

PROJECT OBJECTIVES

Goal: to evaluate and demonstrate a metal hydride-based TES system for use with a CSP system.

Innovation: metal hydrides have a unique ability to deliver low-cost, high capacity and energy efficient TES systems for CSP applications. New higher capacity and lower cost materials have recently become available. SRNL's combined and integrated modeling and metal hydride material research approach to help solve technical challenges.

1st Year Major Milestones:

- Determine the material properties of for at least 10 MH material pairs.
- Screen at least 10 MH pairs to arrive at 2-3 candidate materials meeting SunShot targets
- Approve the final design and construction of the bench-scale MH cycling system.

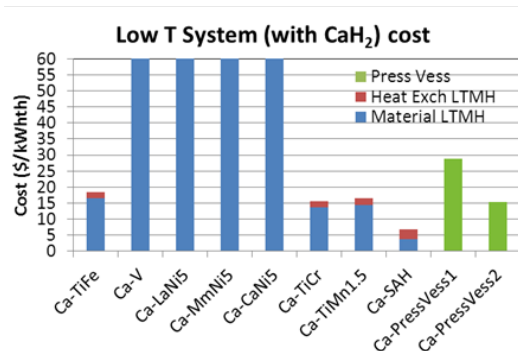
APPROACH

- Make use of the hierarchal modeling methodology developed by the SRNL combined with the extensive material knowledge and expertise at both SRNL and CU to screen several promising metal hydride candidate materials and then select the best candidates for more thorough evaluation through experiments and more detailed models.
- During subsequent years, material optimization, bench-scale testing and more detailed component and system models will lead to a proof-of-concept demonstration and a preliminary system design. The culmination of this proposed research will be the design, fabrication and evaluation of a prototype metal hydride TES system aimed at meeting the SunShot cost and performance targets.

KEY RESULTS AND OUTCOMES

Cost Comparison of Low T MH TES Options

- New material property data on modified low T SAH and high T Mg-based materials are being developed.
- Screening tools were modified to include more detail heat transfer parameters as well as tandem bed cycling operations.
- New high T hydrogen compatible vessels for the bench-scale MH cycling system have been ordered.



NEXT MILESTONES

- Modified screening models and additional, more detailed material data, will be used to further down select the possible candidate pairs to arrive at the best 2-3 candidate pairs.
- A technical paper on the screening process and the material data obtained and used for the process is on track to be submitted by the end of this FY.
- The bench-scale MH TES system is on track to complete the system by the end of the FY.

Go/No-Go Milestone:

Successful completion of all milestones in Budget Period 1. Engineering materials property data evaluation is complete indicating that the performance of the MH TES system can meet the proposed system technical targets.