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REV2026 · PANEL

Energy Storage's Role in Energy Affordability

Thermal storage: new load that works like a grid asset

Paul Lesure, CEO, Durion

HeatTrap storage with a solar trough and ORC, built and operated at UL-Lafayette's START facility, Crowley, LA

TWO WAYS TO STORE

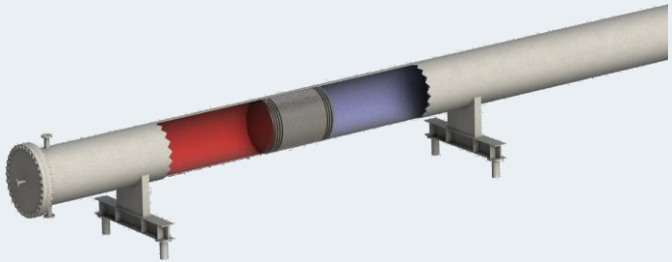
Thermal storage charges like a battery but delivers heat

BATTERY STORAGE

Solar or grid → Battery → Electricity back to the grid or the building

THERMAL STORAGE

Solar or grid → Thermal store → Steam or hot water for process heat or HVAC



ONE EXAMPLE, FROM OUR WORK

Durion's HeatTrap

Pressurized hot water up to 300 °C in standard steel pipe. 15+ hours of storage. A 300 kW electric-boiler demonstration with Green Mountain Power is in permitting.

WHY THERMAL STORAGE

Industrial heat runs almost entirely on combustion

That load sits outside the electric system today. Thermal storage is one way to bring it on, on the grid's terms.

>50%

of U.S. manufacturing energy goes to process heat

~95%

of U.S. industrial heat comes from natural gas (55%), byproduct fuels (36%) and coal (5%)

~70%

of U.S. process heat is used below 300 °C

IN VERMONT

Pipeline gas reaches only the northwest of the state. Many plants elsewhere make heat from delivered propane and fuel oil, so every unit of heat moved onto Vermont electricity is fuel spending that can stay in state.

Sources: ORNL, "Alternative Thermal Technologies for Industrial Process Heat," Energies, 2026 (first two figures); C. McMillan, NREL, 2019, via Global Efficiency Intelligence (below 300 °C).

WHAT THE UTILITY GETS

New load that behaves like a grid asset

Soaks up midday solar

New England had 134 "duck curve" days in 2025. A store can charge into that midday dip, or overnight.

Backs off on command

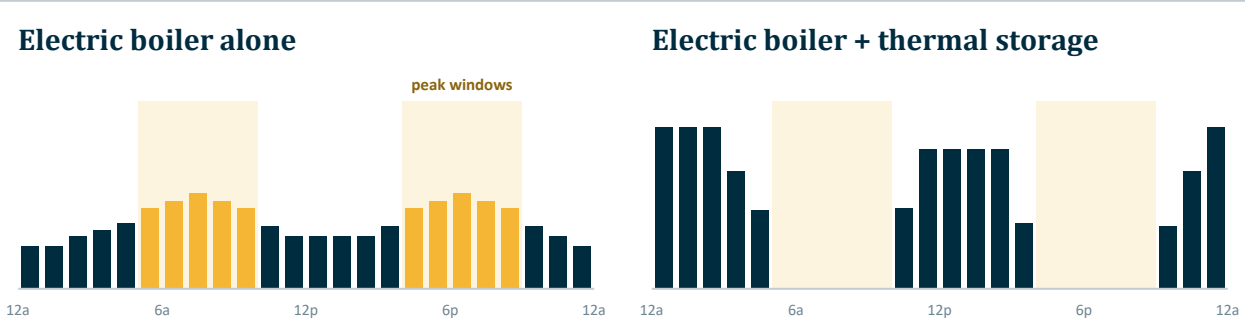
Charging stops for a peak or a constrained circuit. The plant runs on stored heat.

Predictable new load

Industrial heat runs on steady schedules, so the added kWh are easy to forecast and plan supply around.

Spreads fixed grid costs

More off-peak kWh over existing wires can put downward pressure on rates for every customer.



