



**Prime Recipient:** Nexceris, LLC



**PI:** Neil J. Kidner



**Sub-Recipients:** N/A



**Location:** Lewis Center, OH

## Phase I SBIR Project

**DOE:** \$206,500

**Cost Share:** N/A

**Total:** \$206,500

## Objectives

Advancing the technology product readiness by systematic reduction of technical and commercial risk

- ▶ Technical risk through structured DFMEA
- ▶ Implement cost-reduction opportunities
- ▶ Define manufacturing cost and scale-up roadmap

250-Wh module demonstration of key technology benefits

## Relevance and Outcomes/Impact

Enhance the economic and energy security of the U.S

- ▶ Creation of a new battery manufacturing infrastructure
- ▶ Supported by a secure domestic supply-chain

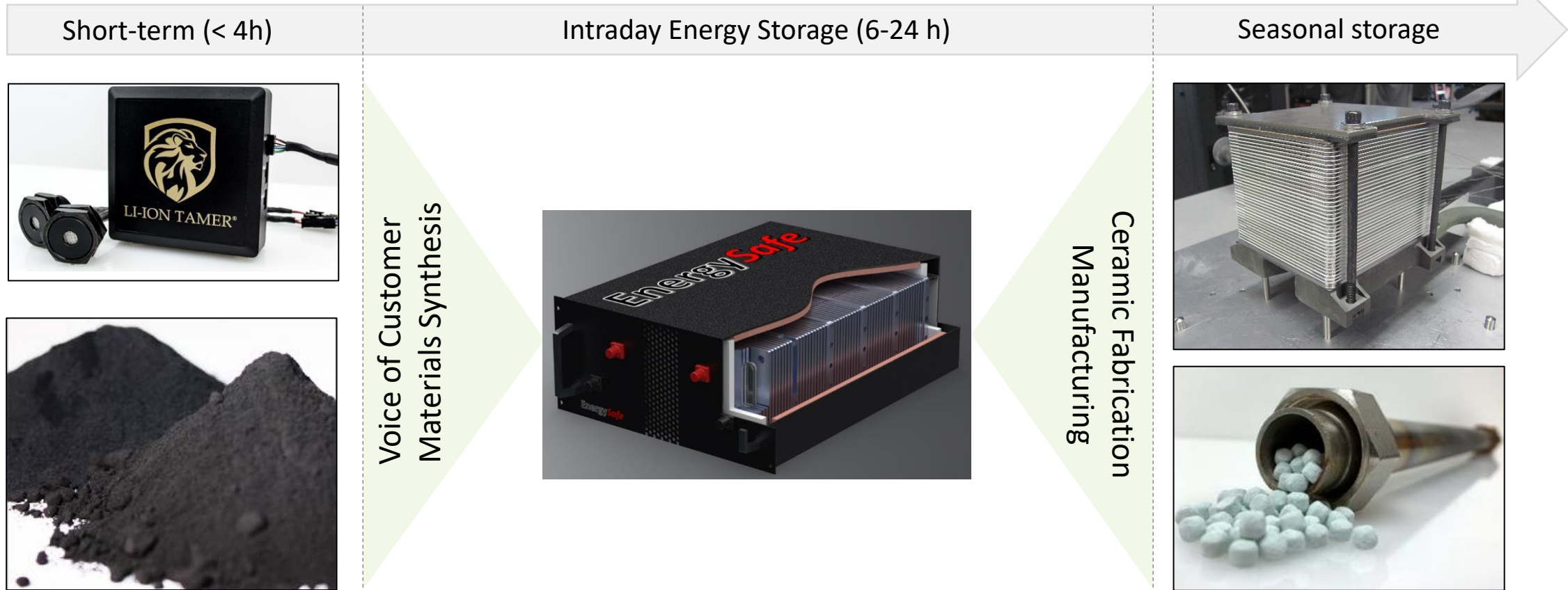
## Problem

- ▶ To balance intermittent renewables with baseload assets and maintain grid stability, a massive expansion of long-duration (6-24 hours) energy storage is required.
- ▶ Li-ion batteries address shorter duration storage but become cost-prohibitive for longer duration and are inherently unsafe.

