



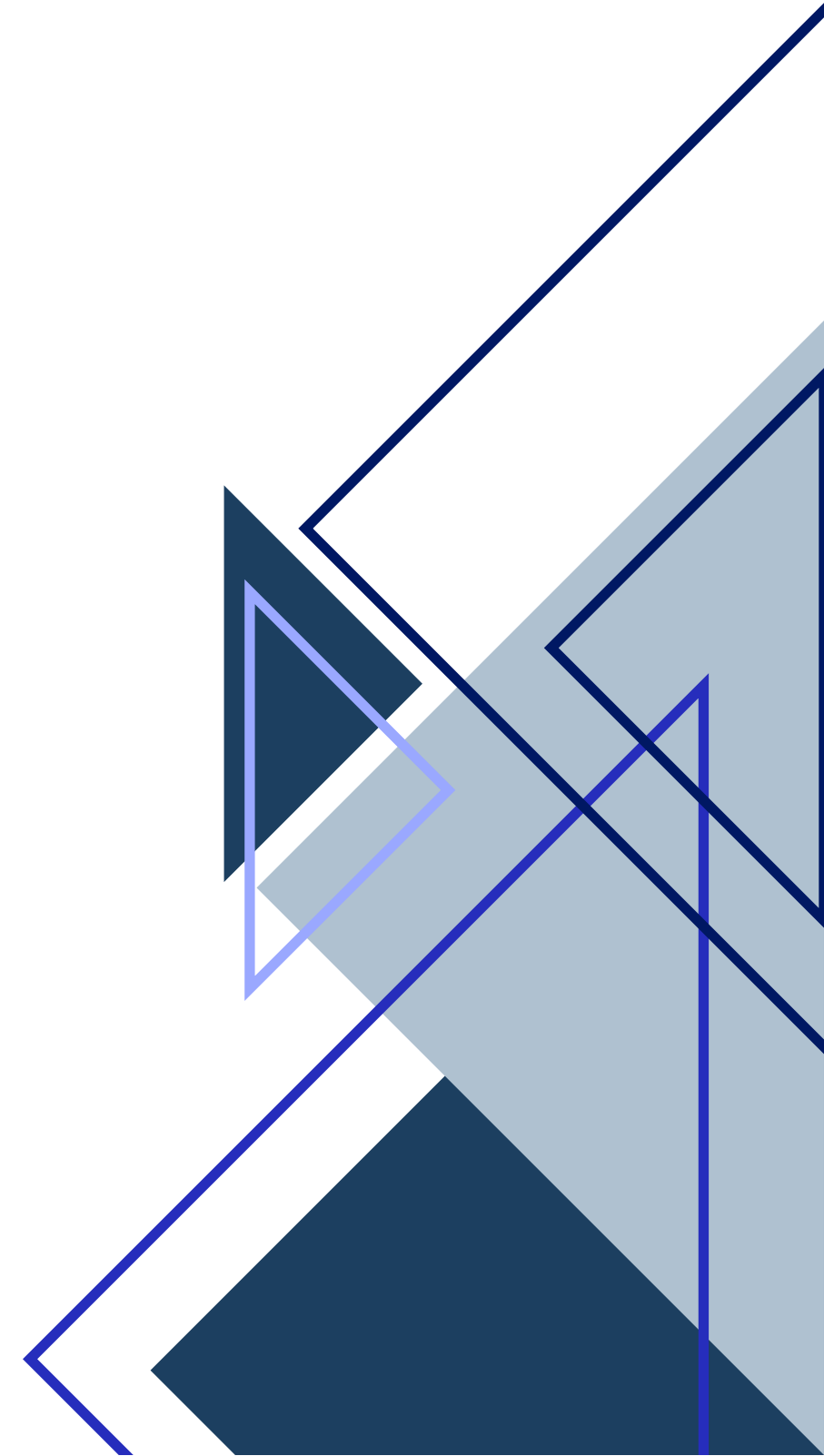
**TORONTO
STOCK
EXCHANGE**

Scope of Project



Install a Thermal Energy Storage System (TESS) to reduce the load on the HVAC system.

