



Trane[®] Thermal Energy Storage

Better for the environment and better for business



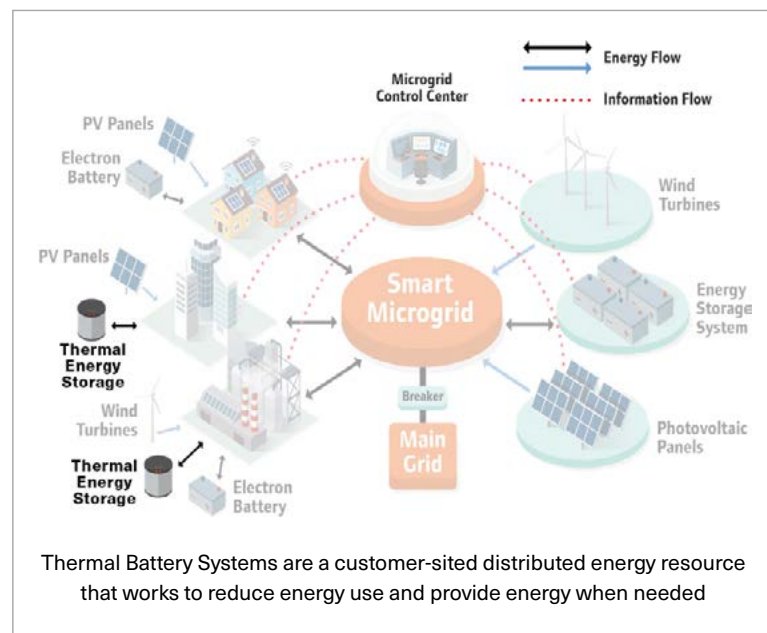


We're your partner in advancing your financial and sustainability goals

As the world moves forward toward carbon neutrality and stronger grid resiliency, industries of all types have economic and environmental factors to consider. Transportation is moving to electric fuel. Electric generation is moving to renewable energy from wind and solar. Building owners are implementing plans to reduce carbon footprints. Our Thermal Battery™ Systems can help accelerate your transition to cleaner energy with flexible, affordable energy management that provides a smaller carbon footprint, grid resiliency and a lower cost of operation. When you join us, you become part of a team that's taking action to secure a more sustainable future.

Thermal Battery Systems

Trane® Thermal Battery Systems utilize thermal energy storage technology to store a larger volume of clean energy—like a battery—for your cooling and heating needs. Climate scientists recognize thermal energy storage as an important distributed energy resource due to its ability to help level energy demand spikes, establish grid flexibility and resolve the variable output of renewable wind and solar energy.*



* Hawkin, Paul (editor), Drawdown: The Most Comprehensive Plan Ever Proposed to Reverse Global Warming, Penguin Books, 2017.

Consider all the advantages

Whether you are facing sustainability, resiliency or certain operational and financial challenges, Trane® thermal energy storage can be part of the solution.

Be more sustainable

Decarbonize. Thermal energy storage optimizes the use of renewables by kicking on when the sun isn't shining or capturing intermittent wind and storing it for later use. And it helps electricity providers avoid using the fossil fuel peaker plants that provide energy when demand is high. Every peak kWh of use that is avoided can reduce peak carbon emissions by up to 1.6lbs.

* EPA Greenhouse Gas Equivalencies Calculator, March 2020

Build resiliency

Modernize. Thermal energy storage helps buildings be more energy source and price flexible, supporting grid resiliency by capturing cleaner and less expensive energy and making it available when you need it most. Our solutions have the flexibility to discharge energy when grid demand is high, allowing buildings greater agility even as rates change.

Turnkey support

Go Beyond. Besides system design, Trane can provide operational support and help you maximize the advantages of your thermal energy storage system for years to come. We provide system installation, startup and commissioning, 24-7 remote monitoring, service and maintenance, plus, a full portfolio of energy and grid services to help continuously improve your energy profile.

Deep expertise and the scale to implement industry-changing innovations

Trane system experts can design a thermal energy storage solution for virtually any building that has an air or water-cooled chiller plant, in both new construction and chiller plant replacements. **Our Thermal Battery™ System includes...** CALMAC® energy storage tanks, Trane air- or water-cooled chillers, pumps and easy to manage pre-packaged controls with operator dashboards.




