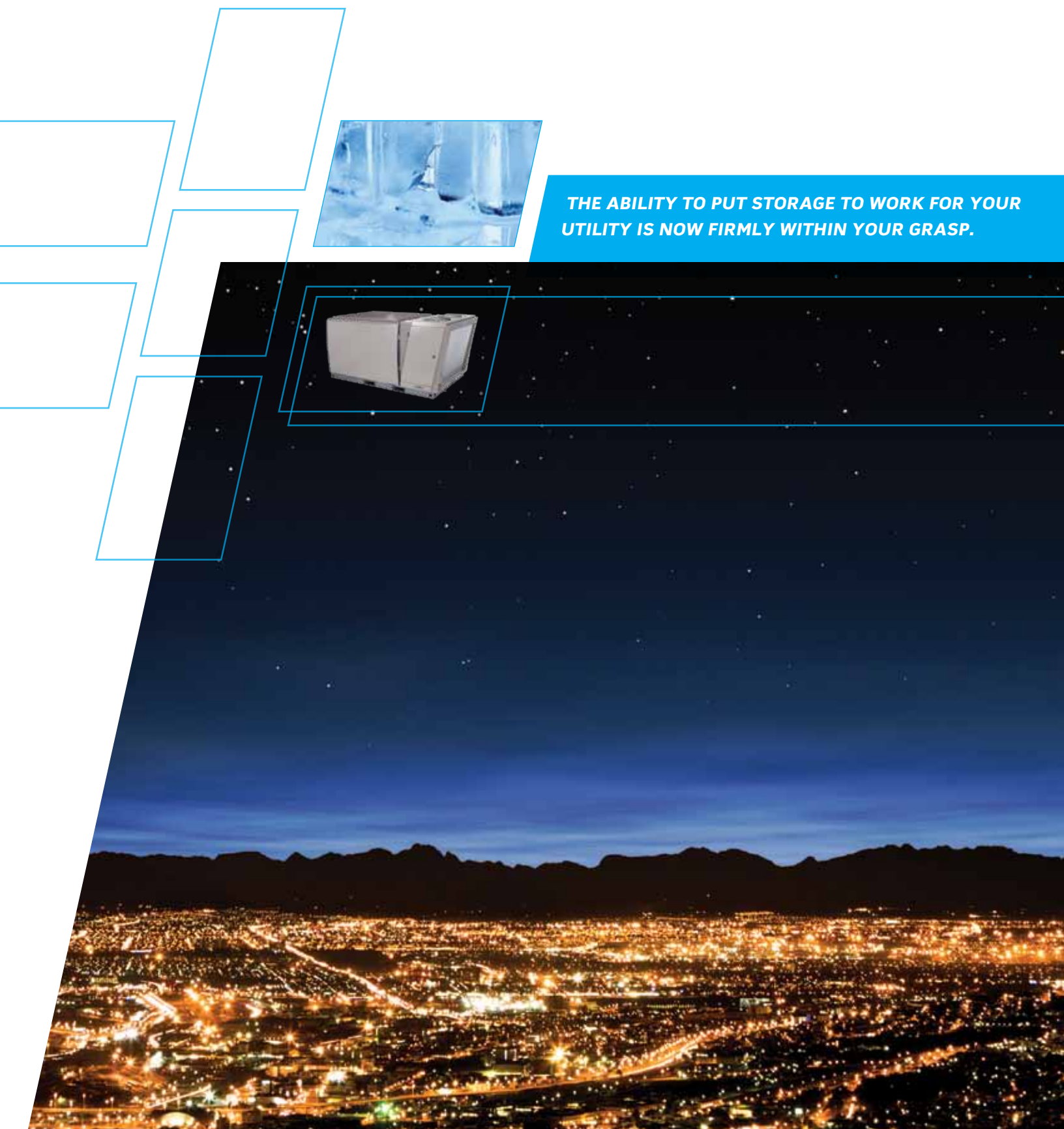




**THE ABILITY TO PUT STORAGE TO WORK FOR YOUR UTILITY IS NOW FIRMLY WITHIN YOUR GRASP.**

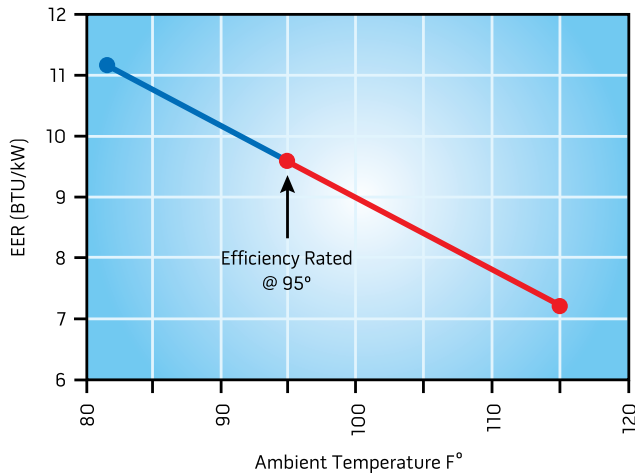


### Why thermal storage works.

As temperatures rise, the efficiency of the electrical grid – generation, transmission, distribution – decreases. The same holds true for mechanical systems. Our storage solution takes advantage of lower nighttime temperatures to produce and store cooling energy more efficiently.

