

Melbourne Airport Smart Energy Analysis

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Background

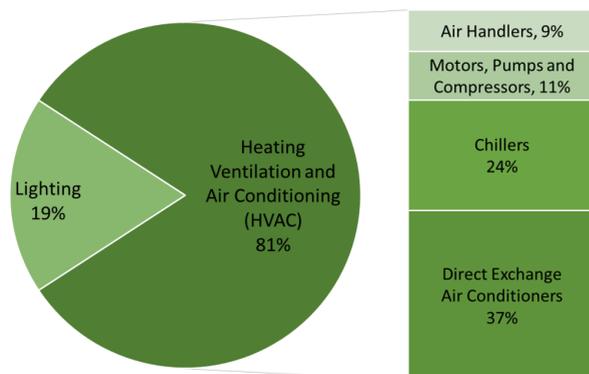
In the last decade there has been a massive push for making airport facilities more sustainable and energy efficient. These measures serve as an investment to cut carbon footprints as well as wasted energy, which is monetarily profitable for airports.

Several improvements that have been implemented at other airports are becoming economically viable for smaller facilities like the Melbourne International Airport (MLB). MLB was originally built in 1933, with the current terminal building being constructed in 1983. The last remodel to MLB was in 2004 and since then the airport has experienced hurricanes, local area development, and other standard wear.

Approach

To determine the existing energy breakdown of the facility, all loads were catalogued. From here, the largest loads were examined to find energy saving techniques. Estimates were collected from contractors or suppliers to calculate a return on investment for each improvement. Various renewable energy sources were also examined to determine what could be the most efficient for a Florida airport.

Energy Distribution



Estimated Energy Loads at the Main Terminal

Recommended Improvements

- Switch to LED bulbs – Replace mercury vapor bulbs with higher efficiency LED's
- Design a more efficient lighting schedule – Turn lights partially or completely off during strategic time periods
- Install a building management system – Install a system to control various functions, including light and HVAC schedules and repair notices
- Design a more efficient air conditioning schedule – Establish an operating hours and off hours set point and control chiller work based on these temperatures
- Install occupancy sensors – In areas of low traffic, install occupancy sensors to automatically turn off lights
- Implement mechanical systems upgrades and repairs – Replace or fix various systems that have decayed or become outdated
- Use low emissivity window film – Lower heat flux through the windows and reduce chiller load
- Reduce reliance on grid power through alternative energy sources – Implement renewable energy programs to lower grid power demand

Motivation

The Melbourne Airport recognizes the need for updated operation practices. The most recent remodel that the airport has undergone was more than ten years ago. The lighting schedule through the airport can benefit from recent innovations, new bulb technology, and a reduction in redundant lighting. The air conditioning at the airport has undergone heavy use, with major components of the ventilation nearing the final stages of their lives, but no end-of-life plans are in place. There is currently no formal maintenance schedule to keep the ventilation machinery in optimal working order, and the lack of a programmable thermostat leads to unnecessarily long operational hours for the facility's chillers.

Project Outcomes

The goals of this project were to reduce energy consumption from the power grid by 25%, select an intelligent management system for the facility, and to determine appropriate renewable energy resources for the main terminal building of the Melbourne International Airport.

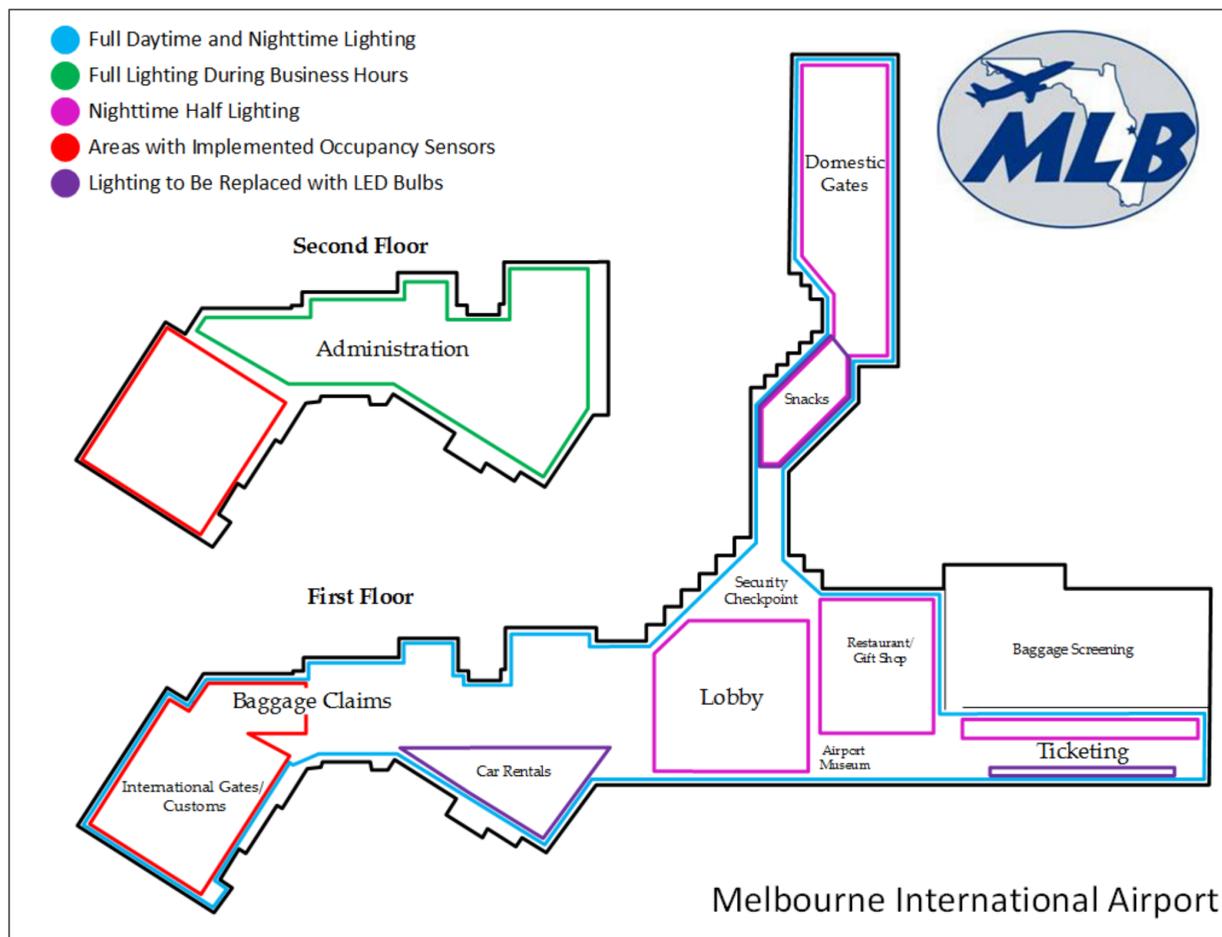
Acknowledgements

MLB Maintenance and Operational Staff and BRPH Architectural Firm

Monthly Energy Bills



Energy Bills Provided by the MLB Administration



Proposed Lighting Changes for the Melbourne International Airport

NORTHROP GRUMMAN



Engineering & Science
Student Design Showcase
at Florida Institute of Technology

