NATIONAL ENERGY TECHNOLOGY LABORATORY

Overview of Fossil Energy Capture R&D and Summary of "Carbon Capture 2020" Workshop

Deployment Barriers for CO_2 Capture on <u>New</u> and <u>Existing</u> Coal Plants Today

1. **Scale-up**
   - Current PC capture ~200 tons/day
   - 550 MWe plant produces 13,000 tons/day
2. **Energy Demand**
   - 20% to 30% ↓ in power output
3. **Cost**
   - Increase Cost of Electricity (COE)
4. **Regulatory framework**
   - Transport — pipeline network
   - Storage

Purpose of the "2020" Workshop

Held Oct 5, 6, 2009, University of Maryland

- **Bring together researchers from industry, universities, DOE national laboratories, and other federal agencies and laboratories to discuss a broad spectrum of carbon capture research**

- **Accelerate development of the best ideas for carbon capture within various time frames including near term (through 2020) and long term (i.e., 2020+)**

- **Identify areas for collaboration across the Office of Fossil Energy (FE) and the Office of Science's Basic Energy Sciences (BES) carbon capture projects**

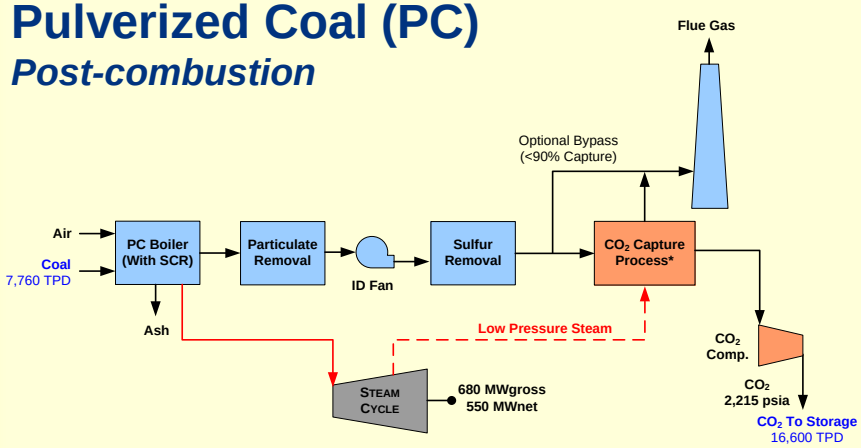
Common Research Themes

from prior "2020" workshop

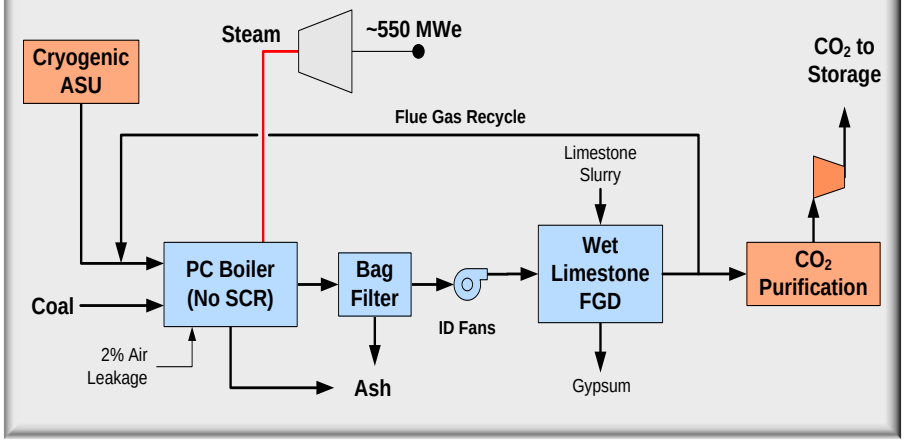
- **Optimization algorithms and methods for complex plants**
- **Measurement of gas-host interactions**
- **Ability to measure and understand key thermodynamic, chemical, and structural characteristics**
- **Discovery of entirely new materials**
- **High performance computing/modeling/simulation to accelerate scale-up**

Fossil Energy CO_2 Capture Options

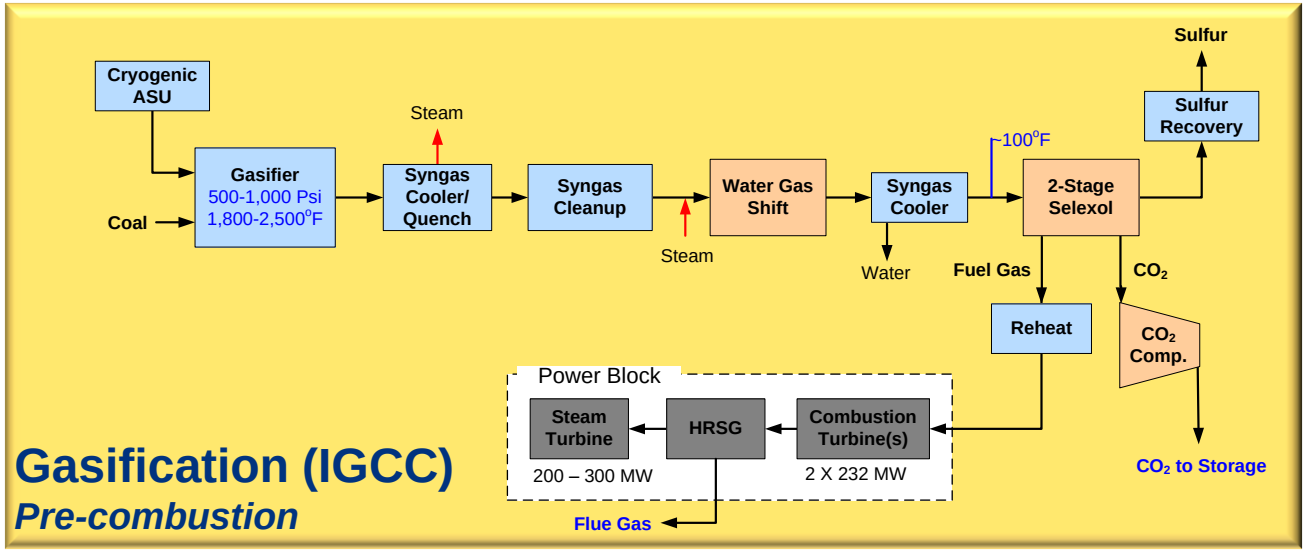
Pulverized Coal (PC)
Post-combustion



PC Oxy-combustion



Gasification (IGCC)
Pre-combustion



Source: Cost and Performance Baseline for Fossil Energy Power Plants study, Volume 1: Bituminous Coal and Natural Gas to Electricity; NETL, May 2007.

Status and Next Steps

- **Proceedings from the Carbon Capture 2020 workshop are available at the NETL web-site:**
  *www.netl.doe.gov/publications/proceedings/09/CC**2020**/index.html*
- **This workshop will identify additional novel, innovative approaches to capturing CO_2.**
- **FE and BES will develop a carbon capture technology roadmap for a coordinated effort that will accelerate development of CO_2 capture technologies by 2020 and beyond.**

The challenge and opportunity

- **Carbon capture and storage: the grand challenge for energy.**
- **An organized effort between discovery science and application can accelerate solving this challenge.**
- **Your participation is gratefully welcomed!**