

### What is a Biomass Boiler?

*Boiler* is defined, in general terms, as an enclosed combustion device in which water is heated to recover thermal energy in the form of steam and/or hot water (40 CFR [Code of Federal Regulations] 63.11237).

*Biomass* means any biomass-based solid fuel that is not a solid waste. This includes, but is not limited to, wood residue and wood products, animal manure, including litter and other bedding materials; vegetative agricultural and silvicultural materials, such as logging residues (slash), nut and grain hulls and chaff (e.g., almond, walnut, peanut, rice, and wheat), bagasse, orchard prunings, corn stalks, coffee bean hulls and grounds. This definition of biomass is not intended to suggest that these materials are or are not solid waste. (40 CFR 63.11237)



Oat Husks



Straw



Pellets



Wood Chips



Wood Waste



Pulpwood

### Benefits of a Woody Biomass Boiler

Kentucky has a robust supply of woody biomass throughout the state. Woody biomass is renewable and, in some instances, a waste product from other processes (i.e. mill residues, forestland thinning, urban wood waste, timber harvest residues, and pulpwood). Within the state, significant acreage could be converted into short rotation woody crops as demand for biomass grows. Access to reasonably priced wood for fuel may make biomass a feasible choice for many applications. Therefore, an integrated business model where biomass is efficiently harvested, transported and used in advanced heating systems can create a number of economic synergies in a community.

New technologies have developed biomass boilers with enhanced fuel handling systems, improved energy efficiency and reduced emission profiles. Most biomass systems utilize thermal energy only for heating, while more elaborate Combined Heat and Power (CHP) systems incorporate engines/turbines for the generation of electricity or

cooling needs. The diversity of biomass fuels available requires additional consideration when evaluating the proper biomass fuel for specific scenarios. For example, green wood from harvesting operations may present a cheaper initial cost, but the lower Btu, higher moisture, and logistical challenges may mean the fuel will not work in some systems. Adherence to manufacturer fuel specifications should enhance the operability of the system and satisfaction. Factors such as ash content and other contaminants can be reduced by practicing good management (i.e. keeping soil, rocks, water and other foreign materials out of the wood supply and fuel type. Well-planned fuel delivery systems with screens and other safeguards can prevent plugging and equipment failures. Various densification technologies, such as pelleting, briquetting, or torrefying, can also improve handling, storage and fuel consistency of biomass. A number of laboratories provide comprehensive fuel analysis for biomass. Information from such laboratories can assist in pollutant reduction and economic feasibility.

#### Contacts

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## Financial Assistance Opportunities

Due to the environmental and economic benefits of utilizing renewable biomass for energy, various state and federal incentives may be applicable for installing biomass energy systems. The North Carolina Clean Energy Technology Center maintains the most comprehensive listing of state and federal programs related to renewable energy and energy-efficient investments:

[programs.dsireusa.org/system/program?state=KY](http://programs.dsireusa.org/system/program?state=KY).

Many of these incentives are tied to specific programs with dedicated and time-limited funding sources. Local municipalities, utilities, and manufacturers may offer tax credits, rebates, grants and other incentives that can assist with the capital or preliminary evaluation for these energy systems. The performance of a comprehensive energy audit to determine the energy needs and additional decisions that can improve energy efficiency may enhance the return on investment and provide needed data when applying for these programs. The U.S. Forest Service has developed a "Wood Energy Financial App" to help calculate the cost effectiveness of biomass systems:

[woodenergy.umn.edu/BiomassCalculator](http://woodenergy.umn.edu/BiomassCalculator).

***Agricultural Act of 2014 (The Farm Bill)*** provides guidance and funding through various agencies and programs that can help with biomass energy systems. The highlights and implications of the Farm Bill Energy Title may be accessed at [www.ers.usda.gov/agricultural-act-of-2014-highlights-and-implications/energy](http://www.ers.usda.gov/agricultural-act-of-2014-highlights-and-implications/energy).

- Kentucky Rural Development ([www.rd.usda.gov/ky](http://www.rd.usda.gov/ky)) offers Energy Programs and specifically has a Rural Energy for America Program.
- Kentucky Natural Resources Conservation Service ([www.nrcs.usda.gov](http://www.nrcs.usda.gov)) offers an Environmental Quality Incentives Program.
- Kentucky Farm Service Agency ([www.fsa.usda.gov](http://www.fsa.usda.gov)) provides a Biomass Crop Assistance Program.



