



# Comparison and Analysis of Energy Use Practices in Gasson Hall and Stokes Hall with Recommendations for Improvement

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## Introduction

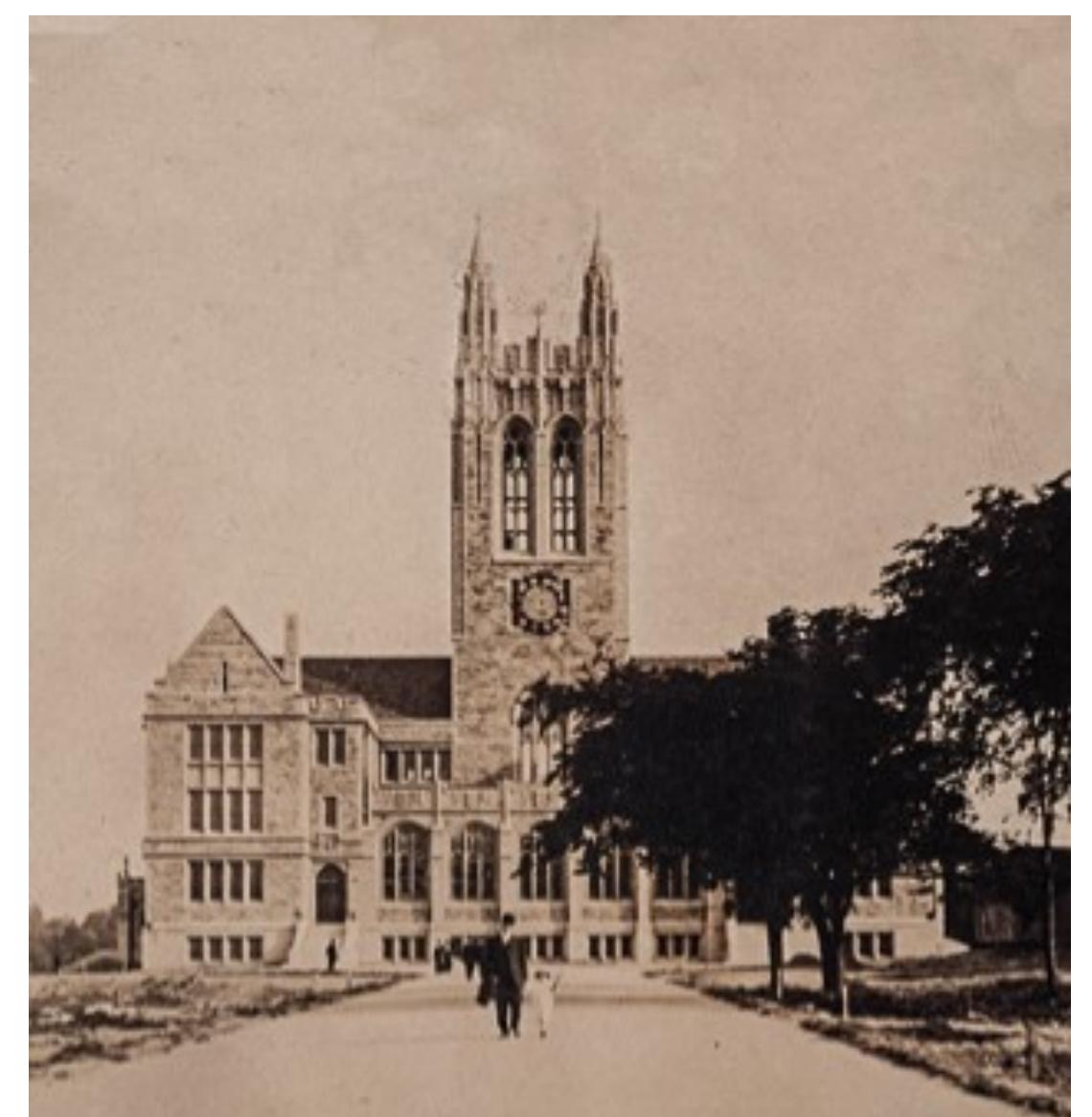
In this technological age, electrical energy plays some role in nearly all aspect of our daily lives. This reality is especially present and easily studied at educational institutions such as Boston College, which can serve as microcosms of energy consumption on a larger scale. Sixty percent of current energy consumption at Boston College is attributable to electricity (Energy Use and Savings at Boston College, 2015). Therefore, attention and urgency to reduce electrical consumption and utilize more sustainable technologies are required now more than ever. Two buildings on the Boston College campus that lend themselves perfectly to a comparative energy study are Stokes Hall and Gasson Hall.



