Window Treatment and Energy Efficiency in McGuinn Hall
Jennifer Crino, Sam Malloy, Will Minor, Cam Stoker

McGuinn Hall, originally constructed in 1968, poses a number of energy efficiency challenges due to its unique design and overall structure. McGuinn Hall is a particularly interesting environmental case because of the large number of windows the building possesses. Out of date single-paned windows make up the majority of the façade of the structure, and these windows allow for an easy transfer of hot and cold air from the outdoor atmosphere into the interior of the building. As a result, McGuinn suffers from high heating and cooling costs and wastes an excessive amount of energy. In response to this, our group examined McGuinn’s current energy expenditures and focused on three different types of weatherization projects and cost-benefit analyses of these alternative methods.

Methods
We started out our project by reaching out to John MacDonald, Energy manager at BC. Mr. MacDonald gave us the energy usage and cost for McGuinn Hall on a monthly and yearly basis. From there we decided to look at three ways to reduce energy costs in the building through window improvements: applying an energy saving film to the windows, installing new, double panned windows, and behavioral changes for the building’s occupants.

Energy saving window film typically consists of a thin polyester film substrate that has a micro-thin, transparent metal coating applied to one side. Energy saving film rejects solar heat effectively by rejecting a greater portion of the sun’s heat than tinted or heat absorbing glass, rejecting up to 84% of solar heat gain. Window tinting can help reduce a building’s energy costs by 5-15% and cut solar heat gain up to 75%, costing about $3.00 per square foot.

The total yearly energy cost for running McGuinn Hall comes out to $153,267 per year!

Glass itself is a poor insulating material, which makes windows the main source of energy loss in McGuinn. Double panned glass gets its insulation benefits from the air between the two layers of glass. When buying top of the line, Energy Star approved products, a single window can cost up to $850, but energy costs can be reduced up to 50%.

Behavioral changes offer a cost free way of reducing a building’s energy use. In the summer and spring months, turning down the A.C. ten degrees when nobody is in the building can recue energy costs up to 10%. In the winter, leaving the blinds open on sunny facing windows can reduce the amount of heat needed. Making sure windows are closed over night can reduce the energy costs significantly year round.

Recommendation: Of the three options explored, installing double panned windows provides the highest energy savings and therefore reduces BC’s carbon footprint the most. However, this method is much more expensive than the window film. If window films are applied to all the windows and the correct behavioral changes are made, McGuinn Hall can significantly reduce its energy consumption at a low cost.

The costs associated with installation of new double panned windows would be paid back by energy savings in approximately 7 years.