

# Technology Demonstration

PROVIDING COMMERCIAL VIABILITY IN REAL-WORLD SCENARIOS



**WITH MORE THAN** 54,000 square feet of technology demonstration facilities, the Energy & Environmental Research Center (EERC) brings together state-of-the-art equipment and the expertise of a multidisciplinary team to solve global energy and environmental issues. This synergy expedites the rapid development and demonstration of client technologies for commercial deployment.

The facilities contain a variety of space for a multitude of technologies, as well as room for construction of new components to fit client needs. Much of the design and creation of the equipment and machinery is done on-site, allowing the EERC to demonstrate technologies in a more rapid, cost-effective way.



## COMBUSTION SYSTEMS

We have been performing controlled combustion tests using bench- and pilot-scale combustion systems for decades. The systems have been used for a wide range of testing applications, including the evaluation of technologies for emission control and to understand the impact of combustion on a wide range of fuels.

## COMBUSTION UNITS TO FIT YOUR NEEDS

- Drop-tube furnaces (atmospheric and pressurized)
- Fluidized-bed combustors
- Combustion test facility (550,000 Btu/hr, 150 scfm)
- Conversion and environmental process simulator (4–6-lb/hr coal feed rate or bottled gas)
- Particulate test combustor (550,000 Btu/hr, 150 scfm)
- Slagging furnace system (2.5 million Btu/hr)
- Fuel-processing system (coal and biomass)

The units are equipped with state-of-the-art measurement capabilities and all types of pollution control equipment:

- Postcombustion CO<sub>2</sub> capture
- Selective catalytic reduction (SCR) reactor
- Electrostatic precipitators (ESPs)
- Baghouses
- Spray dryers
- Wet flue gas desulfurization (FGD) systems



## GASIFICATION AND GAS CLEANUP SYSTEMS

The EERC has multiple gasification systems capable of gasifying coal, biomass, and other solid or liquid feedstocks at a wide range of temperatures and pressures. We will work with you to determine which gasification system is most useful for your specific project.

Our portable bench-scale warm-gas cleanup train can be placed on any gasification system to reduce sulfur levels to less than 0.001 ppm and particulate to less than 0.01 ppmw. Water-gas shift reactors (including sour, high-temperature, and low-temperature) can be inserted at any location in the cleanup train. A hydrogen membrane can also be inserted into any point to simulate desired operating conditions.

## CHEMICAL- AND LIQUID-PROCESSING SYSTEMS

- Small continuous reactor
- Large continuous reactor
- Continuous tubular reactor
- Batch reactors
- Fischer-Tropsch reactor skid

## MAIN GASIFICATION UNITS

- Continuous fluid-bed reactor (CFBR)
- Bench-scale hot-gas filter vessel
- Transport reactor development unit (TRDU)
- Entrained-flow gasifier (EFG)
- High-pressure fluid-bed gasifier (HPFBG)
- Carbonizer
- Advanced fixed-bed gasifier (AFBG)



Gasifier Name	Type	Scale	Feed Rate, lb/hr	Syngas Production, scfm	System Pressure, psi	Gasifier Nominal Temperature, °F	Warm-Gas Cleanup Capability
CFBR	Fluidized bed	Bench	4	8 on air 1.5–2 on O <sub>2</sub>	150	1525 (metal reactor)	Full stream
TRDU	Transport reactor	Pilot	200–500	400 on air 250 on O <sub>2</sub>	120	2000 refractory-lined	Slipstream, 5%
EFG	Entrained flow	Bench	4–16	16–20	300	2730 refractory-, ceramic-lined	Full stream
HPFBG	Fluidized bed	Bench	4–20	30–40	600–1000	1600 to 1800 depending on operating pressure (metal reactor)	Full stream
Carbonizer	Fluidized bed	Pilot	100–150	150 on air	150	1200 to 1800 refractory-lined	Slipstream
AFBG	Fixed bed	Pilot	33–70	35–75 on air	Ambient	1300–1550 (metal reactor)	Cold-gas cleanup train

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