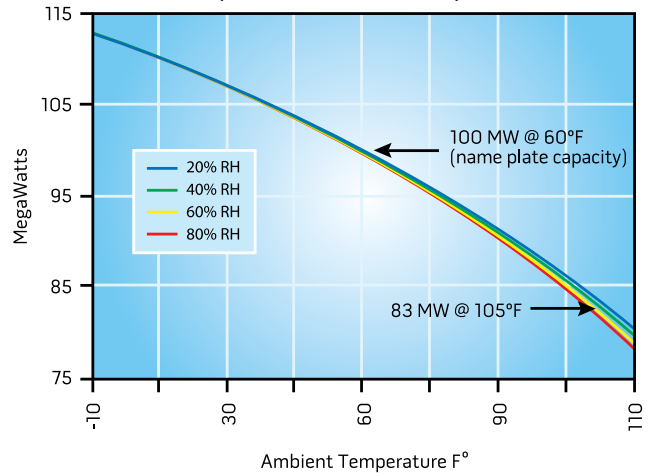
**SIMPLY, THE HOTTER IT GETS, THE GREATER THE BENEFIT.**

**HVAC Compressor Efficiency**  
Relative to Temperature

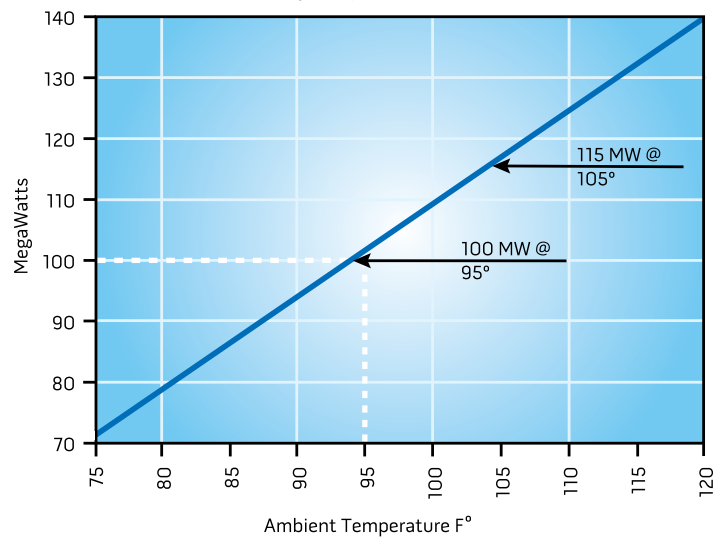


**Peaking Plant**

Output vs. Ambient Temperature



**100 MW Virtual Ice Storage Power Plant**  
Effective capacity delivered to the system



# ICE ENERGY:

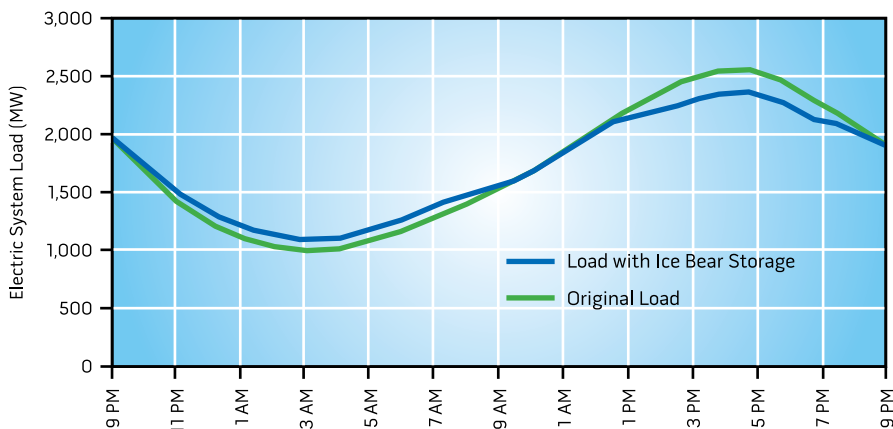
*the leading provider of distributed energy storage solutions to the utility industry.*

Ice Energy develops utility-scale, distributed energy storage solutions that are cost-effective and ready to deploy. Our system stores energy at night by freezing water in an insulated tank. During the day it works with the existing air-conditioning system to dispatch the stored energy, delivering cooling to the building, dramatically reducing the amount of electricity required on peak. During off-peak hours, the conventional HVAC system operates as usual.