**Image 1:** Rear view of Stokes Hall amphitheater  
Courtesy of Xquisite Landscaping Inc.

### Stokes Hall (Image 1)

- . Construction completed in 2013
- . \$78 million dollar academic building with two wings—four floors each
- . Boasts “energy efficient” utilities and LEED Silver Certification
- . 183,000 square foot home to offices, classrooms, and even a café



**Image 2:** Gasson Hall in 1913 just prior to opening  
Courtesy of John J. Burns Library Archive

### Gasson Hall (Image 2)

- . University’s marquee building
- . Constructed in 1913
- . 72,610 square foot, four floor building
- . Houses spaces including dean’s offices, a large room for special events and numerous classrooms

## Goals

- . Compare and contrast energy usage in Gasson Hall and Stokes Hall
- . Identify ways to improve sustainability and decrease energy consumption
- . Maintain the historical integrity of Gasson Hall.

Making these changes here at Boston College will not only improve our relationship with the environment but will also provide motivation and guidance for other organizations who are seeking to change their energy consumption habits as well.

## Current Electricity Usage

The monthly energy consumption in each building is calculated in terms of kilowatts per hour (kWh). The following information refers to the fall semester of the 2015 academic year (August through December).

### Gasson

- . Total Energy Consumption—182,667 kWh
- . Average Monthly Consumption—36,533 kWh (**Figure 1**)
- . Highest Monthly Consumption—August (54,594 kWh)
- . Lowest Monthly Consumption—November (22,525 kWh)

### Stokes

- . Total Energy Consumption—894,089 kWh
- . Average Monthly Consumption—178,817 kWh
- . Highest Monthly Consumption—August (222,386 kWh)
- . Lowest Monthly Consumption—December (142,623 kWh) (Dixon, 2016)

## Criteria Selection

The specific factors of each building that we decided to focus on include the following:

- . Type of usage that each space provides (e.g. classroom, office, event space, etc.)
- . Capacity of the space
- . Types of present lighting fixtures
- . Amount of each fixture
- . Number of outlets
- . Whether or not there were any windows that were open in the space as this can affect the efficiency of the building’s heating and cooling system.