## Solution

- ▶ Nexceris is developing a new energy storage technology that promises:
  - ▶ Low-cost
  - ▶ Inherently Safe
  - ▶ Intraday duration energy storage

Nexceris is engaged in technology development throughout the energy storage spectrum





# Low-Cost Metal-Halide Energy Storage Technology | DE-SC0021566

Value Proposition Element	Description	Value Impact
<b>Safety</b>	<ul style="list-style-type: none"><li>• No risk of fire</li><li>• Fail safe technology</li><li>• No risk of propagation</li></ul>	<ul style="list-style-type: none"><li>• Enables technology to be used in locations where Li-ion is considered too risky (i.e., urban environments)</li><li>• Reduces siting and permitting risk / project execution risk</li><li>• Reduces balance-of-system and potential insurance costs</li></ul>
<b>Enhanced Operability</b>	<ul style="list-style-type: none"><li>• Longer duration (6-24hrs)</li><li>• Greater ambient operating range</li><li>• More flexible than Li-ion</li><li>• Greater stability</li><li>• Improved asset visibility</li></ul>	<ul style="list-style-type: none"><li>• Longer duration expands use-cases</li><li>• Greater ambient temperature operating range potentially reduces HVAC and O&amp;M expense and allows more flexible operations</li></ul>
<b>Purpose-built Design</b>	<ul style="list-style-type: none"><li>• Resilient design</li><li>• Modularity</li><li>• Scalable size</li></ul>	<ul style="list-style-type: none"><li>• Design flexibility allows freedom in tailoring storage assets to specific applications</li><li>• Hardened system more resilient against physical attack</li></ul>
<b>Supply Chain / Sustainability</b>	<ul style="list-style-type: none"><li>• Abundant raw materials</li><li>• Recyclability reduces end-of-life costs</li><li>• No critical materials</li></ul>	<ul style="list-style-type: none"><li>• Abundant raw materials reduce supply chain risk and may lower cost long-term</li><li>• U.S. manufacture reduces risk of supply chain interruption</li><li>• Aligns with corporate, state sustainability goals potentially lower end-of-life / decommissioning costs</li></ul>



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Task	Objective	Milestones
<b>Task 1</b> Value-Proposition Definition	<ul style="list-style-type: none"><li>○ Understand unmet market needs</li><li>○ Establish narrative for technology to meet these needs</li><li>○ Create commercial pull</li></ul>	<ul style="list-style-type: none"><li>○ Value-proposition defined, guided by value-chain</li><li>○ Cell design review completed</li><li>○ Commitment from at least one industrial partner to support on-site demonstration in Phase 2</li></ul>
<b>Task 2</b> Technical Risk Reduction	<ul style="list-style-type: none"><li>○ Drive out technical risk (&gt; 50 % reduction in RPN achieved)</li><li>○ Reproducible cell established</li></ul>	<ul style="list-style-type: none"><li>○ Define cell architecture</li><li>○ Down-select electrolyte membrane approach</li></ul>
<b>Task 3</b> Cost Reduction Implementation	<ul style="list-style-type: none"><li>○ Roadmap &lt;\$50/kWh defined</li></ul>	<ul style="list-style-type: none"><li>○ Manufacturing cost model/roadmap established</li><li>○ Evaluation of lower-cost cell-chemistry completed</li><li>○ Achieve 50 % lower cell cost</li></ul>
<b>Task 4</b> 250 Wh Module Demonstration	<ul style="list-style-type: none"><li>○ Demonstrate key technology benefits</li></ul>	<ul style="list-style-type: none"><li>○ Thermal management of 20-cell pack design validated</li><li>○ Successful completion of 250 Wh stand-alone module demonstration</li></ul>

Nexceris is always looking for value-chain partners to help better understand the market, technology development and commercialization

Dr. Neil Kidner

Director, Battery Business Unit

Nexceris LLC

 404 Enterprise Drive, Lewis Center, OH, 43035

 (614) 802-7105

 [n.kidner@nexceris.com](mailto:n.kidner@nexceris.com)