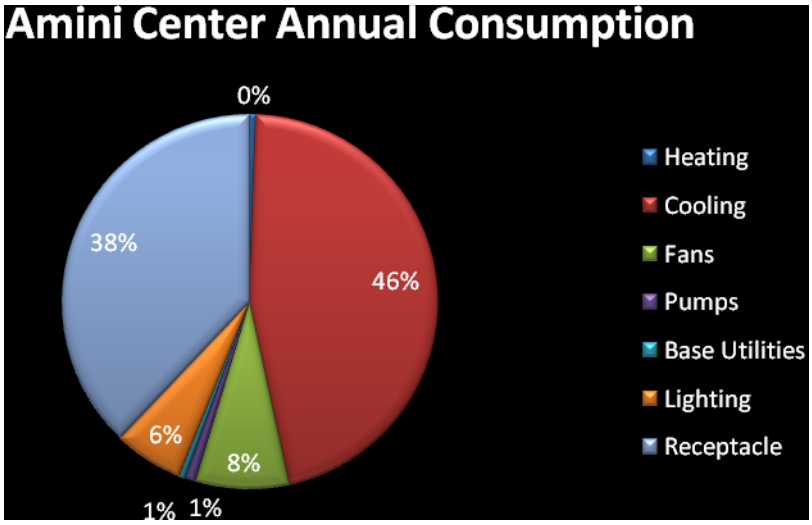
Executive Summary

Many factors and assumptions are taken into account when trying to determine the cooling load needed for a room or building. Some factors include climate data, envelope loads, internal loads, and ventilation air loads. To accurately estimate the loads of an entire building would take an engineer hours to calculate by hand. Due to advancements in technology, computer programs exist to help an engineer calculate cooling capacities much quicker. One particular program, TraneTrace 700, was used for the first part of this report to simulate the load needed to cool the Amini Medical Center.

After inputting the building envelope, people, lighting, plug load, and climate data for the Amini Center, based on the construction documents, the program then calculated the cooling capacities I would expect to see for this building. This particular simulation involved only 35,000 ft^2 of the center due to empty shell plans for the entire third floor. The simulation looked at two units serving lab areas on the first floor and another unit serving administrative and office areas on the remaining first floor and second floor. Overall for the space, the cooling capacity for the lab areas ranged from 115 - 190 ft^2/ton, while the office area unit saw about 471 ft^2/ton. This difference in capacity makes sense in this building because the lab spaces see a much higher internal load due to the many pieces of equipment contained in them.

The second part of this report investigates the energy consumption and cost associated with running the Amini Medical Center for one calendar year. To aid in estimating the consumption and cost to run this facility, the TraneTrace 700 program required more input.

To try and accurately model the space, schedules were created to simulate occupancy, lighting, equipment, ventilation, utility rate schedules, and other factors that have an effect on energy consumption and cost. After plants were created and all schedules were assigned, the program simulated the equipment consumption and produced the dollar figure it would cost to run this facility based on the inputs. For my simulation the energy consumption broke down as follows:



Total cost to run this facility was calculated to be $113,208 per year which ends up being $3.26/$ft^2$.

For the overall experience of using Energy Models, I believe they can be very beneficial tools to help produce information in a short amount of time. Due to the amount of input needed to

generate results, errors seem easy to come by. I don't believe they are good tools for estimating a building's electric bill due to the many assumptions that have to be made. Because this was a fast paced model simulation, I don't believe I spent enough time to develop a truly accurate figures. The values generated, however, do provide much insight into the building and how it will function.