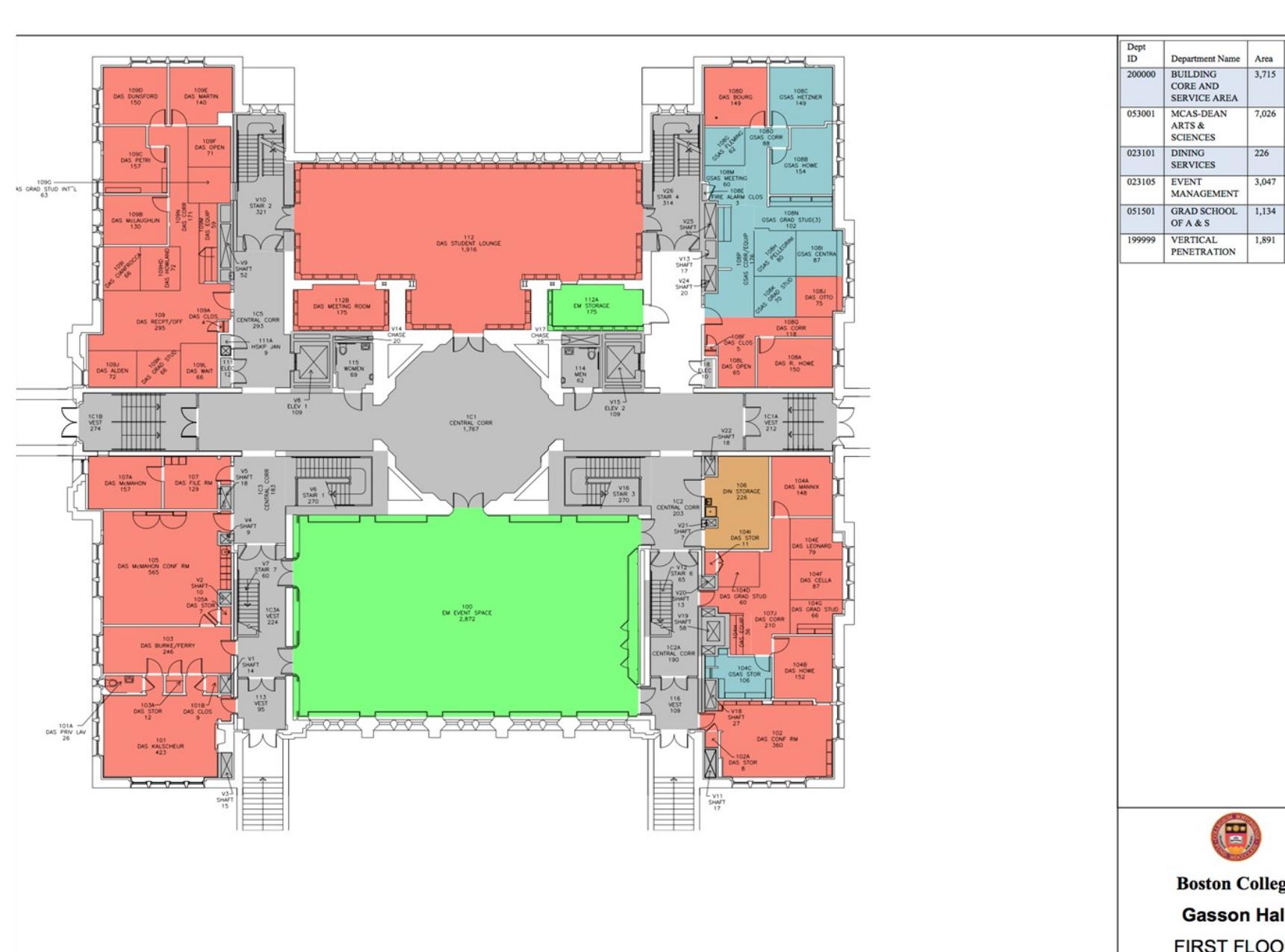
## Data Collection

### Schematic Drawings

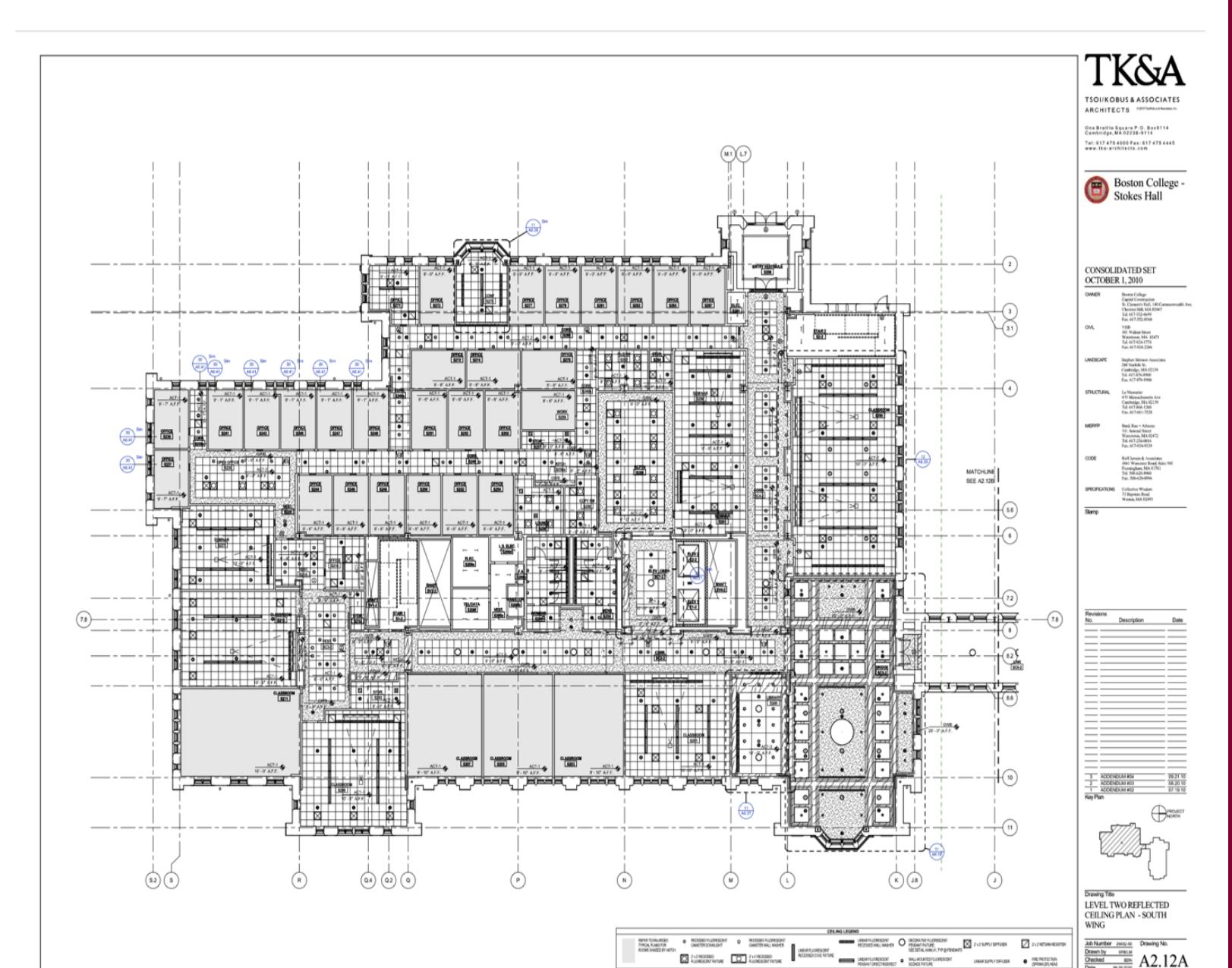
- . Gasson Hall—Only referenced to determine specific usage (e.g. classroom, office etc.) (**Image 3**)
- . Stokes Hall—Referenced for information on usage and individual lighting fixtures (**Image 4**)

### Manual Survey

- . Conducted an extensive manual examination of Gasson and Stokes to supplement information provided by schematics
- . Went from room to room and recorded information specified in the “Criteria Selection” section



**Image 3:** One schematic drawing that depicts the first floor of Gasson Hall and its usage  
Courtesy of Boston College Office of Sustainability



**Image 4:** One schematic drawing that depicts the second floor of Stokes Hall South and its usage  
Courtesy of Boston College Office of Sustainability

