



HIGH DENSITY THERMAL STORAGE WORKSHOP

BREAKOUT REPORT

HIGH TEMPERATURE SYSTEMS

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HIGHEST VALUE USES AND IMPACT



- Solar thermal
- Combined Heat and Power (CHP)
- Peaking for traditional and nuclear power
- Chemicals industry
 - Fuel and chemicals processing
- Building heating
- Absorption chillers

LARGEST TECHNOLOGY CHALLENGES



- Operating range in 0-1300 degrees Celcius for solar thermal
- Infinitely stable
- High specific heat & **thermal conductivity**
- Materials
 - Lower viscosity, corrosivity, melting point, density
 - Higher durability
- Heat transfer coefficient
- Ensuring that practical installation and implementation issues are taken into consideration
- Reliability of heat recovery in refineries
- Reliability of power grids
- Supply and demand mismatch

INNOVATIVE WAYS TO MINIMIZE HIGH TEMP EFFECTS



- Depends on degradation mechanism
- Good thermal transport with chemical isolation
- Combination of two materials to stabilize the system
- Dynamic monitoring of the system

ENERGY DENSITY REDUCTION



- 30-50% energy density reduction from the system
 - Should dictate what the material looks like
- Very application dependant

TARGET COST PER KWH THERMAL



- Cost should not necessarily be broken down
- Must specify several parameters
 - Discharge rate/time of discharge
 - Temperature
 - Ultimately application specific
 - Have to define what the application will be

IS LONG TERM TES VIABLE?



- Seasonal is not viable
 - Just go for a fuel or geothermal

WHAT WILL A HIGH IMPACT PROGRAM LOOK LIKE?



- Collection and transport up to a half a mile
- New chemicals and materials/microstructures

WHAT WILL A HIGH IMPACT TEAM LOOK LIKE?



- Reactor engineers, designers
- Heat transfer specialists
- Chemists, materials scientists
- Early stage research scientists
- Industrial partners
 - Installation/implementation perspective