

Some Like it Hot

Development of the Westinghouse High-Temperature Reservoir Technology

July 2026

Thermal, Mechanical, & Chemical
Energy Storage Workshop

Lars Lippard

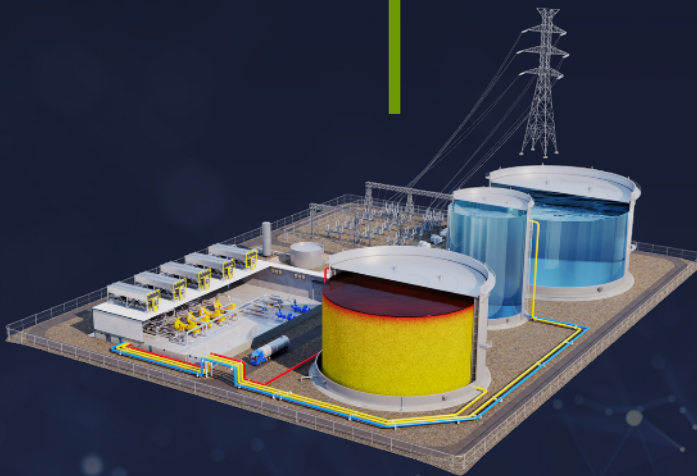
Long Duration Energy Storage Lead Engineer

How It Works

Storing electrical energy as a differential of temperature.

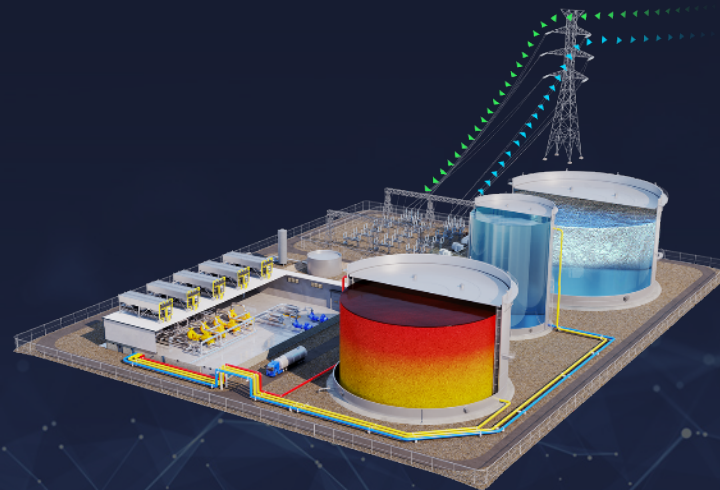
Charging

sCO₂ heat pump cycle consumes grid power to move heat from freezing of water in LTR to heating oil/media in HTR.



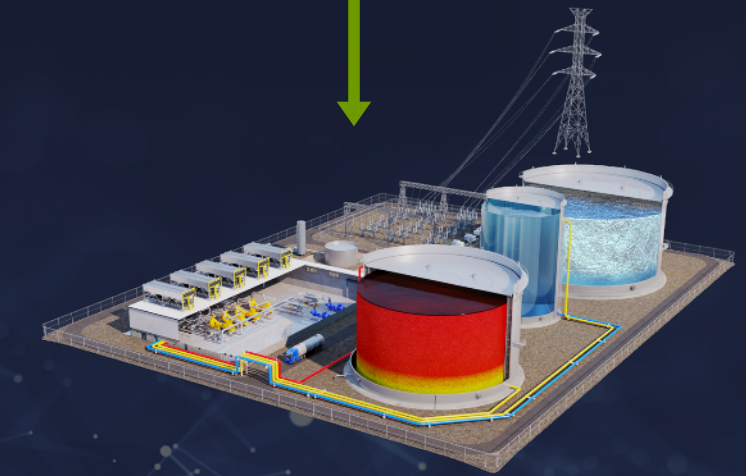
Zero Charge

System at a fully discharged state where LTR has chilled water and HTR has warm oil/media.



Discharging

sCO₂ heat engine cycle utilizes stored temperature difference to produce electricity, melting ice & cooling the oil/media.

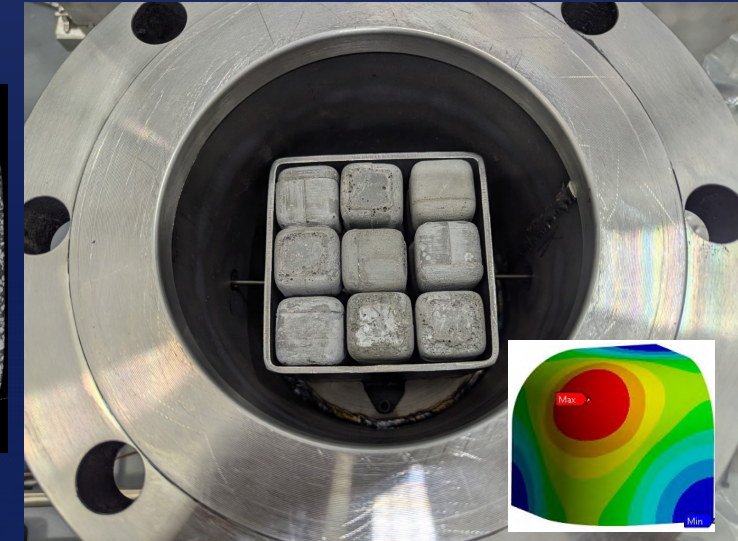
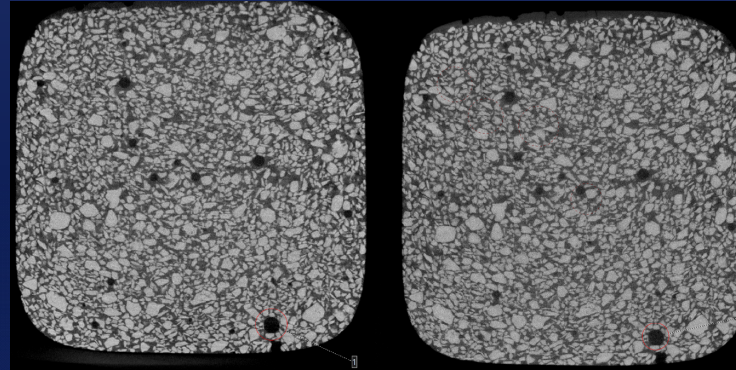


Full Charge

System at a fully charged state where LTR has ice and HTR has hot oil/media.

Thermal Reservoirs – Durability & Performance

- Thermal Element Mix / Manuf. with Spring Valley Corp.
 - Precise shape
 - Manufacturable at scale
 - Exceptional volumetric Cp
 - Low porosity
 - Mechanically tough
 - Over 80 mixes tested
- Durability Testing
 - 27 thermal elements
 - Compressively loaded
 - Accelerated full thermal cycles
 - Correlated simulation activities
 - Over 1000 cycles completed
 - No changes noted in compressive strength, cracking, or properties
 - 20,000 cycle test is next



Thermal Reservoirs- Performance and Packing Fraction

• Thermal testing

- Multiple fill materials tested
- Simulation tools validated against data
- Close correlation between modeling and tests
- In-process of fully integrating with sCO₂

• Packing Fraction

- Demonstrated packing techniques
- Quantified achievable packing in line with literature values
- Demonstrated pathway to >95% of ideal performance

• Oil testing

- Validating film temperature limits
- Attempted to demonstrate fouling
- Measured degradation
- Evaluated online monitoring

