USAEE WORKSHOP
CARBON CAPTURE, UTILIZATION AND STORAGE

Date & Time: Wednesday, October 28th, 2:00-5:00pm
Location: Commonwealth 1 & 2 Rooms
Cost: $50.00 Conference registrants, $75.00 non-registrants
Includes a light lunch at the beginning of the workshop and coffee break
Approx. # of participants: 40-50

OBJECTIVE
Carbon capture, utilization and storage (CCUS) is gaining attention in energy policy discussions, particularly as policies aimed at reducing carbon dioxide (CO2) emissions gain traction. Reconciling climate change policy with the existing deep and well-established fossil fuel supply chains presents a challenge that technology has the potential to address through carbon capture and storage. However, any new technology must be commercially viable in its own right to have an economically sustainable footprint. Thus, the potential value proposition in utilizing CO2 to enhance profitability in the extractive industries has grabbed significant attention. This workshop will address the technical challenges of CCUS and demonstrate multiple efforts aimed at modeling the implications of expanded CCUS on energy markets.

COMPOSITION OF AUDIENCE
Energy economists and engineers in industry, government and academia, students completing PhD degrees in energy economics or engineering, banking professionals and other financial institutions trading energy derivatives, engineering & energy consulting firms, government regulatory or advisory agencies, or law firms.

SCHEDULE
Welcome and Introductions
Ken Medlock, Center for Energy Studies, Rice University’s Baker Institute for Public Policy

Overview of Capture, Transport, Utilization and Storage
Traci Rodosta, NETL

Chuck Zelek, NETL
The Capture, Transport, Utilization and Storage – National Energy Modeling System (CTUS-NEMS) was developed in order to enrich the representation of CCS opportunities in the Energy Information Administration’s (EIA’s) National Energy Modeling System (NEMS). Enhancements include variability in saline storage and transport related parameters, incentive interactions between enhanced oil recovery (EOR) projects and CCS enabled power plants, a revised representation of the potential CO2 supply from the industrial sector, and the provision of the ability for existing natural gas combined cycle (NGCC) plants to retrofit with carbon capture. These enhancements can provide additional insights into the specifics of a CCS system build-out under a given scenario.

System-Level Cost, Geoscience and Water-Energy Characteristics and Challenges for National-Scale CO2 Storage
Peter H. Kobos, Sandia National Laboratories
The Water, Energy and Carbon Sequestration Simulation Model (WECSsim©) was developed to address the cooling water requirements of CCS on specific power plants and national water
requirements if coal and natural gas plants used CCS. The model and related efforts will highlight key cost, geoscience and engineering challenges involved with various regional issues, integration of reservoir models, techno-economic models, Geostatistics and other salient issues related to CO₂ storage and the Energy-Water Nexus.

Opportunities for Decarbonizing Existing U.S. Coal-Fired Power Plants via CO₂ Capture, Utilization and Storage

Haibo Zhai, Carnegie Mellon University

This study employs the Integrated Environmental Control Model developed by Carnegie Mellon University to explore the feasibility of reducing unit-level emission rates of CO₂ by 30% by retrofitting carbon capture, utilization, and storage (CCUS) to existing U.S. coal-fired electric generating units (EGUs). Our goal is to identify feasible EGUs and their key attributes. The results indicate that for about 60 gigawatts of the existing coal-fired capacity, the implementation of partial CO₂ capture appears feasible, though its cost is highly dependent on the unit characteristics and fuel prices. Auxiliary gas-fired boilers can be employed to power a carbon capture process without significant increases in the cost of electricity generation. A complementary CO₂ emission trading program can provide additional economic incentives for the deployment of CCS with 90% CO₂ capture. Selling and utilizing the captured CO₂ product for enhanced oil recovery can further accelerate CCUS deployment and also help reinforce a CO₂ emission trading market.

Discussion