)	PM (lbs./MMBtu)	Meet PM GACT
1	Potlatch Forest Products Post Falls, ID	Sander dust with glues and resins	30	ESP	1760	0.0021	Yes
2	Boralex Ashland, ME	Wood	585	ESP	253	0.0028	Yes
3	Boise Kettle Falls Lumber, WA	Hog Fuel	50	ESP	468	0.0036	Yes
4	Boralex Fort Fairfield, ME	Wood, bark	523	ESP	499	0.0051	Yes
5	Stimson Lumber, WA	Hog Fuel	69	ESP	2840	0.0075	Yes
6	Cadillac Renewable Energy, MI	Mixed wood, pallets, bark, char	500	ESP	N/A	0.023	Yes
7	International Gilchrist, OR	Wood-unadulterated	170	Multiclone	N/A	0.058	No
Avg. of top GACT PM Boilers					1164	0.007	

Using EPA's own data set, *it can be clearly observed that there is no biomass boiler tested that can achieve the proposed levels for both PM and CO.* For example, the best performing biomass unit for CO is at Simpson Door in Washington State; it is a 34.5 MMBtu/hr boiler installed 90 years ago and has a 9' diameter and 236' high stack. It seems extremely likely that this "best in class" emission result is largely due to dilution in the large stack and not due to system design that would ever be replicated in a new boiler. To require new biomass boilers to meet standards that no single biomass boiler has ever achieved in testing is unreasonable.

Absence of data on smaller biomass boilers and various biomass fuel types

Defining all boilers less than 10 MMBtu/hr as "Small" Area Source Boilers, per the proposed rule, ignores the differing design characteristics of truly small boilers. EPA is making incorrect assumptions about the capabilities of commercial biomass boilers from 25,000 Btu to 2 MMBtu; this is especially evident when only boilers >10 MMBtu/hr were used to determine EPA's PM limits, while CO emission limits were developed with boilers >1.6 MMBtu/hr.

Also, there was no data on systems burning non-woody biomass fuels such as corn stover and grasses. Non-woody biomass fuels are common throughout the world, and are becoming more prevalent in the U.S. Multiple federal programs, including the Biomass Crop Assistance Program, support the development of a robust domestic energy crop infrastructure. Non-woody fuels are part of the nation's renewable energy future, and EPA cannot sensibly regulate what it has not measured.

A representative dataset of existing (small, i.e. <10 MMBtu/hr) commercial biomass boilers would include units at rural businesses, institutional sites, and farms; they often emit PM at levels in excess of 1.0 lb/MMBtu. Without these and other small-scale commercial boilers included in the dataset, and without a diversity of biomass fuel types, the data is biased towards the subset of the very best performing boilers and is not a representative sample of the actual biomass boiler population.

Inconsistency with other established biomass emission limits

Further illustrating the dataset's weaknesses are the contrasting proposed limits for Major Source boilers. Four different classifications of biomass boilers (stoker, fluidized bed, suspension burner/dutch oven, and fuel cell) each have a range of permitted HAP emissions and associated allowable CO limits. For Area Source boilers, there is a single biomass class which does not reflect the diversity of Area Source boiler types. The stoker and dutch oven/suspension burner boilers are most similar to Area Source biomass boiler types; these have proposed CO emission levels of 560 ppm and 1,010 ppm @ 3% O₂, respectively (converted to 434ppm and 764ppm @ 7% O₂). Therefore it seems unreasonable that smaller boilers would be subject to CO limits that are so much lower when major sources are allowed much less stringent CO limits.

Also, the proposed standards are sixteen and five times lower for CO and PM, respectively, than the recently proposed European Regulations for similarly sized boilers and USEPA's residential wood boilers that are within the same size range as small commercial units (See Table 3 below).

Table 3: Comparable Solid Fuel Boiler Standards

Parameter	Standard	Limit @ 7% O ₂	Unit
CO	Current European EN303-5 <1 MMBtu	16,879.50	ppm
CO	Future European EN303-5 <1.7 MMBtu	1,617	ppm
CO	Proposed EPA	100	ppm
PM	Current European EN303-5 <1 MMBtu	0.2	lbs/MMBtu
PM	Future European EN303-5 <1.7 MMBtu	0.15	lbs/MMBtu
PM	Proposed EPA	0.03	lbs/MMBtu

EPA’s standard is required to be based on the “available” data, but with such gaps in the data set, inconsistencies within EPA’s own emission limits, and a divergence from international standards, BTEC believes the proposed limits are unreasonable.

Inaccurate assessment of health effects from biomass boiler particulate matter

BTEC understands the usefulness and economy of using CO as a surrogate for Particulate Organic Matter (POM) and PM for metals; however, BTEC believes that these indicators may not be accurate when evaluating emissions from modern high-efficiency biomass combustion systems.