***Kentucky Governor's Office of Agricultural Policy*** has a portfolio of grant and loan programs designed to help facilitate agricultural and rural investments for the benefit of the Commonwealth's farmers ([agpolicy.ky.gov](http://agpolicy.ky.gov)).

- Kentucky Rural Development Fund ([agpolicy.ky.gov/funds/](http://agpolicy.ky.gov/funds/)) offers an On-Farm Energy Program.
- Kentucky Agricultural Finance Programs ([agpolicy.ky.gov/finance/](http://agpolicy.ky.gov/finance/)) provides loan programs.

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### Permitting and Authorizations

Whether starting a new business or expanding, Kentucky One Stop Business Portal ([onestop.ky.gov](http://onestop.ky.gov)) is available as an easy-to-use environment where Kentucky's businesses can find the requirements and tools need to operate a business in Kentucky. When choosing to install or operate a new or existing biomass boiler, there are some key items to consider.

#### ***Kentucky Department for Environmental Protection (KY DEP)***

Environmental permits are required by federal, state and sometimes local governments to ensure that business and construction minimize potential impacts on human health and the local environment. The specific environmental regulations and permits that could apply to the construction and operation of a facility may vary, depending on the specific location, types of activities and pollutants that may be emitted. Permits provide a range or maximum amount of pollution that may be emitted during a specific time frame and explain how the pollutants are to be managed.

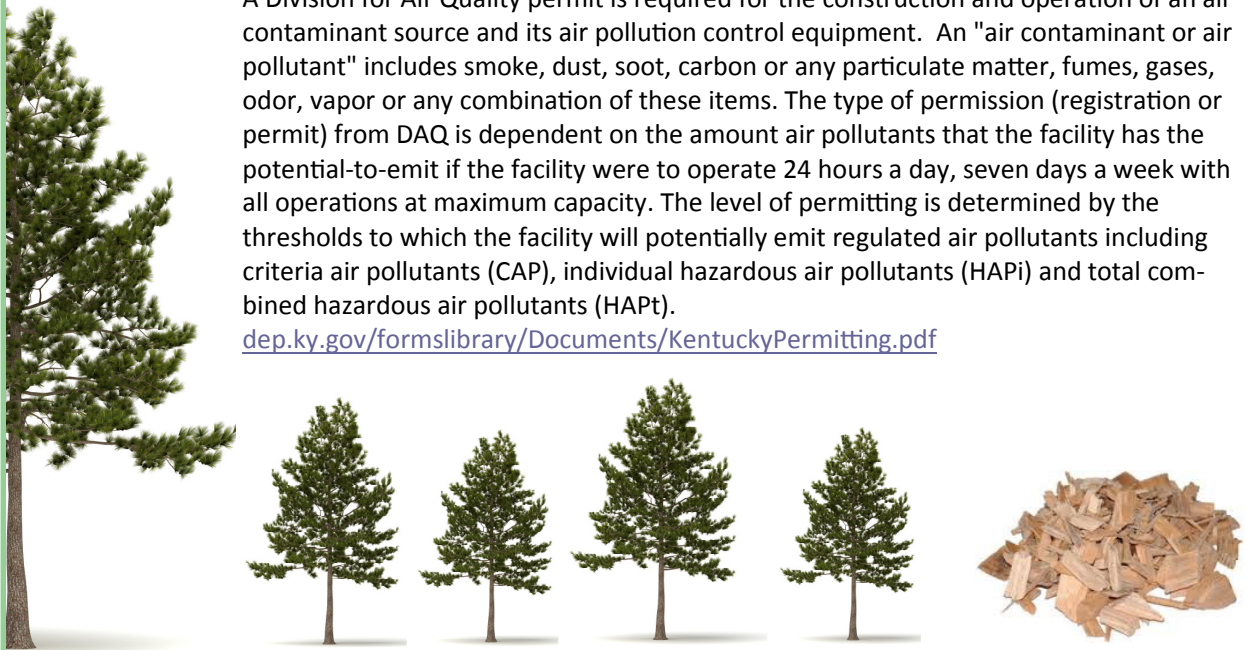
Two resources that address the common permits and authorization issued by DEP include:

