



## Lime Thermal Battery from Infinity Turbine Technology

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<https://infinityturbine.com/lime-thermal-battery-by-infinity-turbine-renewal-energy.html>

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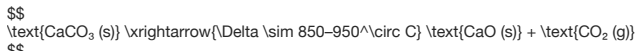
## Lime Based Thermal Battery

Your concept describes a lime-based thermal battery—a thermochemical energy storage system using the calcination and hydration cycle of limestone ( $\text{CaCO}_3/\text{CaO}/\text{Ca}(\text{OH})_2$ ). This is a scientifically valid and potentially highly effective method for storing and releasing heat energy, especially when powered by concentrated solar or surplus electricity.

### Cycle Overview: Lime-Based Thermal Battery

#### Charging Phase (Heat Storage via Calcination):

1. Input: Limestone ( $\text{CaCO}_3$ ), heat from concentrated solar or resistive electric source
2. Reaction (Endothermic):



3. Output: Calcium oxide (CaO) stored as energy-rich material, plus  $\text{CO}_2$  (capturable)

This step stores thermal energy in the chemical bonds of CaO.

#### Discharging Phase (Heat Release via Hydration):

1. Input: Water added to CaO
2. Reaction (Exothermic):



3. Output: Heat (release), hydrated lime ( $\text{Ca}(\text{OH})_2$ )

This step releases stored heat on demand, ideal for space heating, industrial drying, or steam generation.

#### Thermochemical Efficiency and Capacity

Property	Value (Approximate)
Heat of calcination (input)	$\sim 3.2-3.5$ MJ/kg $\text{CaCO}_3$ ( $\sim 900-970$ kWh/ton)
Heat of hydration (output)	$\sim 1.2-1.4$ MJ/kg CaO ( $\sim 330-390$ kWh/ton)
Energy density	250–400 kWh/m <sup>3</sup> (solid CaO bulk)
Round-trip efficiency	$\sim 35-45\%$ (thermal-to-thermal)
Thermal stability	Months to years (CaO is stable dry)

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