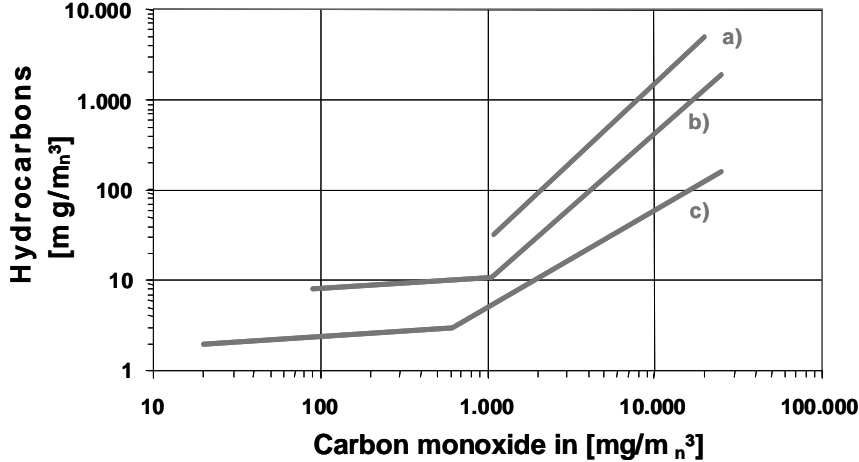
Various research has demonstrated that high efficiency biomass boilers burn with sufficient time, temperature, and turbulence to render particulate emissions into primarily low toxicity inorganic salts and virtually eliminate any volatile organic hydrocarbons. This stands in contrast to the PM emissions from heating oil (diesel) combustion and/or inefficient wood combustion which is predominantly polycyclic organic matter. EPA has assumed that all particulate emissions from new biomass boilers are highly toxic. However, recent research indicates that the inorganic salt emissions from high-efficiency biomass combustion are five times less toxic to cells than the emissions from petroleum based PM.¹

Additionally, research indicates that the relationship between CO and reduced POM is not consistent for biomass boilers across the full range of CO concentrations. As displayed in Graph 1 below, there is a correlation between reduced CO and reduced organic POMs as the CO level is reduced to around 680 ppm @7% O₂.² However, if CO is further reduced below 680 ppm, there are only minimal additional reductions in organic hydrocarbons. Therefore, BTEC suggests that requiring ultra-low CO emissions from biomass may not achieve significantly lower POMs and the associated health benefits.

¹ Nussbaumer T., Klippel N., Oser M., “Health relevance of aerosols from biomass combustion in comparison to diesel soot indicated by cytotoxicity tests,” 14th European Biomass Conference, Paris, 2005.

² Graph 1 is adapted from the “European Wood-Heating Technology Survey,” New York State Energy Research and Development Agency, April 2010, pg. 3-5.

Graph 1: Relationship of CO and Hydrocarbons during Wood Combustion



a) Wood stove, b) solid wood boiler with underburning technology,
c) Wood chips boiler with horizontal feed (Nussbaumer)

Furthermore, EPA’s model for calculating health costs overstates the health impacts of emissions in rural areas with lower population density (which is the location of most biomass boilers), because the model and data were developed based on densely populated urban areas.³ This bias causes the EPA impact model to overvalue emissions reductions from rural biomass boilers in its cost-benefit analysis.

Based on weak correlation of CO and POMs, the lower toxicity of PM from completely combusted biomass vs. petroleum PM, and the likely overstatement of health impacts in areas of low population density, BTEC believes there is a good basis that the exceptionally strict standards proposed in the rule are unwarranted.

HIGH COMPLIANCE COSTS AND RURAL ECONOMIC LOSSES

High costs of testing and compliance measures for biomass boiler systems

The economic and cost modeling for EPA’s boiler regulation are narrowly defined and do not reflect the reality and diversity in the biomass boiler marketplace. Proposed compliance measures entail installing an Electrostatic Precipitator (ESP) or a baghouse for boilers <5 MMBtu, which could equal or exceed the cost of the boiler itself, while for larger systems (<30 MMBtu), these control technologies could cost \$150,000-\$250,000. These proposed add-ons will make most biomass boiler projects uneconomical and discourage investment.

In addition to system improvements, annual emissions testing is conservatively estimated at \$8,000- \$15,000 per boiler system. That added cost likely surpasses the biomass fuel bill for smaller systems and is a major budget consideration for larger systems. Annual testing is also infeasible given geographical considerations, particularly in rural areas. Currently, there are simply not enough companies capable of conducting the annual testing. In Maine, there is not a single such company. Requiring annual testing will put a significant economic burden on schools, local governments, and small businesses.

³ Fann, Fulcher, and Hubbell, “The Influence of Location, Source, and Emission Type In Estimates of Human Health Benefits of Reducing a Ton of Air Pollution,” June 2009.

