

Project Title: Low-cost, Environmental Friendly Thermal Storage for CO₂ Sequestration

Technology Area: Gasification Systems

Technology Manager: Jenny Tennant

Total Obligations: \$149,961

Duration: 06/28/12 - 03/27/13

Performer: Creare Inc.

Agreement Number: SC0008425

Project Description: This project's primary goal is to develop a low-cost, energy-efficient, temporary CO₂ and energy storage system that enables an integrated gasification combined cycle (IGCC) power plant to increase its net electricity output during peak demand periods without additional CO₂ emission. In support of the primary goal, Creare Inc. will develop a reversible Combined Thermal and CO₂ Storage System (CTCSS) that will (1) increase the peak power output of a coal-fired power plant using this system and (2) shift the parasitic load of the CCS process from peak to off-peak periods.

During peak demand periods, the method provides high-quality heat for additional power output by sorbent-like adsorption and storage of CO₂. During off-peak periods, the system regenerates itself from a power island heat energy source. It achieves these capabilities by employing a simple reversible chemical reaction. A CTCSS effectively combines energy and CO₂ storage into a single system with potentially better performance than standalone energy storage system or a CO₂ storage system. High thermal efficiency and low cost can make the CTCSS potentially suitable for utility-scale energy storage.