- Environmental Permits At-a-Glance introduces the common permits and authorizations. [dca.ky.gov/DCA%20Resource%20Document%20Library/TypicalPermitsAtaGlance.pdf](http://dca.ky.gov/DCA%20Resource%20Document%20Library/TypicalPermitsAtaGlance.pdf)
- Common Permits and Time Lines provides the regulatory time line and fees associated with applications. [dca.ky.gov/DCA%20Resource%20Document%20Library/CommonPermitsKYDEP.pdf](http://dca.ky.gov/DCA%20Resource%20Document%20Library/CommonPermitsKYDEP.pdf)

#### ***KY DEP, Division for Air Quality (DAQ)***

A Division for Air Quality permit is required for the construction and operation of an air contaminant source and its air pollution control equipment. An "air contaminant or air pollutant" includes smoke, dust, soot, carbon or any particulate matter, fumes, gases, odor, vapor or any combination of these items. The type of permission (registration or permit) from DAQ is dependent on the amount air pollutants that the facility has the potential-to-emit if the facility were to operate 24 hours a day, seven days a week with all operations at maximum capacity. The level of permitting is determined by the thresholds to which the facility will potentially emit regulated air pollutants including criteria air pollutants (CAP), individual hazardous air pollutants (HAPi) and total combined hazardous air pollutants (HAPT).

[dep.ky.gov/formslibrary/Documents/KentuckyPermitting.pdf](http://dep.ky.gov/formslibrary/Documents/KentuckyPermitting.pdf)



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### Permitting and Authorizations, Cont.

***KY DEP, Division for Air Quality (DAQ), Cont.***

To help determine the type of permit/approval required from DAQ, a facility-wide potential air emissions assessment is to be conducted. A resource that will familiarize you with what a facility-wide air assessment entails, the common terms to be familiar with and how to conduct potential emission calculations is provided at: [dca.ky.gov/DCA%20Resource%20Document%20Library/PotentialtoEmit.pdf](http://dca.ky.gov/DCA%20Resource%20Document%20Library/PotentialtoEmit.pdf).

In addition to Kentucky's air quality regulations (401 KAR Chapter 50 to 65), there are federal air quality regulations that may apply. These rules are referred to as New Source Performance Standards (40 CFR 60) and National Emission Standards for Hazardous Air Pollutants (40 CFR 63). Applicability of an NSPS or NESHAP is source-specific and pollutant-targeted and may have specific permitting implications. If a federal rule is applicable to a source, at a minimum, the submission of a registration application to DAQ is required. A DAQ permit may be required for the construction and operation of an air contaminant source and its air pollution control equipment.

A federal regulation that biomass boilers may be subject to includes, but is not limited to, the National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers at Area Sources, 40 CFR Part 63, Subpart JJJJJ. Information on this regulation, including applicability and requirements, may be accessed at [www.epa.gov/boilercompliance](http://www.epa.gov/boilercompliance).



***Dept. for Housing, Building and Construction, Boiler Inspection Section***

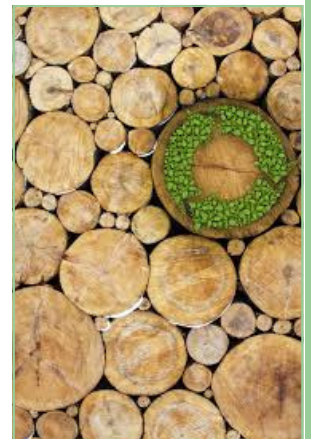
Inspects uninsured boiler and pressure vessels, including related piping for proper installation, maintenance and operation to prevent explosions.

- Phone: 502-573-1708
- Website: [DHBC.ky.gov/boilers](http://DHBC.ky.gov/boilers)

### Resources

***KY DEP, Division of Compliance Assistance (DCA)*** assists businesses, individuals and organizations in understanding and complying with environmental requirements. DCA staff are available to provide on-site assistance and training. DCA can be contacted at 800-926-8111 or [envhelp@ky.gov](mailto:envhelp@ky.gov). Compliance Assistance resources are also available online at [dca.ky.gov](http://dca.ky.gov).

***KY Dept. of Energy Development and Independence (DEDI), Division of Biofuels*** mission is to provide leadership to encourage the growth of Kentucky's biofuels and biomass industries through research, development and commercialization. DEDI resources are available at [energy.ky.gov/biofuels/Pages/](http://energy.ky.gov/biofuels/Pages/).



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