

## 6.2 MECHANICAL DEPTH: DESIGN GOALS

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The ice thermal storage with cold air distribution system was designed with the idea of the following goals:

- ❖ Reduce high demand costs
- ❖ Downsize the needed chiller capacity
- ❖ Increase chiller efficiency
- ❖ Reduce energy consumption
- ❖ Minimize first cost

- Reduce high demand costs

Typically, the main reason for adding thermal storage is to avoid or reduce high demand costs. In this case, it is also true, because of the location of the building, high demand charges are present. The use of thermal storage allowed for savings in demand costs by shifting the peak loads to off-peaks times.

- Downsize the needed chiller capacity and increase chiller efficiency

A common design standard in designing conventional systems is design for the peak load on design day. This often leads to oversized mechanical equipment and forces the equipment to operate more often at part load conditions which may occur only 1-2% of the year. This causes many systems to perform with less efficiency and thus, exceedingly waste energy. In providing thermal storage the chillers would be able to operate more often at the full rated capacity which would be the optimal efficiency and reduce wasting energy.

- Reduce Energy Consumption

As stated previously, incorporating cold air distribution would reduce the amount of air delivered to the spaces which would lead to smaller fans required. The reduction in fans is an example of how energy can be reduced. By having smaller fans less energy is needed which would save considerably in operating costs each year.

- Minimize first cost

In today's world many new building projects are "first cost" driven. Meaning owner's priority lies with saving money initially rather than annually with savings in operating costs. Therefore, in this design, first cost had to be taken into account. The addition of cold air distribution aided tremendously in minimizing and even reducing the first cost compared to a nonstorage system.