Illustrative daily profile for a site with steady heat demand, in electric boiler load; peak windows shown at 5 to 10 AM and 4 to 9 PM. Duck curve days: ISO New England, ISO Newswire, Jan. 13, 2026.

IT'S BEEN DONE

Flexible-load rates for thermal storage already exist

Otter Tail Power: Thermal Market Energy Pricing Rider

Approved in South Dakota (effective Aug. 1, 2025), Minnesota and North Dakota

Who: Voluntary, new customers of 25 MW or more using thermal storage tied to nearby wind or solar

Firm load: A baseline billed at the standard large-power rate

Flexible load: Everything above it priced at MISO day-ahead and real-time at the customer's own node

Curtailment: Registered with MISO as a load-modifying resource, fully curtailable for reliability

Other customers: Market energy costs settled separately, kept out of everyone else's fuel adjustment

First user: Antora's 5 GWh thermal battery at POET's Big Stone City, SD ethanol plant, commissioned May 2026

Germany, §13k EnWG

Since October 2024, grid operators offer wind power that would otherwise be curtailed to power-to-heat and other new flexible loads, at reduced cost. A two-year trial moving to auctions.

Vermont, GMP Rates

Rate 13 has long served electric thermal storage heat. Since 2021, GMP's Flexible Load Management pilot helps businesses shift load off-peak; our Montpelier demonstration is contracted under it.

Sources: Otter Tail Power TMEP Rider petition, SD PUC Docket EL25-017, and Tariff Section 14.16; Canary Media, May 27, 2026; enervis, "§13k EnWG"; GMP Rate 13, effective Oct. 1, 2024.

THE VALUE TO THE UTILITY

One megawatt of flexible heat load, from the utility's side

Illustrative: a 1 MW electric boiler charges a thermal store 8 off-peak hours a day and replaces a propane boiler.

~2,800

MWh a year of new electricity sales, all outside the peak window

0 kW

added to system peaks, since charging stays off-peak and can be curtailed

1 MW

of load that can drop on a call or shift into midday solar

~700 t

of CO2 a year, from about 120,000 gallons of propane displaced

Counts toward Tier III

Vermont's RES requires utilities to meet 7.33% of annual load in 2025, rising to 12% by 2032, with projects that cut customers' fossil fuel use. A project like this could count.

Scales with the site

A 250 kW site brings about a quarter of these figures and a 5 MW site about five times. A heat pump in place of the boiler uses less electricity for the same heat.

Illustrative arithmetic: 1 MW x 8 h x 350 days; electric boiler 99%, propane boiler 85%; propane 91,452 Btu/gal (EIA), 62.87 kg CO2/MMBtu (EPA). Tier III: 30 V.S.A. § 8005.

AFFORDABILITY

Five ways flexible heat load supports affordability

More load over the same wires

From 2019 to 2025, states with the most load growth saw real average prices fall by over 1¢/kWh. In Vermont, low regional load in 2023 triggered a transmission true-up in GMP's FY26 rates.

Kept out of the peaks that set the bill

Transmission and capacity costs are set in a few peak hours. Stored heat charges outside them, when Vermont day-ahead power ran $37/MWh against $58 on-peak (Aug. 2025).

Off gas and its price swings

Vermont's industrial gas price went from $3.95/Mcf in August 2024 to $7.53 in January 2026. New England gas averaged $3.06/MMBtu in 2024 and $6.27 in 2025.

Puts midday solar to work

New England had 134 days in 2025 when the grid served less load at midday than overnight. A thermal store can charge into that dip.

Keeps more energy spending in Vermont

Vermont spends over $2 billion a year on fossil fuels, and about 75% of it leaves the state. Electric heat pays for Vermont wires, local generation and local work.

Sources: Berkeley Lab, Retail Price Trends, Apr. 2026; GMP FY26 rate filing, Schedule A; ISO-NE monthly market report, Aug. 2025; EIA, Vermont industrial natural gas price; ISO-NE market monitor 2025 report; ISO Newswire, Jan. 13, 2026; Vermont Climate Action Plan 2025 draft (Energy Action Network).