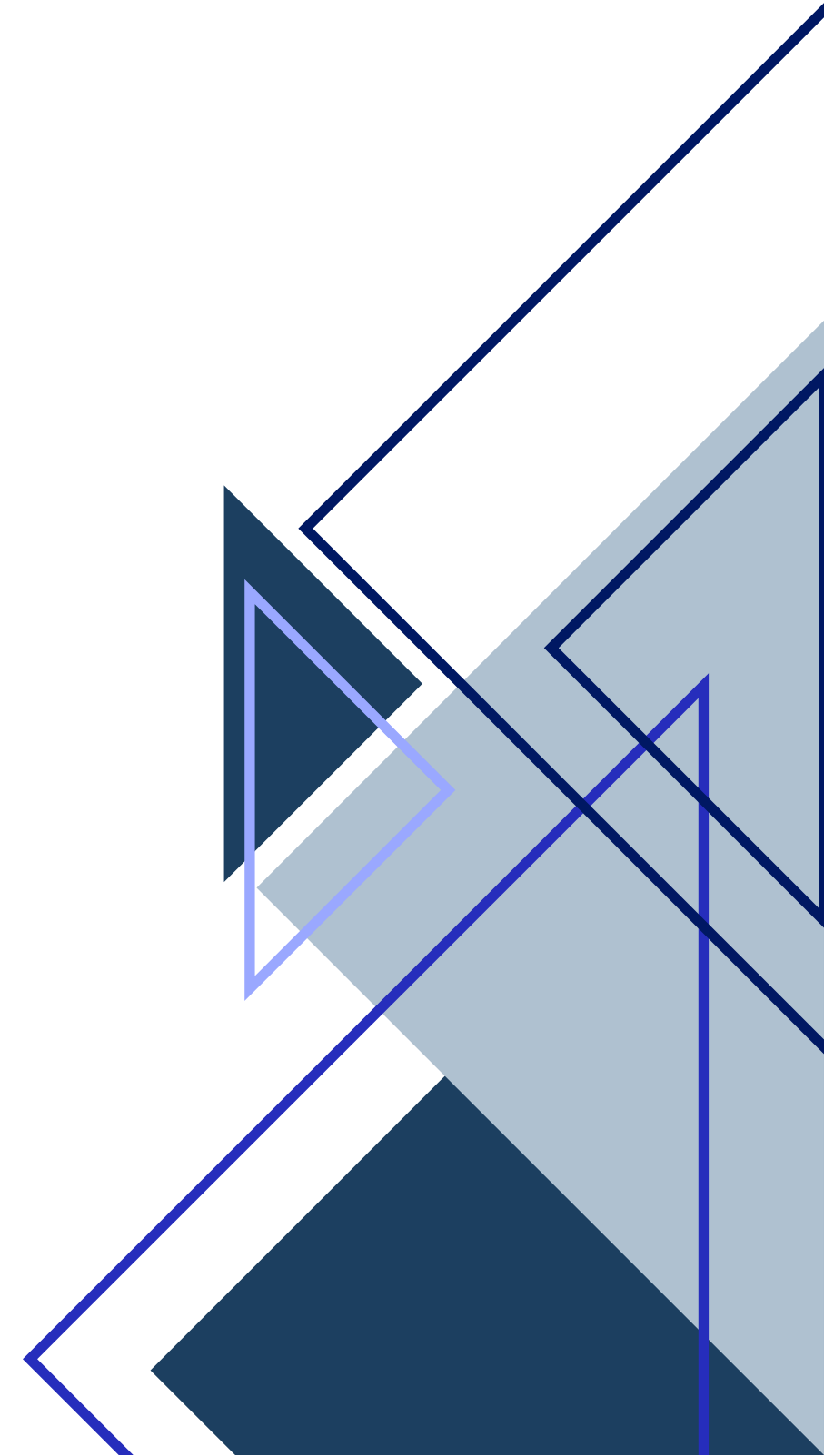
The current chiller plant generates chilled water for the computer room HVAC units, and heat is rejected outdoors through a cooling tower (Wasted Heat)



