



# Absolute cooling power

ENERGIVault 1MW vs  
1MW WATER CHILLER + LITHIUM ION BATTERY

350PPM 

Capitalist Solutions to Climate Change

# Introduction

For high-demand cooling applications, such as data centres, industrial facilities, and hospitals, **absolute cooling resilience is critical**.

A 1MW water chiller running for one hour requires a significant power supply, typically backed by large lithium-ion battery banks, adding substantial costs and complexity.

At O-Hx, we compared the cost and performance of 1MW of absolute cooling for one hour using:

1. Traditional 1MW water chiller + battery storage
2. EnergiVault thermal energy storage (TES)

Our analysis shows that EnergiVault offers a far more cost-effective and efficient solution, saving up to £940,000 compared to a traditional battery-backed chiller system.



# Breaking down the cooling requirements

To provide 1MW of cooling for 1 hour, the system must deliver 1,000kWh of cooling energy ( $1\text{MW} \times 1\text{ hour}$ ). Using a chiller with a Coefficient of Performance (COP) of 3.1, this equates to:

- 322.6kWh of electricity consumption
- A continuous power draw of 322kW
- Peak startup power of up to 1.9MW (6x inrush current spike)

This means any battery storage system must:

- Store at least 322.6kWh of usable energy
- Deliver at least 322kW continuously
- Handle startup surges up to 1.9MW, requiring extensive surge protection

# Chiller + battery system = high cost and complexity

A traditional 1MW chiller + lithium battery system would require:

- Water chillers (1MW capacity)
- Lithium battery bank (400–500kWh capacity)
- Power inverters, battery management systems, and installation
- Surge protection to handle chiller startup inrush current

COMPONENT	SPECIFICATION	COST (£)
Water chillers	1MW capacity	£400,000
Lithium battery system	500kWh capacity	£500,000
Ancillary equipment	Inverters, BMS, installation	£220,000
<b>Total Cost</b>		<b>£1,120,000</b>

## CHALLENGES WITH THE CHILLER + BATTERY SYSTEM

- **Extremely expensive** (£1,120,000 total investment)
- **Complex setup** requiring multiple components and expert integration
- **High peak power demand** (322kW continuous + startup surges up to 1.9MW)
- **Battery degradation over time**, leading to costly replacements every 10–15 years
- **Inefficient use of stored energy**, with losses in conversion and discharge
- **Potential need for power supply upgrades** to handle high inrush current

# EnergiVault: The smarter alternative

**EnergiVault** is a thermal energy storage (TES) system that stores chilled water during off-peak hours and releases it when needed, avoiding high electrical demands during operation.



## Significantly lower cost

- Total cost: £180,000 (compared to £1,120,000 for a chiller + battery system)
- Saves up to £940,000 (84% cost reduction)



## Eliminates battery dependency

- No need for costly lithium batteries that degrade over time
- No complex electrical management for high-power loads



## Handles absolute cooling more efficiently

- 1MWh of stored cooling energy, sufficient for 1MW of cooling for 1 hour
- No electrical demand during discharge, unlike a chiller



## No inrush current issues

- Traditional chillers require high surge current at startup, sometimes up to 6x the steady-state load
- This could mean a momentary power spike of nearly 1.9MW, requiring oversized electrical infrastructure
- EnergiVault delivers cooling instantly, avoiding electrical demand spikes entirely



**EnergiVault**<sup>®</sup>  
COOL ENERGY STORAGE



## Lower maintenance costs

- Unlike batteries, EnergiVault does not degrade over time
- Longer operational lifespan with minimal servicing requirements



## No need to upgrade power supply

- EnergiVault only requires 30kW during charging, meaning existing power infrastructure remains unchanged
- No expensive electrical upgrades needed



## Grid-friendly load shifting

- Charges when electricity is cheapest (off-peak hours)
- Reduces reliance on peak-time power, cutting operational costs