The Role of Energy Storage in Energy Affordability

REV2026 · Chad Farrell

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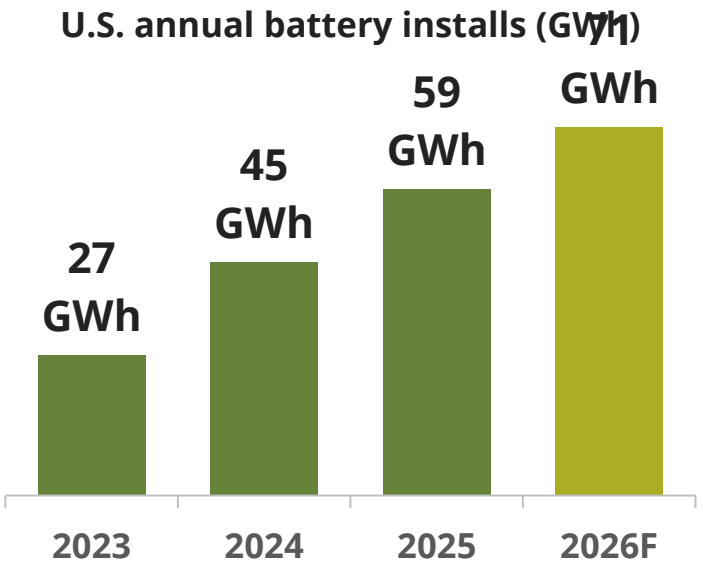
STORAGE IS SCALING FAST



20.2 GWh

added in Q2 2026 — an all-time quarterly record

7

gigawatt-scale projects came online in Q2 alone

+20%

more storage expected in 2026 vs. 2025 (71 GWh forecast)

Source: SEIA / Benchmark Mineral Intelligence, U.S. Energy Storage Market Outlook Q3 2026

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HOW STORAGE LOWERS BILLS

1 Shave the peak

Charge when power is cheap, discharge at the expensive peak hours that set capacity and transmission costs for everyone.

2 Defer grid upgrades

Distribution-connected storage provides peak shaving and grid support that can avoid or delay costly wires upgrades.

3 Protect ratepayers

As data centers and other large loads grow, storage helps homes and businesses hedge against rising electricity costs.

4 Keep the lights on

Backup power plus virtual power plant and demand-response programs turn home and business batteries into grid resources.

Nearly 500 U.S. counties and growing have moratoriums in place on renewable energy development.

According to the Siting Clean Collaborative of the 1100 counties where they are tracking ordinances related to Battery Energy Storage technology, ~250 have ordinances in places that are highly restrictive or a moratorium.