At TMX



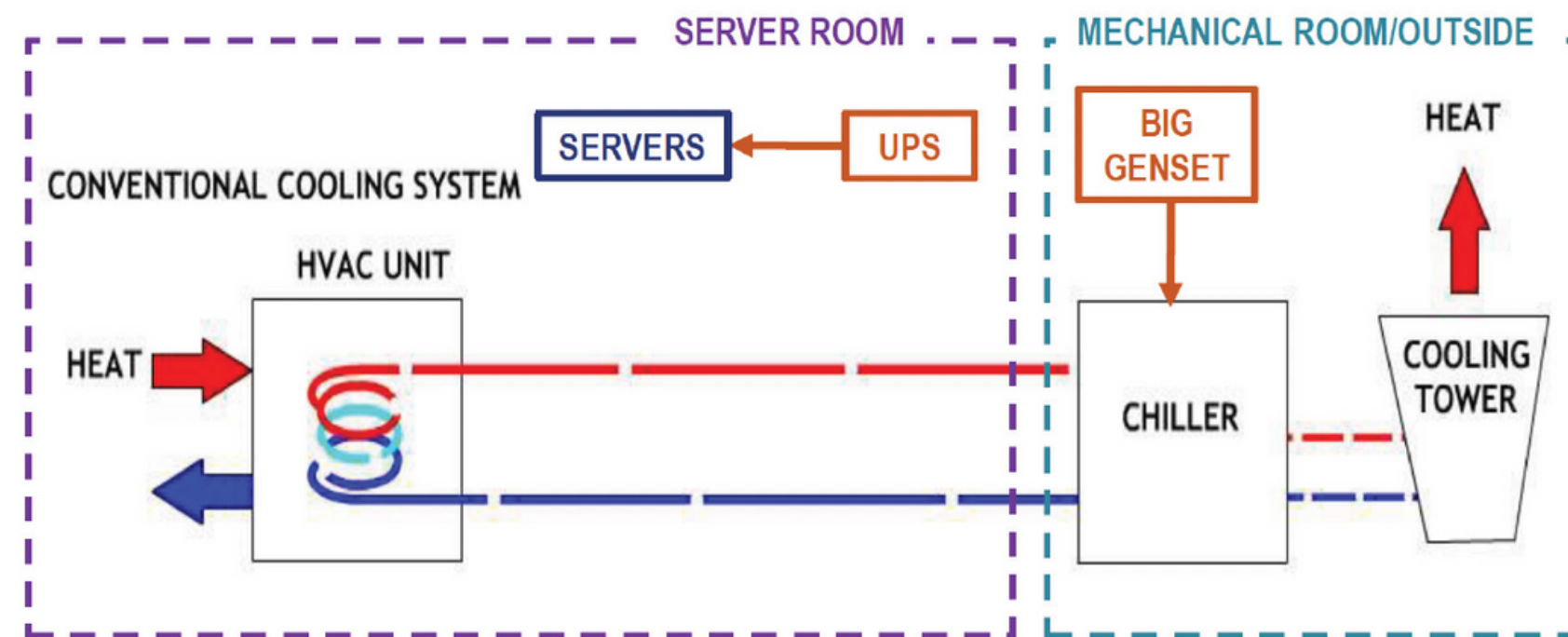
- 2 Large Data Centers
- 48-Story building, 1,076,690 sq. ft.
- 2,500 Tons of installed cooling (2 Chillers)
- 24/7 Critical operation



Before TESS



- The hotter the outside temperature, the harder the chiller and tower must work; the greater the load is on the electric grid
- The Chillers must account for all such extreme conditions
- The Variability in Cooling Load leads to partially-loaded, inefficient chiller operation



