

# CANMET Energy Technology Centre

## Oxy-fuel Combustion Technologies with CO<sub>2</sub> Capture for Near-Zero Emission Power Generation



### PROGRAM DESCRIPTION:

This R&D program is managed by CANMET Energy Technology Centre (CETC) of Natural Resources Canada (NRCan), in Ottawa, Ontario.

The program aims at developing near-zero emission fossil fuel technologies with focus on oxy-fuel combustion systems with CO<sub>2</sub> capture for permanent storage in geological formations.

The program manages the CANMET CO<sub>2</sub> R&D Consortium and receives funding from various sources, including NRCan's Panel on Energy Research and Development (PERD), and Technology and Innovation (T&I), while working in partnership with industrial stakeholders and providing technical support for large-scale demonstration of advanced near-zero emission technologies for power generation.



### PILOT-SCALE FACILITY:

The experimental component of this R&D program is supported by a highly modular state-of-the-art combustion research facility with a nominal output of 0.3MW<sub>th</sub>. Natural gas, coal, coal slurry, oil and bitumen can be burned in controlled combustion environment in air- and oxy-fired modes.

### PROGRAM COMPONENTS:

The program covers a wide range of R&D activities at bench-scale, pilot-scale, and pre-commercial demonstration levels.

Current activities include:

- Development and pilot-scale evaluation of next generation near-zero emission oxy-fuel combustion technologies
- Modeling of advanced near-zero emission cycles including supercritical and ultra supercritical power plants with CO<sub>2</sub> capture
- Development of multi-pollutant control technologies
- Design and development of CO<sub>2</sub> capture and compression processes and evaluation of CO<sub>2</sub> phase behavior
- Development of models for Canadian oil sands operations with H<sub>2</sub> production and CO<sub>2</sub> capture
- Evaluation and design of advanced integrated gas turbine and solid-oxide fuel cell (SOFC) cycles



Integrated Pilot-Scale Hydroxy-Fuel Burner



Variable Swirl Generator Hydroxy-Fuel Burner Prototype

### Partners:

Government of Canada  
Alberta Energy Research Institute  
U.S. Department of Energy  
SaskPower  
Ontario Power Generation  
Babcock & Wilcox

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