ICE ENERGY

Intelligent Distributed Energy Storage.

Proven, Reliable, Safe

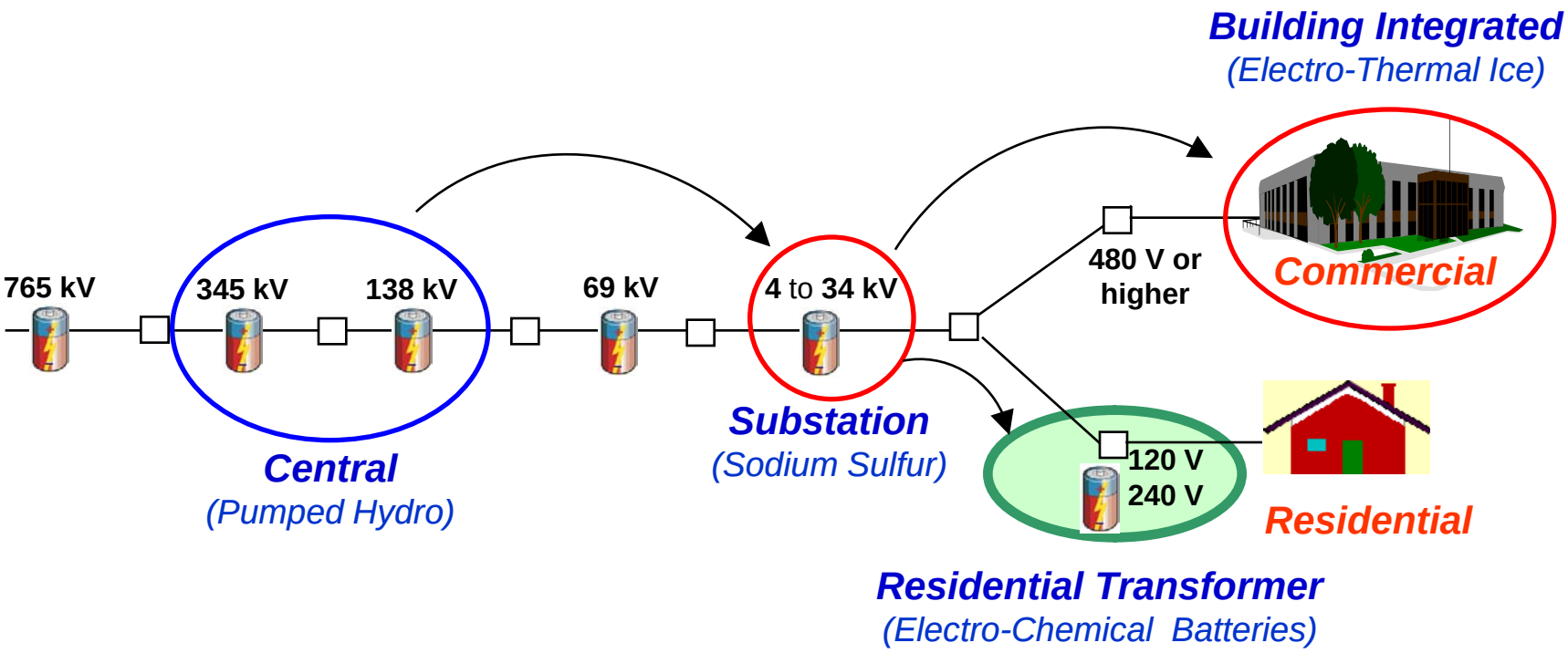
- Manufactured in Hammondsport, New York
- Over 5 million hours of reliable operation in the field with M&V
- Hundreds of successful installations
- Thousands of units under contract
- Tested by dozens of utilities
- No inverter, interconnection, chemicals, or fire hazard

Successful Utility Demonstration Projects	
American Electric Power	London Hydro (Ontario)
Anaheim Public Utilities	Los Angeles Department of Water and Power
Austin Energy	NV Energy
Azusa Light & Water	Ontario Power Authority
Burbank Power and Light	Pacific Gas & Electric
Burlington Hydro (Ontario)	Pasadena Water & Power
CPS San Antonio (in process)	Redding Electric Utility
City of Victorville Municipal Utilities	Riverside Public Utilities
Electric Power Board / TVA	Sacramento Municipal Utility District
Electric Power Research Institute	Sempra / San Diego Gas & Electric
First Energy (Ohio)	Southern California Edison
First Energy / Jersey Central Power & Light	Southern Company / Georgia Power
Fort Collins Light & Power	Tennessee Valley Authority
Glendale Water & Power	Toronto-Hydro (Ontario)
Hawaiian Electric Company	Veridian Connection (Ontario)
Imperial Irrigation District	Volunteer Energy Cooperative / TVA

