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CETC CANMET ENERGY TECHNOLOGY CENTRE

FLUIDIZED BED COMBUSTION/ GASIFICATION

CLEAN ENERGY TECHNOLOGIES

FLUIDIZED BED COMBUSTION

Fluidized Bed Combustion (FBC) is one of the most promising energy conversion options available today. FBC combines high-efficiency combustion of low-grade fuels with reduced emissions of sulphur and nitrogen oxides (SO_x and NO_x). CETC-Ottawa's test facilities are available to assist in the development of FBC systems to burn a variety of fuels in an efficient and environmentally friendly manner.

CETC-Ottawa's Research Services

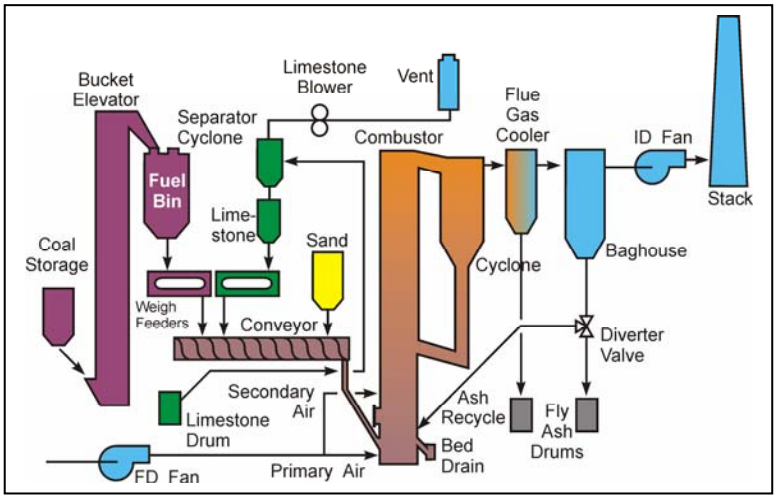
CETC-Ottawa's research services play a leading role in the development of potential applications for fluidized bed combustion. CETC-Ottawa offers these specialized services to assist utilities and other industrial entities in:

- planning and running a full-fledged demonstration program or specific areas of testing, such as combustion product analysis;
- developing mathematical models based on pilot-scale combustion tests with specific feedstocks;
- generating data on combustion performance of high-sulphur coals from eastern Canada, high-moisture plains coals, high-ash rejects from western Canadian coal washeries, coke from oil sands upgraders and pitch residues from hydrocracking; and
- assessing the feasibility of applying fluidized bed combustion technology to specific industrial sites.

FBC's major potential applications in Canada are in:

- utilization of eastern Canadian, high-sulphur coals for electricity generation;
- utilization of high-sulphur pitch and coke residues from heavy oil/oil sands upgrading;
- co-firing of wood waste and coal in the forest products industry;
- incineration of contaminated solid and liquid wastes; and
- co-firing pulp and paper wastes or municipal solid waste with coal or other fuels for energy recovery and disposal of wastes.

Tighter environmental control of the disposal of wastes has resulted in increased market demands to evaluate the combustion of waste products, including paper sludge, using FBC technology.



CETC-Ottawa's Pilot-scale Circulating Fluidized Bed Combustor

Canada

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FBC technology is well suited for burning these low-grade fuels and wastes, because it offers long combustion residence times, lower temperatures to control NO_x formation, and the flexibility to accept a wide range of fuel forms and sorbents in sand or limestone beds.

R&D Facilities

CETC-Ottawa's laboratory has an extensive inventory of specialized equipment necessary for FBC research:

- 0.8 MWt pilot-scale circulating fluidized bed combustor with a bed area of 0.129 m^2;
    - equipped to fire solid and liquid fuels (with or without sorbents for capturing sulphur compounds)
    - thoroughly instrumented to monitor pollutant formation, combustion performance, heat transfer characteristics, and metal wastage of heat transfer surfaces by corrosion/erosion mechanisms; and
    - being renovated to perform oxy-fuel CFBC firing to generate high-CO_2 flue gas, ready for sequestration
- bench-scale, 100mm diameter mini-CFBC, for ranking the reactivity of solid biomass and fossil fuels and for studying fundamental combustion mechanisms; and
- pilot-scale (0.78 m^2) bubbling bed combustor to study corrosion, erosion and the fate of trace metals in feedstocks; and combustion/gasification of biomass/MSW.

Collaborative Accomplishments

A variety of arrangements are available to assist industry in the application of this technology.

In cooperation with a Maritime power-generating utility and the Department of National Defence, CETC-Ottawa has set up two demonstration-scale FBC units:

- 22-MWt circulating FBC plant at Chatham, New Brunswick; and
- 15-MWt bubbling FBC plant at Summerside, Prince Edward Island.

Relative to conventional coal-fired systems, emissions of SO_2 have been reduced by 90% and those of NO_x by 45% in each of these two demonstration plants.

Development of Residue Disposal Protocols

CETC-Ottawa assisted a major chemical company acquire expertise in disposing of ash generated from FBC. Specifically, the expertise focused on the development of residue disposal protocols and the identification of such potential applications for FBC residue as utilization in road construction, the treatment of acidic wastes and the manufacture of concrete and mortars.

Your Invitation to Work with Us

We are interested in collaborating with you. Please contact the Business Office to discuss your particular needs.
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