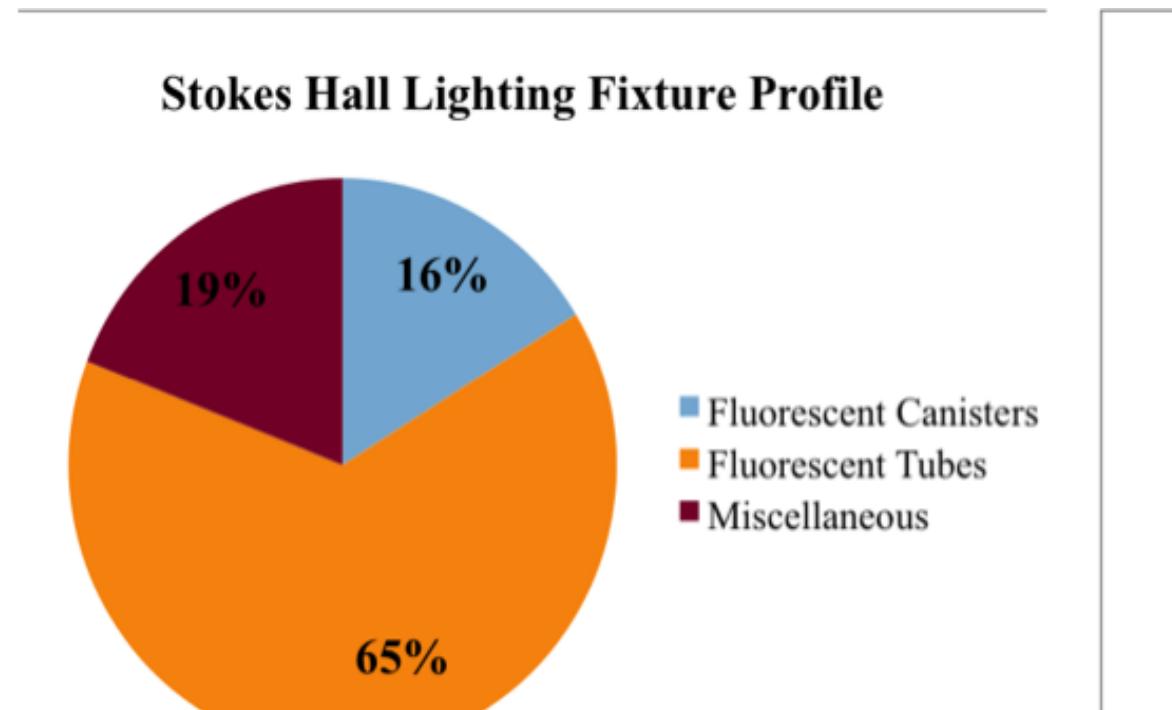
## Results

### Building Usage and Data

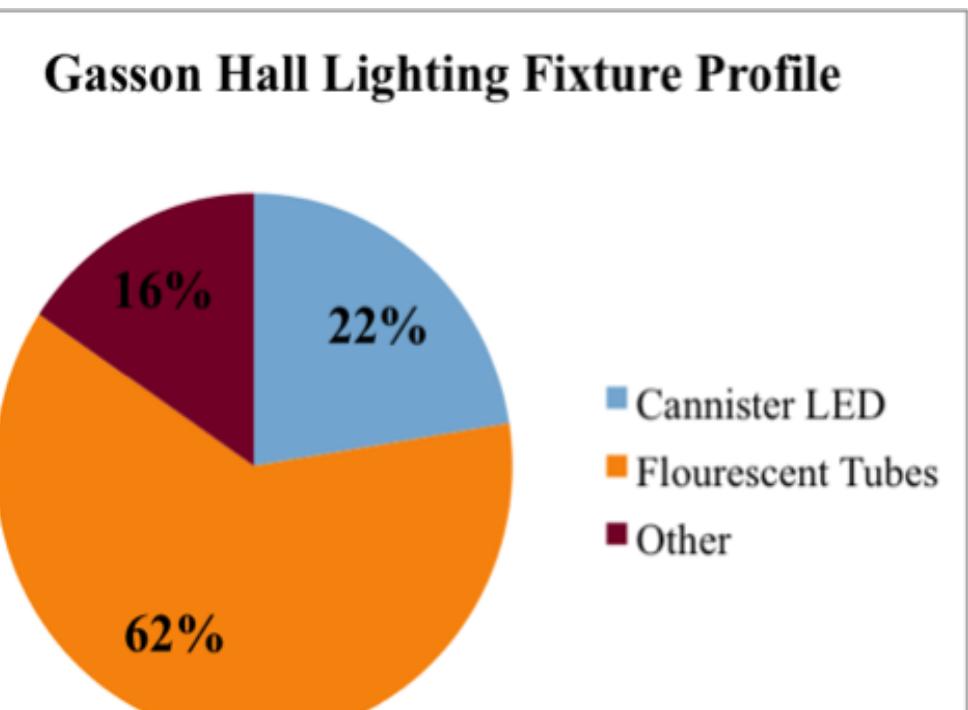
	Gasson	Stokes
Number of Classrooms	20	35
Average Classroom Capacity	53	31
Number of Individual Offices	0	4
Number of Office Suites	5	6
Gasson Commons - 1		Lecture Hall - 1
Irish Room - 1		Chocolate Bar - 1
Roof - 1		Study Area - 1
Hallways & Stairwells - 4		
Average Number of Open Windows	.517	.492
Average Number of Outlets (Including Office Suites)	8	26

### Lighting Fixtures

The largest proportion of lighting implemented in each building was undoubtedly attributable to recessed fluorescent canister down lights (Fluorescent Canisters) and linear fluorescent fixtures (Fluorescent Tubes). Individual lighting profile data revealed that the buildings showed relative similarity in the proportion of Fluorescent Canisters, Fluorescent Tubes, and “other” bulbs; which consisted of miscellaneous fixtures as well as outdoor halogen spotlights (**Figures 3&4**).