Disastrous effect on rural communities

Many communities in rural regions rely upon or significantly benefit from the use of biomass boilers for consumption of biomass energy crops. By limiting the opportunity for biomass boilers, economic losses will be considerable, especially so in the wood products manufacturing, forestry, and agriculture sectors.

Rural economies, which have suffered tremendously during the recession, benefit from the production and use of sustainable biomass. It is predicted that 342 private sector jobs are created during the production of 200,000 tons of biomass for heat.⁴ However, the proposed rule will certainly cause the opposite result and invalidate EPA's original estimate of only 2,000 job losses. Biomass demand will drop in response to onerous, expensive, and unrealistic regulations; some boiler operators will have to reduce emissions by a factor of five over their current State air quality permits or go out of business entirely. The proposed rule states that new boiler purchasers have the option of selecting gaseous fuel types that are cleaner and avoid emissions testing. In many rural areas, natural gas pipelines do not exist and propane (the most expensive fuel type) is typically five to six times more expensive per Btu than wood chip fuel.

Encouraging increased dependence on fossil fuels for thermal needs impedes federal, state and local renewable energy and greenhouse gas reduction goals. Forest products industries and other businesses alike rely on renewable, low cost wood residue for heating. Restricting biomass thermal applications through unreasonably expensive and compliance measures of questionable value will serve the counterproductive purpose of encouraging nonrenewable fossil fuels use and reduce local self-reliance.

EMISSIONS RECOMMENDATIONS

BTEC is confident that its proposed alternative standards and requirements achieve a common-sense balance between significantly reducing emissions from new biomass boilers as well as fostering a strong renewable biomass thermal sector. EPA's dataset illustrates that no boiler can meet the two key emission factors; therefore BTEC suggests calculating the average CO of the six boilers with the lowest PM emissions and calculating the average PM of the eight boilers with the lowest CO to determine the minimum emissions limits.⁵ Based on this approach, the initial and interim recommended limits and practices include:

- CO – 1,164ppm at 7% O₂, for all boilers (Method 10);
- PM - 0.23 lbs/MMBtu, for all boilers (Method 5);
- Initial independent third party certification test for biomass boilers to prove compliance. Once a boiler (or range of boilers) is tested, that boiler would be approved for installation until a change was made in the boiler design;
- Work practice standard for biomass boilers, consisting of an annual boiler tune-up according to manufacturers' specifications.

These recommendations are a starting point for reducing HAPs and other emissions; EPA must gather more inclusive, accurate data on biomass fuels, sizes, and technologies before moving forward on more restrictive limits. BTEC recognizes that as an industry, it is a partner in improving air quality and environmental sustainability of energy, and so the organization advocates a ratcheting down of data driven emissions limits over a sensible time period. Such a

⁴ Biomass Thermal Energy Council, et al, "Heating the Northeast with Renewable Biomass: A Vision for 2025," April 2010, pg. 37.

⁵ These limits also correspond to the European EN303-5 Standards for commercial-scale biomass boilers, further underlining the reasonableness of the proposed limits.

path could involve biennial reduction goals beginning with the above limits, then decreasing in a tiered approach based on the data generated from boilers tested in compliance with the new Area Source Boiler Rule, with a goal of allowing the marketplace to develop financially feasible emissions control options.

Combined with the revised limits above, initial emissions testing and work practice standards for maintenance will ensure that clean-burning boilers are installed and that they consistently achieve high emission standards. BTEC believes that superior emission performance can be best achieved and be cost effective over the long-term with on-site tune-ups rather than onerous annual emission testing requirements for boiler owners. The proposed annual tune-up of boilers to meet manufacturers' specifications is consistent with typical manufacturers' recommendations for regular maintenance and is consistent with what the EPA has proposed for existing Area Source Boilers.

CLOSING REMARKS

The biomass thermal industry has great potential to grow, innovate, and support local community energy independence and greenhouse gas reduction through the replacement of fossil fuel heating with high efficiency biomass boilers. As proposed, the only certainty is that the Area Source rule will devastate the biomass thermal industry and small businesses, and local government and schools will be forced to look for non-renewable fossil fuels for their heating needs. By revising the rule to reflect a common-sense approach, EPA can still achieve major improvements to air quality and support the ancillary environmental, economic, and social benefits that biomass thermal supports.

Cleaner air is not EPA's responsibility alone. BTEC is joining citizens, industry associations, nonprofits, and the federal government in working to clean up our shared atmosphere. As multiple parties contribute their input on the proposed Area Source rule, EPA should work to assemble the most reasonable and responsible rule possible. BTEC implores that EPA now reexamine its proposed Area Source rule, with an increased understanding and balanced vision for regulating emissions in the biomass boiler sector.