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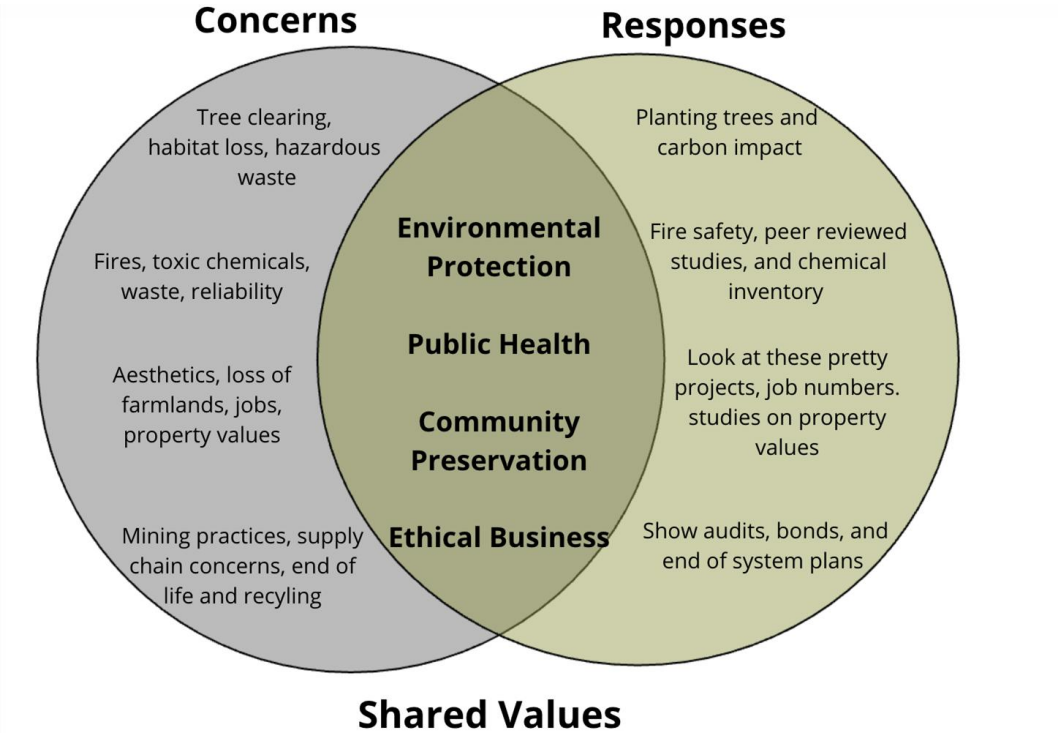
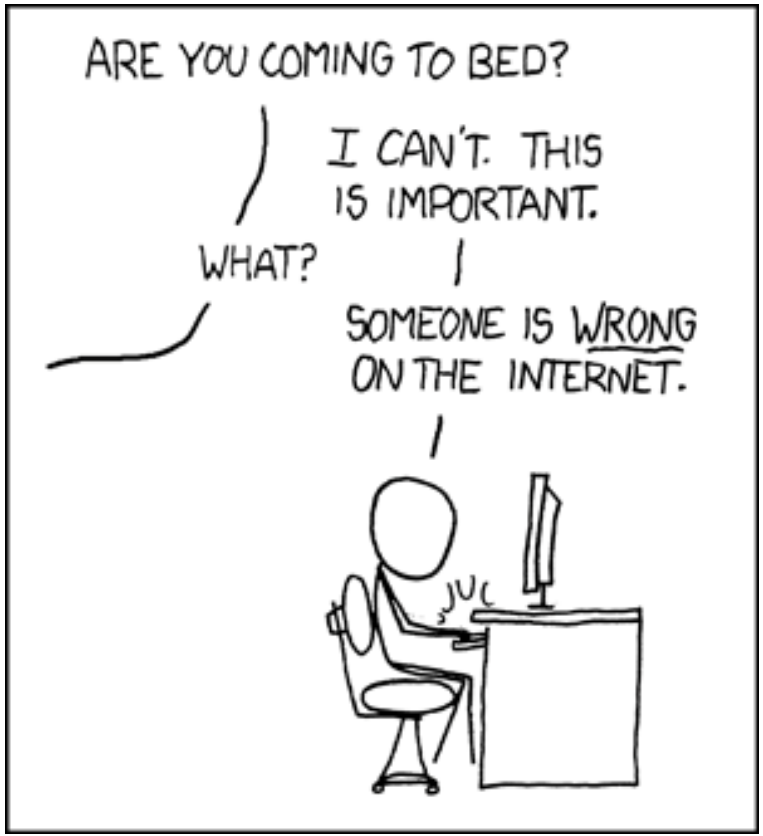

Concerns
Responses
Tree clearing, habitat loss, hazardous waste
Fires, toxic chemicals, waste, reliability
Aesthetics, loss of farmlands, jobs, property values
Mining practices, supply chain concerns, end of life and recyling
Environmental Protection
Public Health
Community Preservation
Ethical Business
Planting trees and carbon impact
Fire safety, peer reviewed studies, and chemical inventory
Look at these pretty projects, job numbers. studies on property values
Show audits, bonds, and end of system plans
Shared Values

FACTS VS FEELINGS



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STATES ARE ACTING ON STORAGE

JAN	**Illinois**	Clean and Reliable Grid Affordability Act: 3 GW of storage by 2030
MAR	**Nebraska**	LB1010 sets a clearer framework for storage development
APR	**Virginia**	20+ GW utility procurement, incl. long-duration and distributed storage
JUN	**FERC**	All six RTOs ordered to justify or reform large-load interconnection rules

Illinois put “affordability” in the name of its storage law. The question for Vermont: how fast do we follow?

