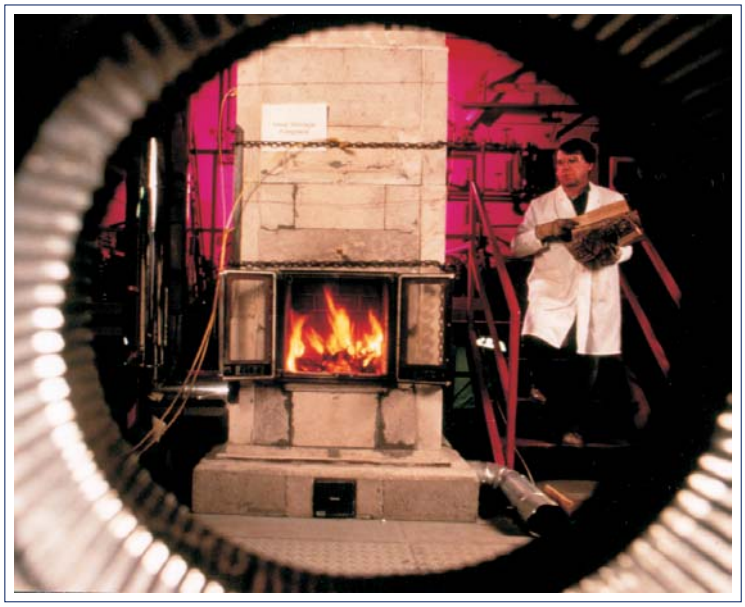
Biomass Combustion

Biomass combustion to produce energy can be cost-effective and address major environmental issues such as waste disposal and climate change. Scientists and engineers at the CANMET Energy Technology Centre (CETC) work closely with industry representatives to design and test new appliances and evaluate fuels to reduce costs and emissions and increase operating efficiencies.

CETC also collaborates with industry and government representatives to increase the use of biomass combustion systems by developing and adopting standards, codes and regulations.



Wood Burning Fireplace under Test

CETC has state-of-the-art facilities to measure the performance of biomass-fuelled systems. These facilities enable combustion characteristics, pollutant generation and system efficiency for both "conventional" and "exotic" fuels to be studied.

Analytical Capabilities

Measurement capabilities encompass continuous analysis of flue gases for O_2, CO_2, CO, SO_2, NO_x, as well as total particulates and PAH/VOC emissions. The data generated allow manufacturers to assess the performance of their units and to focus their development efforts on those areas with most potential for rewards. Complete analytical facilities for characterizing fuels and combustion residues are also available.

Test Equipment

Experimental rigs use continuous digital data-logging and data-reduction systems. Two test cells are equipped to conduct performance testing of wood-burning appliances to EPA/CSA B415 requirements. A pilot-scale, stoker-fired, industrial boiler system also enables fuels and handling systems for biomass-fired industrial systems to be evaluated. In addition, a mobile facility allows easy set-up for on-site testing. The facility includes a wide range of sampling and data-reduction equipment.

Residential Heating Systems

Product testing by CETC helps equipment manufacturers and fuel producers increase their market

Advanced Combustion Technologies

CETC's Biomass Combustion Laboratory is designed to meet the needs of:

- manufacturers of residential and commercial biomass-burning stoves, fireplaces, boilers and equipment components;
- producers of biomass fuels such as chunkwood, wood pellets and chips, fireplace logs, corn husks and tree bark; and
- developers and adopters of standards, codes and regulations applicable to biomass combustion.

acceptance. Among the projects in which researchers have assisted manufacturers are:

- developing standards regarding the safety, emissions and efficiency for wood stoves
- establishing an in-house emissions testing facility for a wood stove manufacturer
- designing of a low-emissions combustion system for a traditional wood cookstove

Commercial and Industrial Systems

Research efforts at CETC are also aimed at supporting manufacturers and operators of commercial and industrial units. A moving grate system is currently being installed to expand the research capabilities in the industrial area. Given the increased cost and difficulty of sending biomass wastes to landfill sites and in meeting tighter emissions regulations, industries are under pressure to install or improve industrial combustion systems for biomass wastes.

Increasing Market Share for Biomass Combustion Systems

Biomass remains the only class of fuels that can be burned in a CO_2-neutral manner, in spite of which, biomass fuels are underutilized in North America. Furthermore, the use of wood in Canadian homes could be greatly increased if the public perception of this energy source were improved. Biomass needs to be recognized as an efficient, clean, environmentally friendly and safe energy source.

Increasing the use of biomass fuels is a challenge in which scientists and engineers at CETC are providing support. In collaboration with appliance manufacturers, fuel suppliers, environmental agencies, standards-writing organizations and certification bodies, we strive to:

- develop new biomass-burning technologies;
- improve existing combustion technology;
- optimize systems to reduce emissions and improve efficiency; and
- assist certifying bodies in ensuring safe, reliable operation.

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