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# **Commercial Scale Wood Heat & Air Quality Impacts**

Franklin Regional Council of Governments  
Continuing Education Series

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# Questions for Today

- ❑ *What are the air emissions & air quality impacts of commercial scale wood heat facilities and how do they compare to other fuels?*
- ❑ *How are wood heating systems regulated?*
- ❑ *What are best practices for installation and best available control technologies to minimize emissions?*
- ❑ *Are there standards for the composition of wood pellets or wood chips used in wood heat boilers?*
- ❑ *How is the ash from these facilities typically disposed of?*

# Typical Emission Rates By Fuel

From EPA Reference AP-42	Emissions Factor (pounds of pollutant per million Btu fuel energy)		
Pollutant	Wood	No. 2 Heating Oil	Propane
Particulates, including condensables	0.2	0.012	0.007
Nitrogen Oxides	0.5	0.13	0.14
Carbon Monoxide	0.6	0.036	0.08
Organic Compounds	0.04	0.018	0.01

# Addressing Wood Heat Air Emissions

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- MassDEP permits for larger systems
- MassDOER and MassCEC criteria for incentive eligibility
- Fuel Quality Criteria
- Siting

# MassDEP Permit

- Comprehensive Plan Approval Required if Energy Input *per unit*:
  - 3 mmBtu/hr for automatic feed
  - 1 mmBtu/hr for manual feed
- CPA Establishes:
  - Best available control technology (i.e., stringent emission rate limits)
  - Demonstrate ambient air quality impacts acceptable by modeling
  - Proper stack design and stack testing
  - Fuel quality criteria
  - Monitoring, recordkeeping and reporting

# CPA Examples

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- Mt Wachusett Community College
- Narragansett Regional Middle – High School Complex
- Cooley Dickinson Hospital
- Seaman Paper

# CPA-exempt examples

- Greenfield Community College: four 190,000 Btu/hr (output) pellet boilers
- Petersham Center School (design): one 566,000 Btu/hr (input) pellet boiler
- Sanderson Academy (design): three 190,000 Btu/hr (output) pellet boilers
- Hawlemont Regional School (design): five 190,000 Btu/hr (output) pellet boilers

# MA Commercial/Institutional Incentive Eligibility

- DOER SAPHIRE pellet or chip boiler criteria:
  - 0.03 lb PM<sub>2.5</sub>/mmBtu for sensitive receptor locations
  - 80 % thermal efficiency
- MassCEC Commercial-Scale Biomass criteria (7/19/2016)
  - 0.03 lb PM<sub>2.5</sub>/mmBtu for sensitive receptor locations
  - 270 ppm carbon monoxide (CO)
  - Thermal efficiency: 85 % (pellets) 75 % (chips)



# MassCEC Commercial-Scale Biomass Fuel Quality

	Pellets	Chips
Calorific value	> 8,000 Btu/lb	> 5,950 Btu/lb
Moisture	< 6%	<30%
Ash	< 1%	<3%
Source materials	Only wood pellets or wood chips. Grass, construction & demolition waste are excluded.	

- Pellet fuel quality standards: certification against standards such as the PFI Premium or ENPlus A1.
- Chip fuel quality standards: Biomass Energy Resource Center Woodchip Heating Fuel Specification available at:  
[http://www.biomasscenter.org/images/stories/Woodchip\\_Heating\\_Fuel\\_Specs\\_electronic.pdf](http://www.biomasscenter.org/images/stories/Woodchip_Heating_Fuel_Specs_electronic.pdf)

# MassCEC Commercial-Scale Biomass Stack Criteria

- Stack height sufficient to
  - adequately disperse emissions from the immediate vicinity,
  - prevent entrainment into building air intakes, and
  - minimize exposure at ground level adjacent to the building on which the stack is being located.
- Stack height
  - minimum of five feet above the highest point of building
  - above the roof height of any other taller building within 100 feet.
- Stack location: avoid proximity to air intake or operable window.
- Stack design: vertical discharge, no obstruction (no rain caps!), minimize horizontal piping and bends

# Wood Pellet or Chip Ash Disposal

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## Beneficial Use Determination

- Clean wood fuel only
- Site specific approval process
- Agricultural soil amendment principles
- Protect surface water bodies
- Contact MassDEP Regional Office Solid Waste section

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# Questions?

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