Energy Storage Types

Ice Energy

Utility Peak Load Shifting



Commercial Ice Storage Options

Two types of Ice storage products are available today

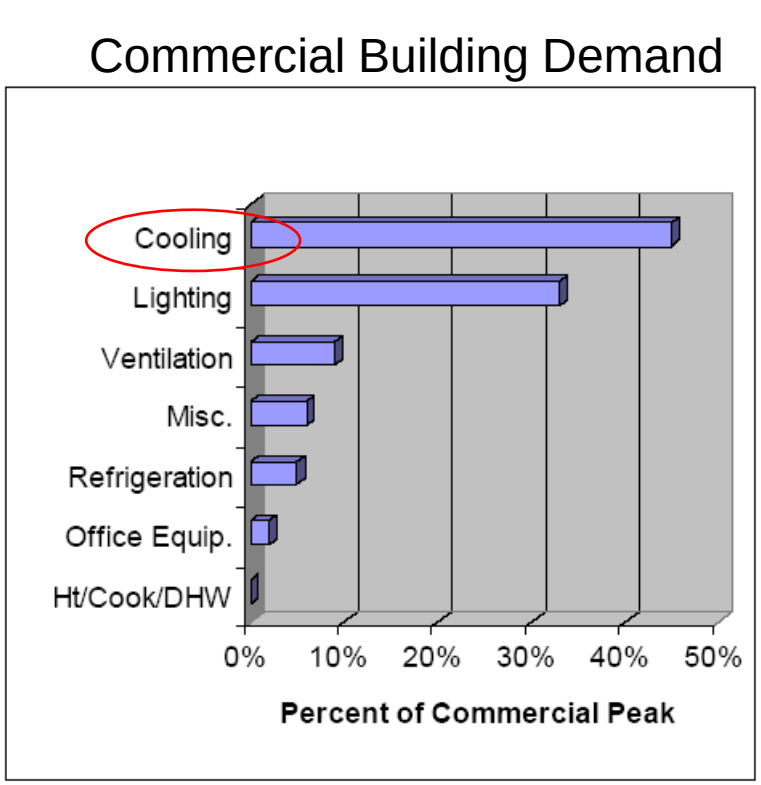
1. Designed for utilities to reduce 3 phase motor loads on a group of C&I loads on a feeder and offers SCADA and SmartGrid-enabled aggregation and **UTILITY CONTROLS** (Ice Bear)

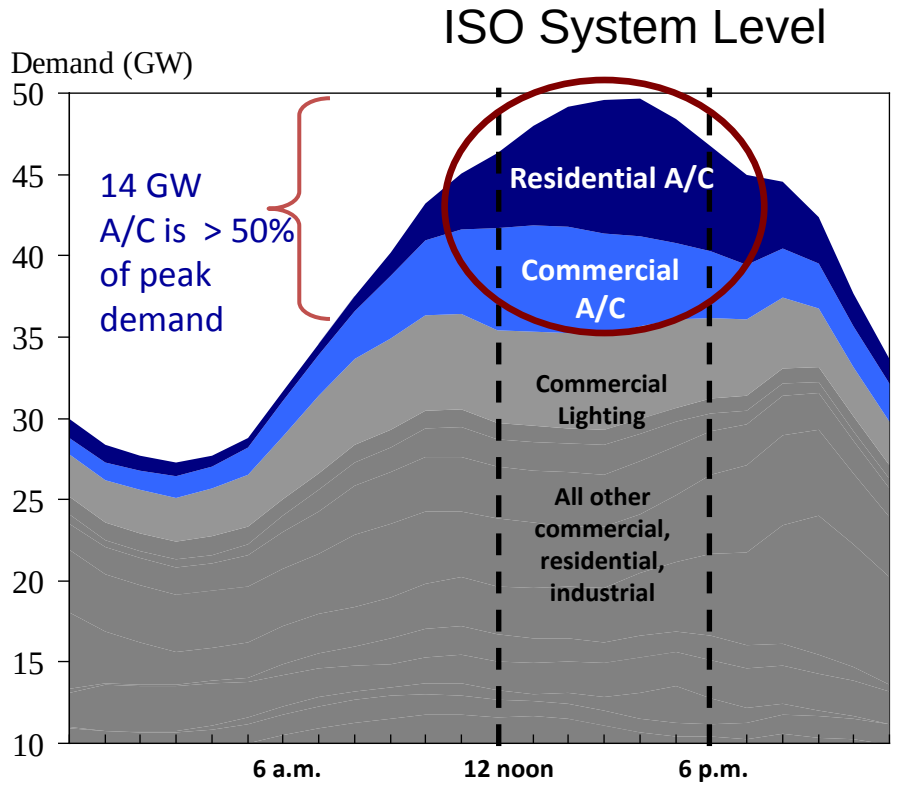
2. Designed for large consumers, like large buildings and city centers, and offers **LOCAL CONTROLS** to building owners (Calmac)

