

BGTL, LLC  
partnered with  
Argonne National Laboratory

GA-17AN020104, High-Efficiency and Low-Cost Thermal Energy Storage System

**YEAR AWARDED:** 2016

**TOTAL PROJECT VALUE:** \$375K (DOE funds awarded, \$300K; awardee cost share, \$75K)

**STATUS:** Completed

**PRINCIPAL LAB INVESTIGATORS:** James Sienicki (sienicki@anl.gov)

**DESCRIPTION:** BgtL, LLC is a company that has developed and hopes to commercialize a compact high-efficiency thermal energy storage (TES) system that utilizes fusion heat through the phase change between solid and liquid to store and release energy at high temperatures, incorporating state-of-the-art insulation to minimize heat dissipation. This Gateway for Accelerated Innovation in Nuclear voucher paired the company with Argonne National Laboratory (ANL) to develop a conceptual design for a full-size transportable TES unit using a molten aluminum alloy as the high-temperature phase change material for use with different energy systems, including a 150-MWth sodium fast reactor, a coal-fired plant, wind turbines, and photovoltaic solar energy systems.

**BENEFIT:** The Fortran computer code developed by ANL will enable BgtL to better design TES units to meet the requirements for charging and discharging for specific applications. BgtL will be able to optimize TES unit designs to make them more economical. The schemes developed by ANL for coupling aluminum-alloy-based TES units to nuclear and coal power plants will assist in the development of the TES market by showing potential customers how TES can be used practically with a heat source.

**IMPACT:** This assessment confirmed the technical viability of the concept and identified photovoltaic solar energy as the best near-term market for the new TES system. The voucher work also resulted in the identification of a potential corrosion issue and involved the formulation and testing of a solution to this issue involving the use of coatings.

**NEXT STEPS:** BgtL's TES system would greatly improve the economics of existing nuclear and coal-fired power plants by allowing the power plant to store energy when power prices are low and sell power into the grid when prices are high. For wind and solar applications, BgtL's novel TES solution can be significantly less costly to acquire and maintain, does not have any waste or environmental emissions, and does not deteriorate over time. It can keep constant efficiency and operates cleanly and safely.