TESS Installed

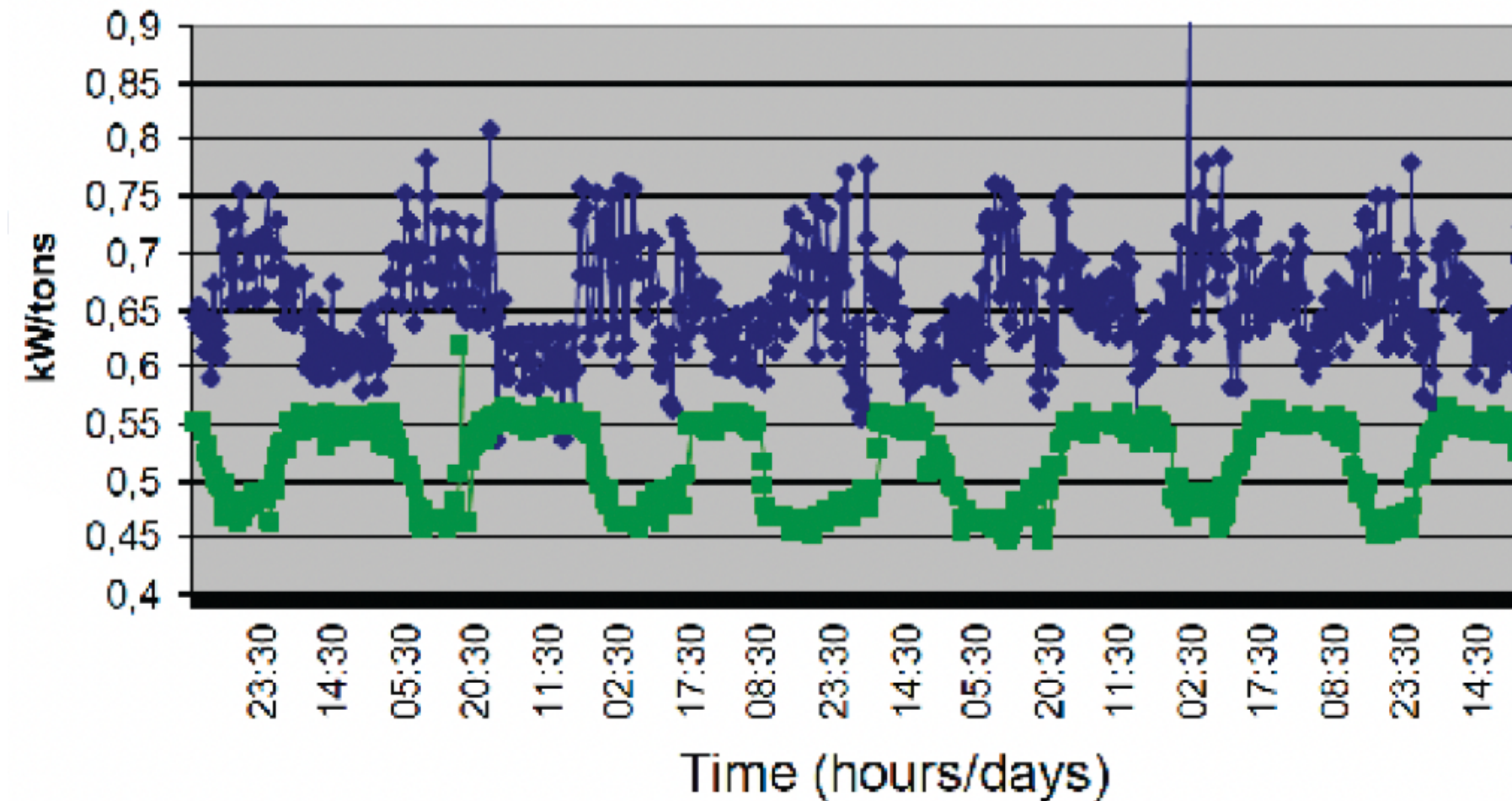


Chillers Efficiency

Before TESS
High fluctuations
Low Efficiency

With TESS
Reduced fluctuations
Increased Efficiency

27% improvement
on kW/ton

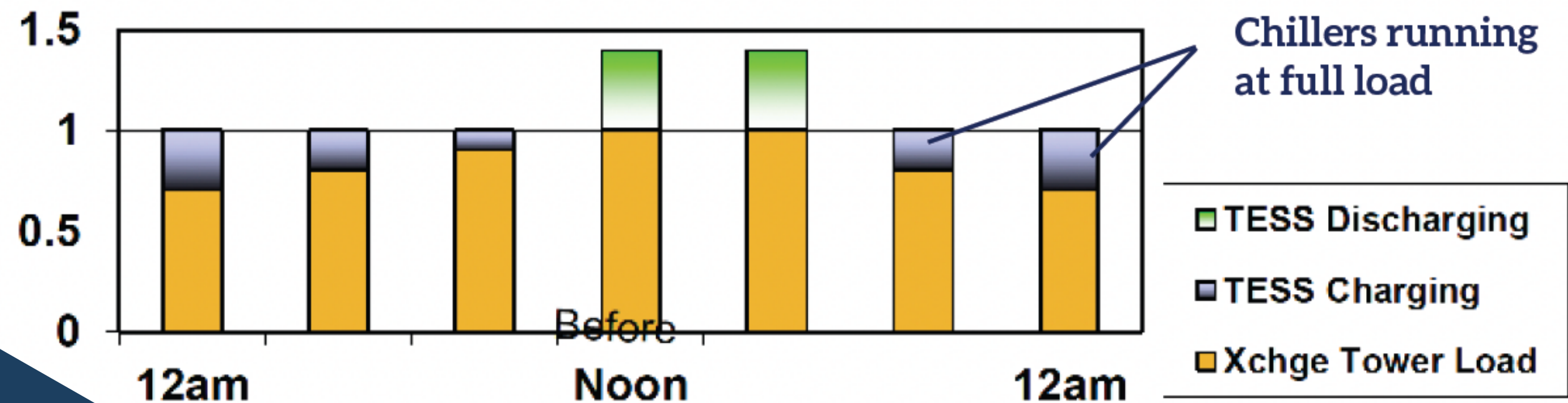


TESS acts as “shock absorber” in the chilled water loop

Load Leveling



The equipment runs at full capacity for 20 to 24 hours on the design day. The surplus energy is stored when the load is below the equipment output. The additional requirement is discharged from storage when the load exceeds the capacity. A load-leveling approach minimizes the required equipment, storage capacities, and GHG emissions.



Effects of TESS



- Reduced Stops/Starts, ramp up/down, & short cycles
- Peak shaving reduced by 800KW
- 3,800,000 KWh produced per year
- Extended life of HVAC units and Chillers
- CO2 reduced by 2,926 tons per year