# Final comparison: chiller + battery vs EnergiVault

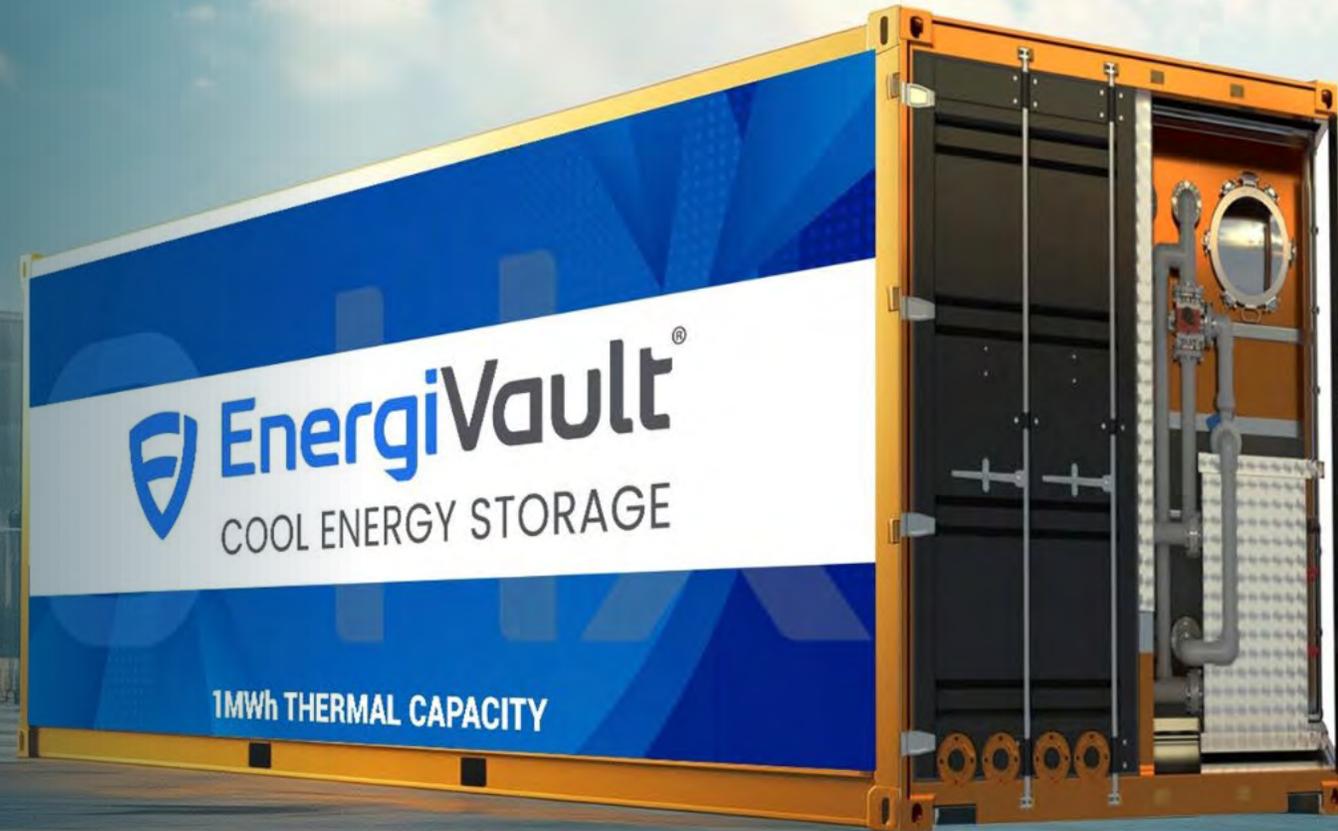
FACTOR	CHILLER + BATTERY SYSTEM	ENERGIVault
TOTAL COST	£1,120,000	£180,000
SAVINGS WITH ENERGIVault	—	£940,000 (84% cheaper)
COOLING STORAGE CAPACITY	N/A (live cooling only)	1MWh (pre-stored cooling)
BATTERY REQUIRED?	Yes (500kWh required)	No batteries needed
GRID POWER DEMAND	322kW continuous + up to 1.9MW inrush	30kW during charging
STARTUP INRUSH CURRENT	Yes (6x running current, up to 1.9MW surge)	None (pre-stored cooling)
ONGOING MAINTENANCE	Battery replacement every 10-15 years	Minimal maintenance
POWER SUPPLY UPGRADES	Likely required due to high peak demand	No upgrades needed (30kW charge power)
LOAD SHIFTING CAPABILITY	Limited (direct grid draw)	Yes (off-peak charging)

# The verdict: EnergiVault is the future of absolute cooling

For businesses looking to ensure reliable absolute cooling without the massive expense and complexity of a battery-backed chiller system, EnergiVault is the superior solution.

- 84% lower cost
- No dependency on expensive, short-lived batteries
- Instant cooling delivery with no startup surges
- Lower operating costs through load shifting
- No power supply upgrades required

**If you're looking for a cost-effective, energy-efficient, and reliable absolute cooling system, EnergiVault is the answer.**



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# 350PPM

Capitalist Solutions to Climate Change

 +44 203 1511 350

 [info@350ppm.co.uk](mailto:info@350ppm.co.uk)

 25 Cabot Square, London E14 4QZ

[WWW.350PPM.CO.UK](http://WWW.350PPM.CO.UK)



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