Building and Plant Energy Analysis Report

Monday, October 31, 2005

Executive Summary

This report develops a detailed energy analysis of the Hilton Hotel at BWI Airport. Several different approaches to examining the buildings energy compliance are employed.

The U.S. Green Building Council's LEED for New Construction checklist is used to look at all aspects of the hotel building and site, not just the mechanical systems. Although the Hilton Hotel was not originally designed to have a LEED rating, it would be possible to obtain enough points for the building to be LEED Certified.

ASHRAE Standard 90.1-2004 is another non-mechanical energy performance baseline for the building envelope and lighting systems for the hotel. Section 5 of the Standard sets guidelines for measuring the thermal performance of the building envelope, and it applies the Prescriptive Building Envelope Option to determine compliance. It was found that the roofs, walls, and doors all met the criteria, but the floors did not comply. The Space-by-Space Method is described in Section 9 to measure the performance of the building's lighting systems. After running the calculations, most of the spaces in the Hilton Hotel meet the requirements in Standard 90.1.

The total amount of lost rentable space was determined to be almost 5% of the total building floor area. When other support spaces are included, the lost rentable space is more than 7% of the total area. The mechanical system first cost was calculated next. At a total cost of almost $6.5 million, this equates to $23.69 per square foot.

Carrier's Hourly Analysis Program (HAP) was used to calculate the design load and perform an energy analysis on the Hilton Hotel at BWI Airport. HAP also determined the yearly energy utilization data. Annual energy consumption and operating costs were found using the simulation program, as well.

Finally, an emissions analysis was performed on the hotel with its large yearly consumption of electric and natural gas power resources. The quantities of pollutants of carbon dioxide, SOx, NOx, and particulates are calculated using HAP and an emissions estimate associated with on-site electricity use.