Southern California Public Power Authority
Member Utilities & Ice Energy
53 MW for 6 hours daily during summer peak
63 Gigawatt hours peak shift annually

Credit Suisse, NY - NYSERDA & CALMAC
1 MW, 2 Gigawatt hours peak shift annually

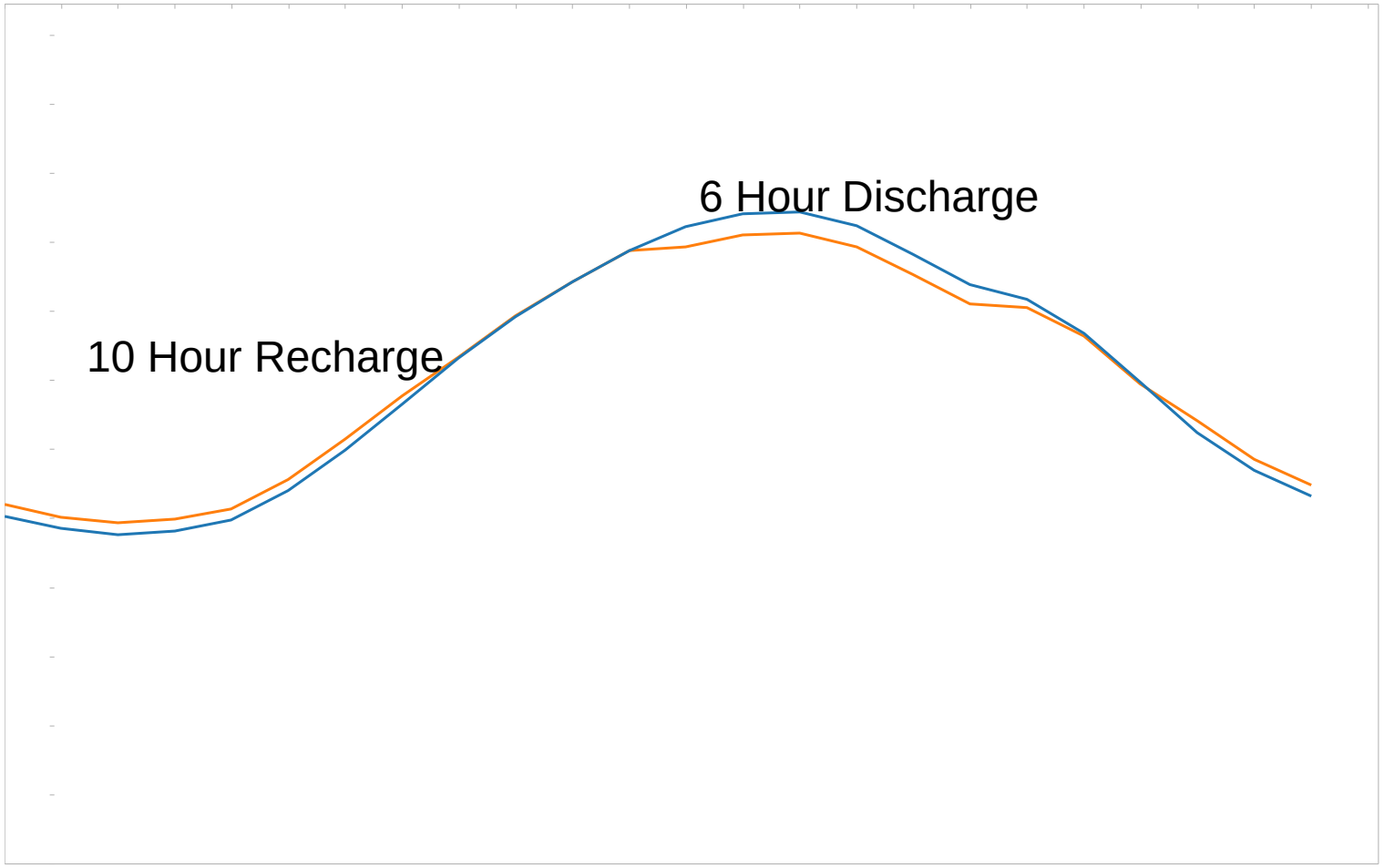
Commercial Building AC Drives Utility Peak Demand





