

Executive Summary

Technical Report 2 is an analysis of the DASCO Medical Office Building and plant energy usage. It is a goal of this report to model the HVAC systems in the building using an energy model program. Carrier's Hourly Analysis Program (HAP) was the program used to model the DASCO building. Also, as part of this report, the United States Green Building Council's Leadership in Energy and Environmental Design (LEED) building performance rating system was used to determine the sustainability and green design aspects of this building. LEED for New Construction Version 2.2 was the checklist used to evaluate this project.

It is also important, when analyzing a building's energy consumption, to check the compliance with ASHRAE Standard 90.1. The latest version of this standard was released in 2004, and details the energy standard for buildings. ASHRAE lists guidelines for compliance for building envelope, HVAC systems, service water heating, power, lighting, and other equipment. Included in this report are details on the mechanical system first cost and lost rentable space due to the mechanical system.

A large portion of this assignment is found in the design load estimation and the annual energy consumption and operating costs sections. In order to determine the HAP results needed to assess the design load and energy consumption, a computer model was generated. HAP combines each room square footage, occupancy, equipment loads, and exposure to determine the cooling and heating requirements of the system equipment. The output sizing data from HAP was checked against the actual design specifications for each air handler. HAP is also able to generate operating costs and energy consumption based on utility data which was taken from the Baltimore Gas and Electric website.

Based on the results of this report, certain parts of the building mechanical equipment are not in compliance with ASHRAE Standard 90.1-2004. Also, the DASCO Medical Office Building, based on assumptions made in this report would not achieve LEED certification. Design load estimation, annual energy consumption, and operating cost data are as accurate as HAP is able to produce results based on user input values for utility costs, scheduling profiles, and internal building equipment loads. Each air handler was selected to have extra cooling capacity. This is because the units were selected for the design of the shell and core of the building and no fit-out or occupancy data, which would breakdown each space, was available to the engineers.