

Executive Summary

The content of this report includes a summary of the mechanical system, by the design requirements, external influences, and the various components used throughout the system. An overall evaluation of the system is provided along with the operation of the building.

The mechanical system does use sustainable ideas and energy consumption reduction as a basis for the initial design approach. The building does implement 5 VAV AHU's, 3 of which are 100 percent outdoor air, and the other 2 are standard VAV systems that use an economizer with CO2 measurement controlling the damper for outside air. The Grunenwald Science and Technology Building uses (2) 250 ton centrifugal chillers which are water cooled by 2 cooling towers. Hot water is produced by passing the campus generated steam through a plate and frame heat exchanger with water, and the water is used in the pre-heating and heating coils of the AHU's.

The sustainable design approach can be seen in the energy efficient equipment used for the building. The energy reduction was calculated to be 40 percent better than the baseline building when analyzed for the LEED credit. The designers were able to meet many of the LEED credits associated with the mechanical system in the following two sections; Energy and Atmosphere and Indoor Environmental Quality. A grant from the government allowed for the use of a micro turbine to produce on-site energy powered by natural gas. The micro turbine does not only produce electricity but the heat produced is used to precondition outdoor air. The designers did use rooftop photovoltaic panels that produce on-site electricity as well, but not enough to earn LEED points.

The overall cost of the mechanical system was \$6.25 million, while the total construction cost was \$34 million. The operational cost of the building was calculated to be \$1.43/sf, which is relatively low for this type of building. With the use to the VAV systems which have become standard in office buildings the maintenance costs should be low with building engineers knowing how to work with these systems.