- Cooling is becoming about ½ the commercial load
- Commercial A/C load extends beyond the utility peak period

Utility Controlled Distributed Energy Storage – 75 MW Ice Bear Storage



Ice Bear Storage System Specs

Proven Resource	5 + million field hours
Asset Life	25 years
Reliability Based on 200 days/year 16 hours/day	51,000 hours to first major maintenance, 16 years MTBF
Utility Risk	Lowest –no inverter, distributed
Environmental Risk	Lowest –water no HazMat
Peak Load Shifting	6 – 8 hours
Persistence	Capacity increases with temperature
Efficiency	100 % (85 + 15)
Control	Schedule and/or Dispatch
Cycling	Unlimited, full or partial
SmartGrid Enabled	Utility Aggregated Control
Customer Focus	Commercial & Industrial A/C
Application Focus	HVAC 5 Tons – 20 Tons
Measurement & Validation	Energy Shift, Demand, Availability

CoolData® - Distributed Intelligence and Aggregated Energy Storage

- RTU tightly integrated into the storage device
- Two way, closed loop control
- Local scheduling and remote dispatch
- Aggregated load control and optimization
- Direct load control for demand response of other building assets and AC cycling algorithms
- Real-time status, sub-metering, and data monitoring of customer equipment

OSIsoft.

- **OSIsoft, PI Enterprise Layer**
- **RS-485 Sensor Network**

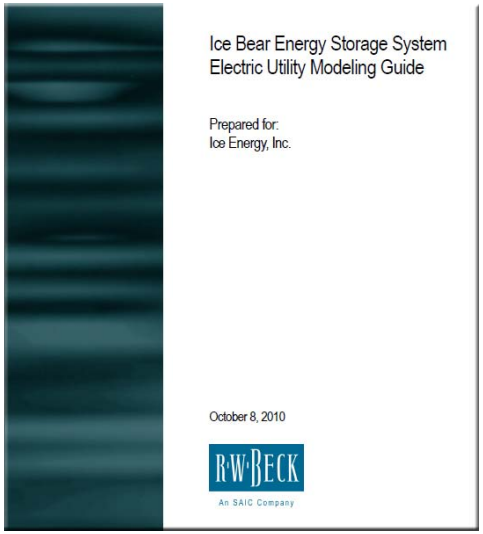
EnerNex SmartGrid Scorecard

- 90 of 100 highest score in the industry to date
- 10 for Impact, Scalability, Manageability, Interactivity
- 9 for Extensibility, Upgradeability, Standardization, Security

A Permanent Load Management Solution for Distribution System Planners

A fleet of Ice Bear units will eliminate 1,000's of 0.7 load factor, 3-Phase A/C inductive motor loads for 6 hours or longer daily.

- Avoided or Delayed T&D System Improvements
- Reduction in Reactive Power Requirements
- Improved System Power Factor & Voltage Support
- Increased System Power Transfer Capability
- Improved Daily Electric System Load Profile
- Avoided Electric System Marginal Losses
- Eliminates Fault Induced Delayed Voltage Recovery (AC Stalling)
- Credits for Improvements in System Efficiency
- Enabling of Building Integrated, Renewable Energy Only Resources



Ice Ready Rooftop Units Shipped Directly from Trane & Carrier

SUN + ICE – A Winning Combination