When aggregated and deployed at scale, Ice Energy's Ice Bear® storage system represents a new, sustainable energy solution to meeting the challenge of peak demand. In the process, it improves energy system efficiency and reliability and enables the transition to a cleaner, smarter, more sustainable power grid.

**COLD HARD  
INESCAPABLE FACT:  
A/C ACCOUNTS FOR  
40-50%  
OF A BUILDING'S ELECTRICITY USE  
DURING PEAK HOURS.**

**Example: Electric Utility Load Profile - 200 MW Ice Bear Deployment**



*Ice Energy's technology helps reduce thermally-driven peak energy demand by shifting air-conditioning energy usage to off-peak. Storing energy at night – when electricity generation is cleaner, more efficient and less expensive – and delivering that energy during the peak of the day to provide cooling to the building, the Ice Bear can reduce daytime energy demand from air conditioning by as much as 95%.*

Ice Energy provides offset capacity (MWs) and offset energy (MWhs) to utilities for a contract term typically 20-25 years in length. Utilities in turn fund the purchase and installation of Ice Bear storage units directly at customer sites within their service territory. Your utility controls the operation of each storage resource while your customers maintain control of their comfort. These storage resources are then aggregated and managed by means of a real-time control network in support of your utility's business objectives.

Utilities benefit from a dispatchable, distributed resource that helps offset the need for peak generation, relieves transmission congestion, firms up renewable sources of energy and reduces emissions. Businesses and buildings where the Ice Bear units are installed benefit from lower daytime energy consumption, increased efficiency, lower energy costs, a smaller environmental footprint, and improved comfort for customers and employees.

## Breaking it down & adding it up: Appreciating the value of distributed energy storage.

The value of distributed energy storage is substantial, yet determining it requires more of utility resource planners than the traditional methods of modeling conventional power supply or demand-side resources. Whether performing a standard utility pro forma analysis or a regulatory Total Resource Cost (TRC) analysis, it's vital to consider a wide range of attributes when evaluating the Ice Bear system.

**These include:**



### Ice Bear Energy Storage System Electric Utility Modeling Guide



Available for download at [ice-energy.com](http://ice-energy.com), the Modeling Guide is designed to assist utility planners and analysts in

determining how to account for Ice Bear-equipped facilities within conventional planning processes.

#### Value of Avoided Capacity

By reducing electric system peak demands, future capacity requirements for the utility are reduced at significant cost savings to the utility through avoidance of generating unit additions or purchased power.

#### Avoided Energy Production Costs

A fleet of Ice Bear units operating within an electric system will produce measurable impacts on the electric utility load shape, clipping peak period loads, filling off-peak valleys and resulting in savings in electric system operating costs.

#### Reduced Losses

Electric system losses are higher during peak load periods and are lower during low periods. The Ice Bear system counteracts this effect by reducing energy requirements during high-loss, on-peak periods and using energy during low-loss, off-peak periods, with the net effect being a reduction in total electric system losses.

#### Performance under Peak Conditions

A unique attribute of the Ice Bear system is its ability to assure demand reductions under high temperature conditions. In fact the capacity of the Ice Bear actually increases with ambient temperature.

#### Transmission & Distribution System Impacts

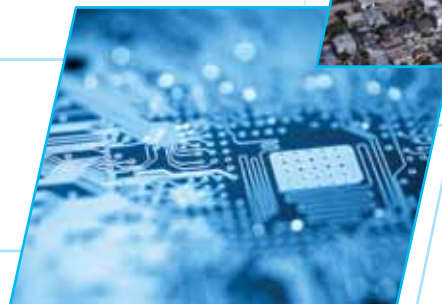
Increasingly, avoided transmission and distribution upgrades can be significant, especially for electric systems facing major constraints on the electric grid. The Ice Bear system provides value by avoiding transmission and distribution system capital and operating costs.

#### Ancillary Services

The Ice Bear system will reduce ancillary service requirements of the electric utility or balancing authority, improving electric system power factor and in turn reducing reactive power requirements.

#### Market Transactions

During peak periods, the Ice Bear system will either reduce the quantity of high-priced market purchases the utility must make, or free up utility resources that can be then sold at a profit in the market.