Source: SEIA / Benchmark Mineral Intelligence, U.S. Energy Storage Market Outlook Q3 2026

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REV 2026 · STORAGE AFFORDABILITY

Value Stacking in Practice

Laura Coriell

Danville VA BESS 1 | 10.5 MW | Operational Since 2022

PROJECT EXAMPLE · LARGE C&I PEAK SHAVING

GlobalFoundries, Vermont

Lightshift has partnered with GlobalFoundries on a peak shaving project at its Vermont manufacturing facility

16 MW

Battery at the Vermont manufacturing plant

Fall 2026

Target COD; currently under construction

New Model

For pairing battery storage with precision manufacturing

Driving Cost Savings

Dispatched to shave transmission and capacity peaks, cutting costs and hedging against rising demand charges. Providing benefits to GF and the local grid.

Additional Value Stacking

When not peak shaving, the project can participate in wholesale markets, further reducing costs and supporting the regional grid.

Protecting Power Quality

In-depth Lightshift studies ensure the battery runs harmoniously with precise manufacturing equipment.

PROJECT EXAMPLE · PUBLIC POWER PARTNERSHIPS

VPPSA & Northfield, Vermont

Lightshift is partnering with the Vermont Public Power Supply Authority to deploy energy storage with a handful of municipal utility members, starting with the Northfield Electric Department.

VPPSA
Vermont Public Power Supply Authority

NORTHFIELD VERMONT

Savings

Peak shaving cuts utility costs

Scalable

VPPSA model for all members

Local

Benefits for the community

Partnership Highlights

- Peak shaving cuts costs for Northfield's municipal utility, and the savings reach the community
- The VPPSA partnership gives other member utilities a model to replicate across Vermont
- Similar projects are maturing with other Vermont utilities
- Delivers savings, reliability and renewable integration

PROJECT EXAMPLE · MICROGRID + PEAK SHAVING

Wakefield Campus Microgrid

Lightshift partnered with the Town of Wakefield on a 5 MW storage project that provides backup power to schools and generates significant savings for the community.

5 MW
22 MWh of storage

2025
Operational since mid-2025

2 schools
New high schools supported

Project Highlights

- Designed to save money through peak shaving plus backup power for two new schools
- Batteries are part of a larger microgrid with a gas generator, rooftop solar and heat pumps
- Supports the electrification of two new high schools, and displaces full gas service and diesel backup generators

PROJECT EXAMPLE · MICROGRID + PEAK SHAVING

Groton 2 School Microgrid

Lightshift partnered with Groton Electric Light Department to deploy a first-of-its-kind microgrid at a local school, increasing reliability and resilience for its students.

2.2 MW
9 MWh of storage

Aug 2024
Commercial operations

US first
Power Electronics grid-forming

Project Highlights

- First grid-forming application for Power Electronics in the US
- Primary function: nearly instantaneous backup power for the newly built elementary school
- Also serves as a peak shaving asset, providing significant savings for the community

PROJECT EXAMPLE · SOLAR SOAKING AND RENEWABLE INTEGRATION

Milford, Delaware

Lightshift is partnering with the City of Milford to pair battery storage with the city's 15 MW solar facility, soaking up excess solar to support local infrastructure.

8 MW
Multi-hour battery storage system

15 MW
Milford Solar Facility next door

2027
Project Operational

The Challenge

Milford's solar farm can produce more midday energy than the local system can always use or export, so valuable output is lost.

Solar Soaking

The battery absorbs excess solar at midday and discharges it during evening peaks, getting more value from the existing solar park.

More Room for Solar

Supports grid reliability and increases hosting capacity, so more Milford residents can add rooftop solar.

Additional Value Stacking

When not soaking solar, the battery peak shaves to cut transmission and capacity costs and can participate in PJM wholesale markets.

1. **Midday** — Solar output exceeds what the system can absorb
2. **Charge** — Battery soaks up the excess solar energy
3. **Evening** — Battery discharges to serve the local peak

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