BuildingIQ

Building Energy Intelligence

Mount Pleasant Shopping Centre

CASE STUDY

The Mount Pleasant Shopping Centre is one of two major retail centers serving the city of Mackay, Queensland, located on the Corral Sea, 970 kilometers north of Brisbane, Australia. The climate is tropical to subtropical. The shopping center includes more than 65 retail stores, which together occupy some 23,000 square meters (approximately 247,570 sq. ft.) of commercial space. Three large retail establishments—Coles, Kmart, and Woolworths—as well as a large enclosed food court, anchor the complex. Pedestrian traffic flowing through the center averages 4 million person-trips per year.

THE CHALLENGE:

A hot, humid climate, aging buildings, relatively inefficient HVAC technology, and pre-existing relationships with data management vendors, posed the major technical hurdles when BuildingIQ was asked by Mount Pleasant's management to optimize HVAC operations at the center.

The overriding challenge was to establish a strong working relationship and technology buy-in by the owner and operator whereby BuildingIQ would connect indirectly with the Metering system through the SkyFoundry interface.

The HVAC system used by the shopping center employs direct expansion (DX) technology, which involves distributed cooling plants rather than central cooling with distributed air. DX systems are typically less efficient and less effective than centralized, chilled water (CHW) systems. As a result, operational improvements with DX technologies are much harder to come by and are typically much smaller than those possible with CHW systems.

THE SOLUTION:

Mount Pleasant's management chose BuildingIQ for its innovative energy efficiency and Predictive Energy Optimization™ (PEO) systems, and because the PEO model can engage seamlessly with virtually any building management system (BMS). The strategy for implementation employed by BuildingIQ was that of an individualized zone-temperature target system. The optimization sequence had to be varied throughout the center because of the heavy foot traffic and thermal loading in key areas, such as the food court, where comfort is a critical factor in the customer's dining experience, and where the allowable temperature band is relatively tight.

The BMS to which BuildingIQ's PEO was eventually linked to is an Airmaster system, using Tridium R2 at the front end. Although the initial interface took the better part of a year because of the interface creation with R2 version, early results have been encouraging, with savings up to 10%.

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Once the BMS interface was complete, BuildingIQ was able to tap into the historical metering database to begin charging the PEO model. The transitional learning phase accelerated, and within 2-3 weeks, the optimization procedures were initiated. Energy savings were immediate, positive and growing. Typically, the algorithms underlying optimization become more astute as the PEO model masters the thermal dynamics of the buildings.

THE RESULTS:

The central challenge of establishing a solid working relationship with the management of Mount Pleasant was successful, largely because of good will, team dedication, the successful integration of vendors, and the demonstration of immediate savings with the promise of greater rewards ahead.

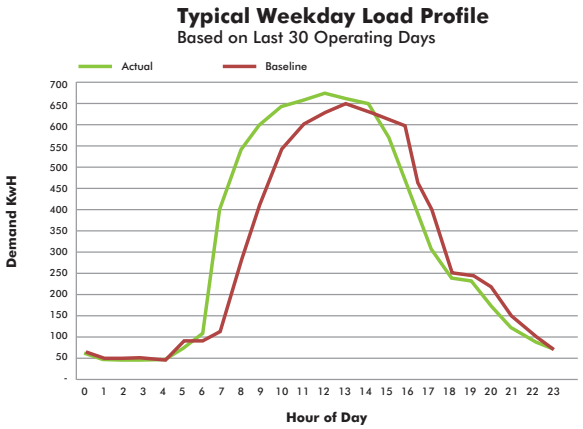
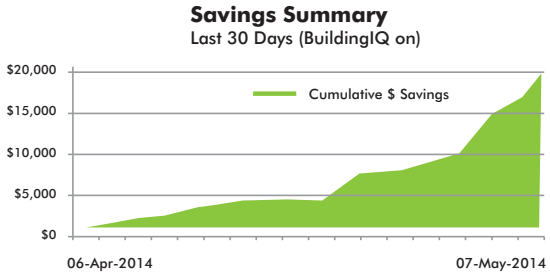


Figure 1—Typical Weekday Load Profile

Shows the alteration in typical weekday load profile for the shopping center. The PEO has shifted the profile slightly forward in time (about one hour) and reduced the peak demand by roughly 25 kW, or 4%. This is a daily average based on 30 days of operational data.

The implementation at Mount Pleasant was done in early 2014 and the first month's savings of 10% were considered extraordinary given the DX system. Savings will continue to grow as the PEO model selectively and progressively takes hold of the HVAC controls.



	Energy Usage/Area	Energy Usage/(kWh)
Baseline	7.75	186,117
Actual	6.95	166,792
Savings	0.81	19,325
Percentage	**10.38%**	**10.38%**

Figure 2—Savings Summary

Shows cumulative energy savings for the complex over the same 30-day operational period. Graphically, there is a noticeable acceleration in savings as the PEO model learns the thermal dynamics of the buildings. Total savings has been more than 10% in both energy usage terms (kWh) and in energy usage per square foot.

The energy savings shown in these two figures are calculated by analyzing the weather and energy data for a comparable period, a baseline, when the BuildingIQ system is not in use (or prior to installation). The analysis of the daily load profile allows for the effects of changing occupancy and temperature to predict usage if the BuildingIQ system was not operating.

About BuildingIQ

BuildingIQ is a leading energy management software company with a mission to redefine and enhance the way energy is managed in commercial buildings. BuildingIQ's unique, patent-pending Predictive Energy Optimization™ technology is the foundation for reducing energy cost and consumption. It is designed to help building owners, managers and tenants get more value out of their existing energy systems. BuildingIQ has leveraged over 25 man-years of building controls, modeling and comfort research by world-leading experts at CSIRO, Australia's national labs, and BuildingIQ to create this innovative platform in energy intelligence. The company has been honored as Winner of the AIRAH Award for Excellence in Innovation, Tech23's Greatest Potential Award, ED+C and Sustainable Facility's Readers' Choice Award and Red Herring's Asia 100 Award.

Predictive Energy Optimization

The BuildingIQ system is the only energy management system that predicts energy demand and directly adjusts the HVAC system parameters in real time to optimize energy use. BuildingIQ communicates with your BMS—factoring in weather forecasts, occupant comfort, peak demand, and demand response signals—in order to automatically reduce energy consumption, cost, and emissions while maintaining or improving tenant comfort.

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1065 East Hillsdale Blvd., Suite 310
Foster City, CA 94404 USA
www.buildingiq.com
biq-sales@buildingiq.com

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