FEATURING CALMAC ENERGY STORAGE

Average tank dimensions: 9 ft x 8 ft diameter

The area required for an average CALMAC Ice Bank® tank is the equivalent to half a parking space.

Average capacity: 160-ton hours per tank, eliminating approximately 20kW of peak demand from the grid.

That's equivalent to...

-  The amount of energy required to cool four 2,000 sq ft houses for an entire day
-  Energy stored in 40,000 AA batteries
-  Electricity required to charge 6 electric vehicles



Trane Web based controls help manage your energy use on your computer, phone or tablet.

Join the Energy Storage Movement

See if your project is a suitable application for thermal energy storage

We've installed thermal energy storage systems in religious buildings, schools, skyscrapers and district plants.

If your building meets at least two of these three conditions, your installation is a good candidate:

- 1 The building peak cooling load is over 100 tons
- 2 A planned or existing chilled-water cooling system
- 3 The building use schedule allows for sufficient time to make ice (even buildings with nighttime loads can benefit from thermal energy storage)

Check the financials.

Trane designs for peak thermal load, yet you won't be paying for the more costly chiller capacity that you only need for a few hours each year. Meet peak cooling capacity with chillers that are 20 percent smaller. The cost advantages immediately offset the price of thermal storage tanks.

Let's calculate your equipment costs. **Here's a partial storage example:**

Equipment First Cost Comparison: Typical 400 ton chiller plant (air cooled chillers)

Item	Traditional	Thermal Battery™ Design	Your Project
Chiller(s)	Two (2) 200 ton chillers at \$600/ton = \$240,000	Two (2) 120 ton chillers at \$600/ton = \$144,000	
Thermal Battery™ Ice Bank® tanks	None	Four (4) CALMAC 1320CSF Thermal Battery Ice Bank tanks (160 tons of load shift) at \$30,000 each = \$120,000*	
Thermal Battery controls, extra piping, concrete pad for thermal batteries**		\$60,000	
Total Cost***	\$240,000	\$324,000	
Incremental Costs	0	\$84,000	

* Each 1320CSF Ice Bank Thermal Battery is rated at 324 net useable ton-hours and can satisfy 40 tons of cooling load for 8 hours at typical CHW supply temperatures.

** Costs above are equipment only. Installation costs, site preparation costs are site specific.

*** Thermal Battery chiller plants may require the use of a plate/frame heat exchanger; this will add to the first cost of the Thermal Battery Design

Thermal Battery chiller plants can reduce required electrical costs. In the example above, the reduction in chiller tonnage of 160 tons could result in a reduction of approx. 175 kW in required electrical supply. At \$75/kW this would be a savings of roughly \$13,000. This is not shown in the numbers above.

Pay less for energy. Find out how much you could save.

Utilities design commercial rates to correspond to when the demand for electricity peaks on the grid. You could pay up to 40 percent less for cooling by avoiding peak time of use rates and reducing peak electricity demand. Utility demand side programs may provide further savings.

Let's calculate your projected energy cost savings, using just 4 pieces of information about your building and current local utility rates. **Here's an example:**

Demand Charge Savings:

	Traditional	Thermal Battery Design	Your Project
Tons of load shift		160 tons	
Kw/ton	1.2 kw/ton	1.2 kw/ton	
Demand Charge	\$14/kW	\$14/kW	
Months of Cooling	8 months	8 months	
Annual Demand Charge Savings*		160 tons x 1.2 kw/ton x \$14/kw x 8 months = \$21,500	
Simple Payback (incremental costs / annual demand charge savings)	0	3.9 years	

* Savings dependent on equipment type and location

Experience matters. Trane is a leader in thermal energy storage systems, with over 1 GW of peak power reduction in over 4,000 installations worldwide. To learn more visit us at Trane.com or CALMAC.com



Trane – by Trane Technologies (NYSE: TT), a global climate innovator – creates comfortable, energy efficient indoor environments through a broad portfolio of heating, ventilating and air conditioning systems and controls, services, parts and supply. For more information, please visit trane.com or tranetechnologies.com.

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