**Ice Bear System Highlights:**

*Ice Bears represent a reliable solution for distribution system planners:*

*6 million+ hours of field operation throughout North America*

*Works with commercial packaged HVAC systems to reduce peak demand*

*Provides cooling for 6 – 8 hours*

**Each Ice Bear Unit:**

*Shifts up to 50 kWh (95% of A/C energy) to off-peak, every day*

*Reduces up to 8.5 kW of on-peak demand*

*Shifts up to 8MWH annually*

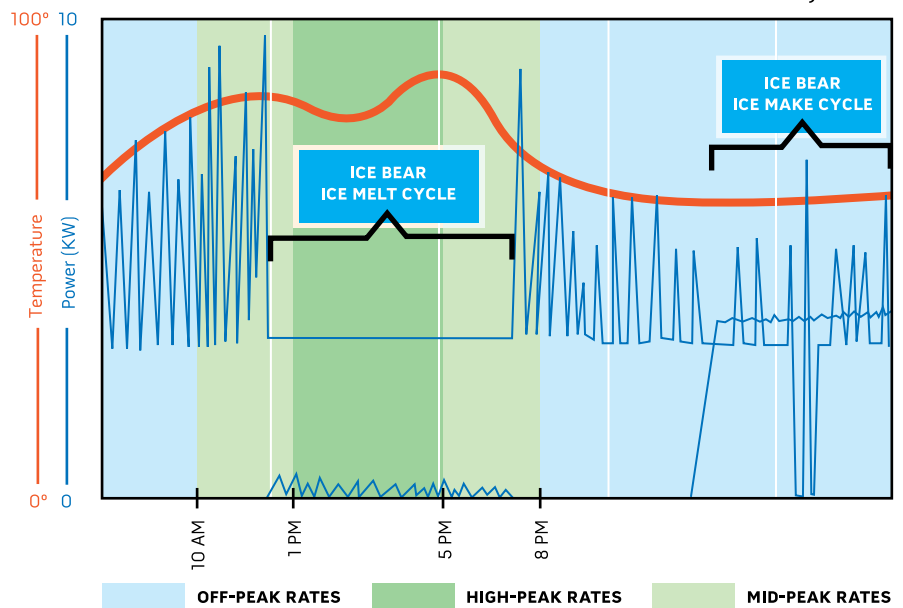
*Runs autonomously or can be remotely dispatched*

*No reduction in customer comfort*

**Bears on Duty:  
Ice Bear Distributed Energy Storage**

The Ice Bear system works with commercial rooftop air-conditioning systems, specifically those refrigerant-based systems common to most small to mid-sized commercial buildings. It enables a powerful change in how — and more importantly when — energy is consumed for air conditioning.

**Ice Bear Peak Demand Reduction - Ice Make / Ice Melt - 24 Hour Cycle**





### *The Ice Energy advantage.*

While your utility manages the resource, your customers maintain complete control of their comfort. This is due in large part to the technology behind the Ice Bear.

### *The anatomy of the network.*

Control of the system is managed across the CoolData® network through an advanced Smart Grid system architecture utilizing a sophisticated, web-based remote terminal unit (RTU), a data-logging control system (a SCADA system architecture), and OSIsoft's secure PI System® real-time data management infrastructure.

### *Your utility controls it all.*

The CoolData Controller delivers real-time measurement, verification and reporting of Ice Bear performance in the field, enabling integration of aggregated storage resources directly into utility operations for optimal dispatch and control.



### *A view to performance: Real-time measurement, verification and reporting of distributed resources.*

With a simplified online interface and flexible navigation pane, Ice Energy's Utility Dashboard gives utility operators instant access to cumulative system and real-time performance data from aggregated and individual Ice Bear units gathered by the CoolData Controller. Utility operators can verify peak demand reduction and energy shift performance via a secure, real-time web portal and view results for days, weeks or months – or custom-defined time periods. Control strategies can be applied to one, all, or any subset of storage devices. Schedule changes can be made on-the-fly in response to changing system conditions, or simply set and consistently maintained per schedule.



**ICE ENERGY®**



**TO LEARN MORE, VISIT US  
AT [ICE-ENERGY.COM](http://ICE-ENERGY.COM) OR CALL  
970-545-3630.**

***Field-proven utility-scale distributed generation. Just add Ice.***

***The benefits just keep adding up.***

Ice Energy's distributed storage solution delivers significant benefits across the entire utility value chain. Simply shifting energy consumption from daytime to nighttime helps lower costs for everyone. Reducing peak demand

increases resource utilization, improves reliability and helps defer or avoid transmission and distribution system investments. At the same time, Ice Energy's distributed storage solution firms up intermittent renewable energy sources.

More broadly, widespread deployment and installation of Ice Energy's Ice

Bears promotes job creation and energy efficiency – and aligns seamlessly with any other initiatives your utility may be considering.

***Ice Energy is ready now to deliver on the promise of cost-effective, grid-scale energy storage. To learn more, visit us at [ice-energy.com](http://ice-energy.com) or call 970-545-3630.***

[ICE-ENERGY.COM](http://ICE-ENERGY.COM)



**ICE ENERGY®**

*INTELLIGENT STORAGE AT WORK.™*

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