**Figure 3:** Depiction of the breakdown of lighting fixtures observed in Stokes



**Figure 4:** Depiction of the breakdown of lighting fixtures observed in Gasson

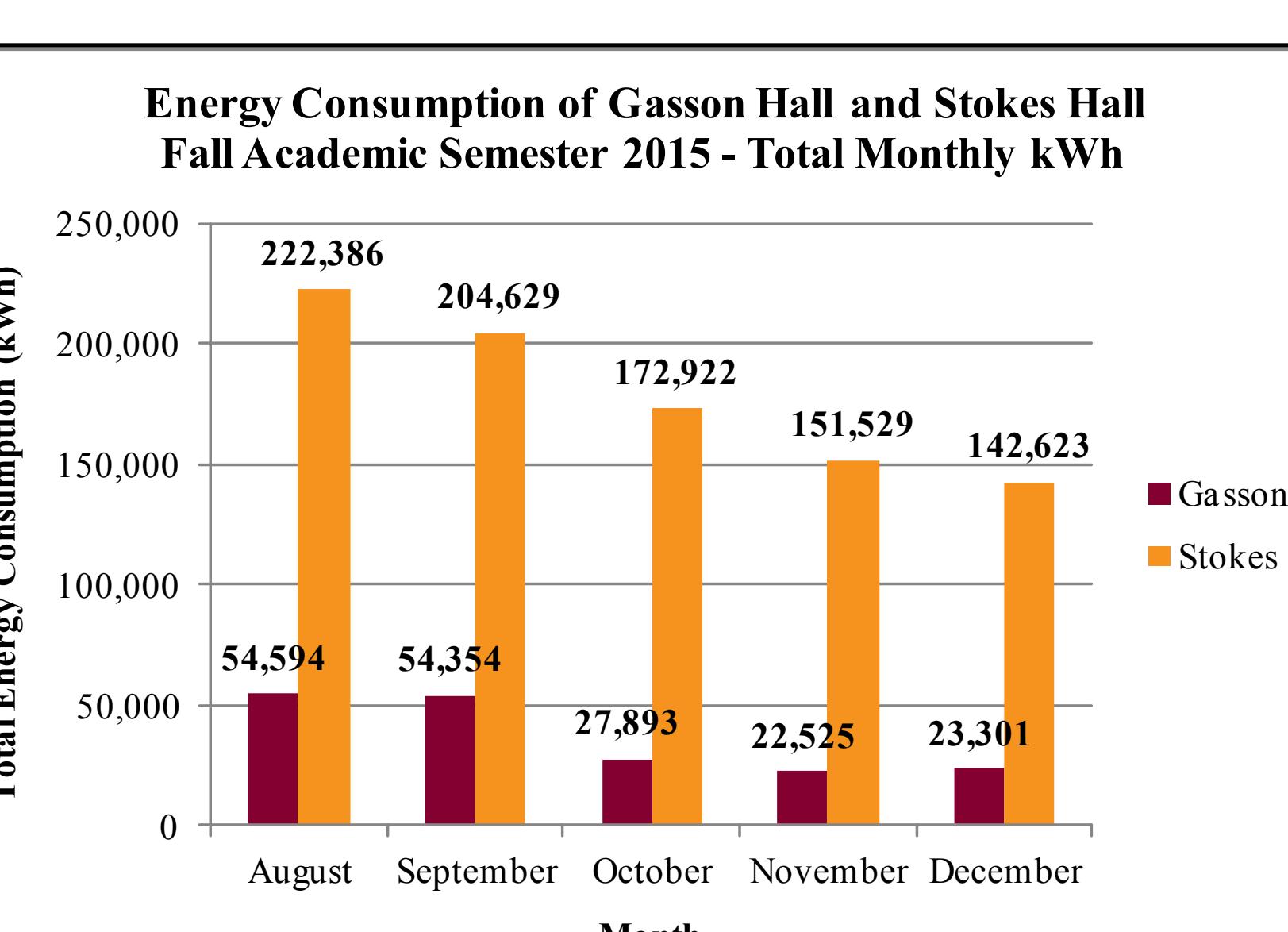
## Suggestions for Improvement

### Gasson Hall

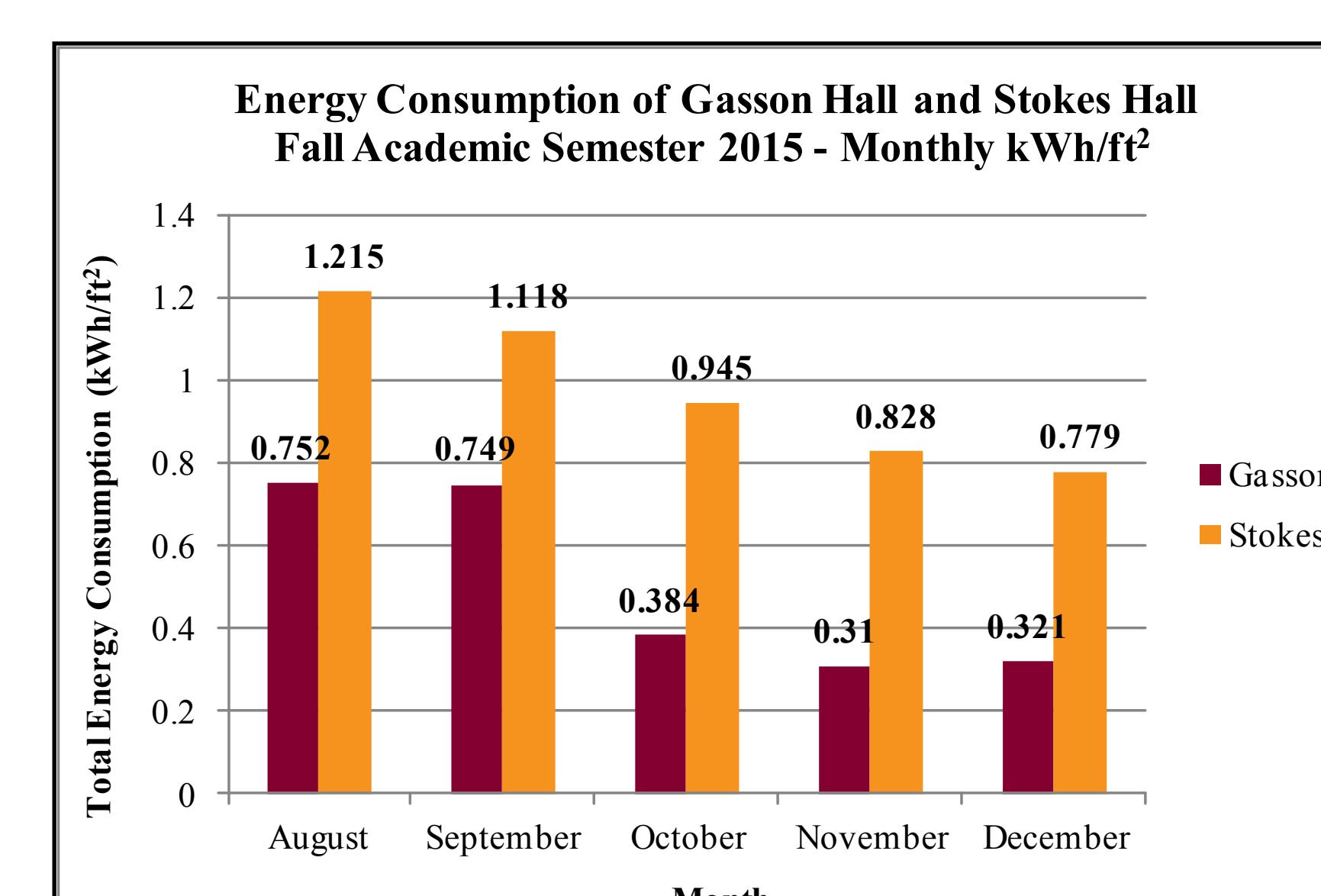
- . Retrofit an automatic lighting system to ensure lights are turned off at a reasonable hour as opposed to being left on all night
- . Replace fluorescent bulbs with more energy efficient LED bulbs that will also be more cost efficient in the future
- . Reevaluate outdoor up lighting of Gasson
  - . Reduce the lighting time or amount of lights shining on Gasson at any given time during the night
  - . Use more energy efficient bulbs that can still provide the same brightness
- . These changes could propel Gasson closer towards becoming LEED certified

### Stokes Hall

- . Consider altering the automatic lighting system so that if the initial power down is overridden, lights will shut off again at a later time
- . Replace bulbs as recommended for Gasson Hall
- . Consider installation of solar panels (applicable to Gasson as well)



**Figure 1:** This figure depicts the total monthly electricity consumption for Gasson Hall and Stokes Hall throughout the 2015 fall academic semester.



**Figure 2:** This figure depicts the kWh consumed per square foot of each respective building over the months of the 2015 fall academic semester

## Citations

- Dixon, Bruce. "Gasson and Stokes KWh Information." 3 Feb. 2016. E-mail.  
"Energy Use and Savings at Boston College." Boston College. Facilities Management, 15 June 2015. Web. 02 May 2016.  
"Green Buildings." Boston College. Boston College Office of Sustainability, 26 June 2015. Web. 02 May 2016.  
"U.S. Green Building Council." LEED. U.S. Green Building Council, n.d. Web. 02 May 2016.

Despite the fact that there seems to be great disparity between the total electricity consumption for each building, if you examine the data in terms of kilowatt hours consumed per square foot each month it is much easier to do so while also taking into account the variance in size between Gasson and Stokes (**Figure 2**).