

Inventions & Innovation Project Abstract

Ice Bear™ - Thermal Energy Storage for the Small Packaged Terminal Air Conditioning Unit

Ice Energy's Ice Bear™ is an ice storage air conditioning module engineered to upgrade existing air-conditioning equipment into Thermal Energy Storage (TES) Systems. The Ice Bear™ is designed for use with five through twenty-ton capacity rooftop or split system air conditioning equipment. The Ice Bear™ and an air cooled condensing unit operate during off-peak hours to store energy as ice. During peak daytime cooling, the Ice Bear™ functions as the condenser, circulating ice-condensed refrigerant with a 100-watt refrigerant pump.

The Ice Bear™ is designed to meet retrofit, replacement, and new construction requirements in light commercial air conditioning and industrial process cooling. Capable of several different installation configurations, the Ice Bear™ can be used to expand an air conditioner's capacity, or perform two different energy conservation functions: load-shifting and load-leveling. Load-shifting provides the greatest demand reduction, typically reaching 90 percent. Load-leveling, sometimes called partial storage, typically provides 40 percent demand reduction during peak cooling periods and up to 90 percent during months with small cooling loads.

The Ice Bear™ consists of a heat exchanger made of helical copper coils placed inside an insulated polyethylene storage tank, an air pump to enhance the heat exchanger's heat transfer rate, a refrigerant pump, and an air cooled condensing unit. To provide air conditioning, the Ice Bear™ pumps refrigerant to an evaporator coil in an air handler. By using the condensing unit to produce ice during the night and the refrigerant pump to supply condensed liquid refrigerant to the evaporator coil during the day, the Ice Bear™ may be used effectively to transfer the majority of load requirements to nighttime hours or to level energy loads. In both of these applications, the Ice Bear™ also reduces humidity levels which aids in meeting indoor air quality standards.

The Ice Bear™ provides savings benefits through either a subsequent 30 percent energy savings realized by load-leveling applications or through a reduction in price/kWh in load-shifting applications where peak and off-peak price differentials exist.



Contact

*Ice Energy, LLC
2020 Lowe St.
Suite 201
Fort Collins, CO 80525*

*Contact: Chris Kay
Telephone: 970-223-6138
Email: ckay@ice-energy.com*



U.S. Department of Energy
Energy Efficiency and Renewable Energy