

U.S. Department of Energy awards \$700,000 to advance clean coal technology

Southwest Research Institute and industry collaborator Thar Energy LLC have received \$700,000 from the U.S. Department of Energy to demonstrate a novel, supercritical carbon dioxide (sCO₂) power cycle using pressurized oxy-combustion, a process that uses pure oxygen instead of air as the primary oxidant.



“The goal of this one-year effort is two-fold: to achieve 90 percent CO₂ removal at no more than a 35 percent increase in the cost of electricity and to achieve high overall plant efficiencies with 90 percent CO₂ capture and compression to 2,200 psi,” said Dr. Klaus Brun, a program director in SwRI’s Mechanical Engineering Division.

Project objectives include demonstrating the advantages of the proposed power cycle using an engineering design analysis to refine the cycle, demonstrating cycle efficiencies and identifying critical components that have a significant impact on cycle performance.

Contact Brun at (210) 522-5449 or klaus.brun@swri.org.

SwRI, industry collaborators receive funding for energy research projects

Southwest Research Institute and industry collaborators Solar Turbines Inc., Oak Ridge National Laboratories, German Aerospace Center and San Diego State University have been awarded a \$3.8 million contract by the U.S. Department of Energy to develop a novel gas turbine combustor for a concentrating solar power (CSP) hybrid gas turbine system. The award was given through DOE’s SunShot Initiative, a collaborative national effort to make solar energy cost-competitive with other forms of energy.

The majority of today’s commercial CSP plants generate steam to support steam turbine electric power generation. The steam generated by these state-of-the-art commercial CSP plants is limited to a maximum temperature of 400°C, yielding approximately 40 percent thermal efficiencies. Even for developmental CSP technologies, these efficiencies are well below those achievable with gas turbine combined cycle plants, which can be well above 55 percent thermal efficiencies and as high as 62 percent for state-of-the-art combined cycle power plants. This project aims to combine the advantages of highly efficient gas turbine power plants with concentrating solar power systems by operating the gas turbine at up to 1,000°C combustor air inlet temperatures.

Contact Brun at (210) 522-5449 or klaus.brun@swri.org.

SwRI receives award for lithium-ion battery technology

Southwest Research Institute (SwRI) has been awarded a \$712,500 contract from the U.S. Department of Energy to investigate the behavior of lithium-ion batteries during charge and discharge. The contract award is one of 19 projects that will receive \$43 million in funding from the Department’s Advanced Research Projects Agency-Energy (ARPA-E) to develop breakthrough energy storage technologies.

“This contract will give us the opportunity to analyze the capacity and health of lithium-ion batteries over time,” said Jeff Xu, a principal scientist in SwRI’s Engine, Emissions and Vehicle Research Division and a co-principal investigator of the project.

The two-year project, “Strain Estimation Technology for Lithium-Ion Batteries,” will explore the potential of tracking physical expansion and contraction of lithium-ion batteries during charge and discharge cycles as a new method for analyzing battery capacity and health. The award was given through ARPA-E’s Advanced Management and Protection of Energy Storage Devices (AMPED) to focus on innovations in battery management and storage to advance electric vehicle technologies, help improve the efficiency and reliability of the electrical grid and provide important energy security benefits to America’s armed forces.

Contact Xu at (210) 522-5103 or jeff.xu@swri.org.

SwRI adds test cell to flow component test capabilities

A new cell for testing valves and other pressure-containing and pressure-controlling products has been added to Southwest Research Institute’s Flow Component Testing Facilities.

To ensure the safety of pipelines, refineries, offshore platforms and chemical processing plants, valves and similar devices operating under high pressure must be tested to established standards. SwRI has offered these testing services to the oil and gas and chemical industries for more than 35 years.

“This new test cell augments a suite of test facilities housed in one centralized location,” said Shane Siebenaler, a group leader in SwRI’s Fluids and Machinery Engineering Department who oversees the facility.

The cell can evaluate products up to 30,000 psi with gas hydraulic pressure. Other capabilities of the cell include cryogenic testing (to -320°F), elevated temperature testing (up to 750°F), fugitive emissions testing and thermal cycling, among others.

Contact Siebenaler at (210) 522-5758 or shane.siebenaler@swri.org.

