



Boston College Solar Panel Proposal

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Introduction

Boston College does not currently use direct solar energy to power any of its buildings. Although sustainability initiatives have been implemented on campus over the past couple of years, not including solar in BC's energy infrastructure may be cost inefficient and contribute to global climate change. We looked at the best buildings on campus to potentially implement solar panels given their location, exposure to the sun, aesthetic appeal, and energy demand.

Questions

1. What is the most sustainable method to implement solar panels onto BC's campus?
2. What are the best places, if any, to install solar panels on campus?
3. What are the cost savings produced from using solar panels?
4. How should Boston College pay for this project?

Methods

1. Worked with John MacDonald concerning the feasibility of solar panels on BC's campus.
2. Spoke with Professor Raikar regarding solar panel PPAs and implementation methods.
3. Spoke with Bruce Dixon regarding energy consumption of buildings on BC's campus.
4. Conducted a survey about BC's opinions of solar panels on campus.

Discussion

Building off of previous years proposals, it's already been concluded that a solar panel project at BC is possible. What we wanted to look into was what was the best place on campus or method of installing them. We believe implementing a renewable energy system into BC's campus will not only benefit the students and faculty, but also set an example for universities throughout the country. We assume the cost for electricity continues to increase as it has done historically in MA and that it averages between \$0.10-\$0.15.

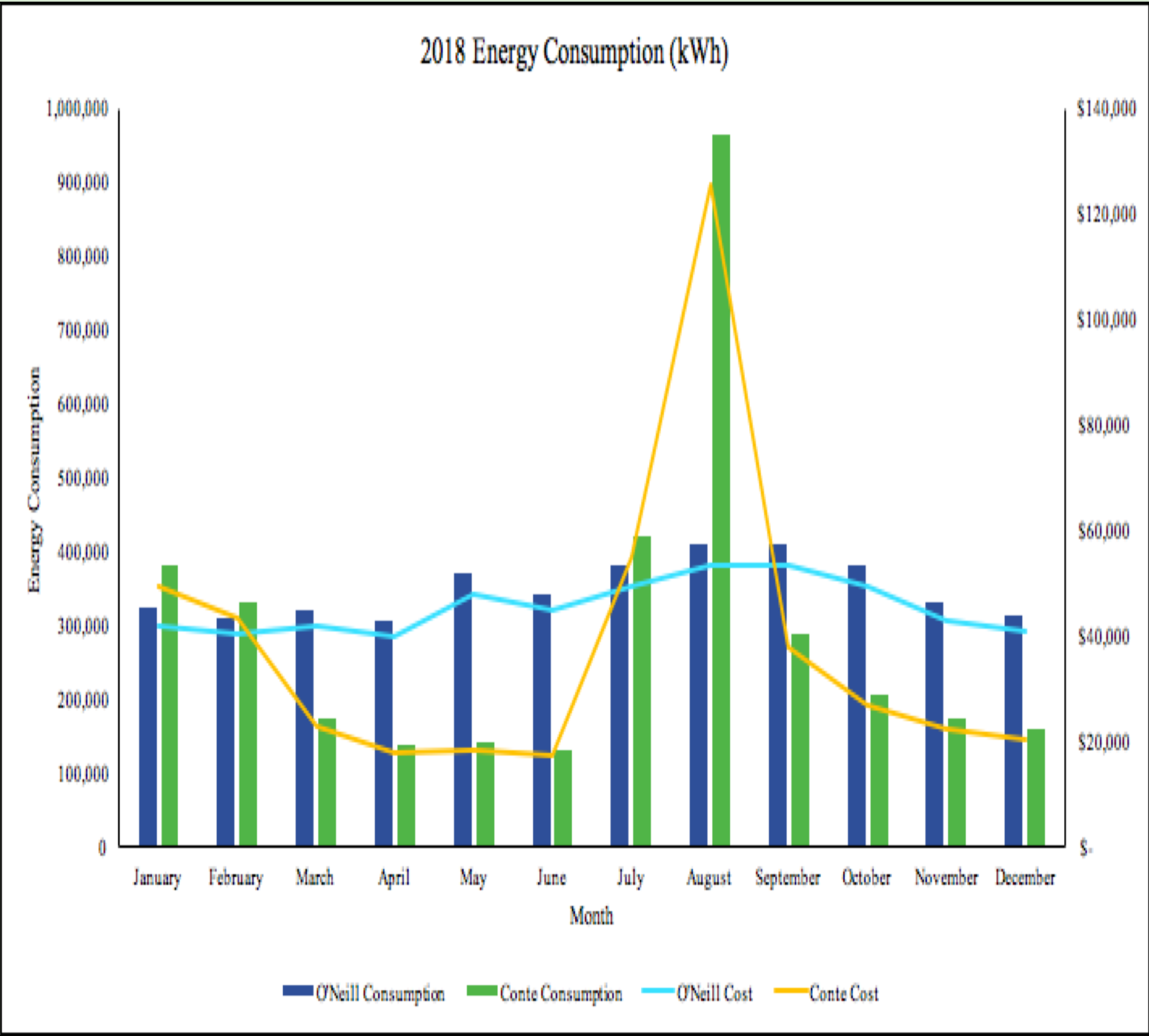


Figure 1: Total monthly energy consumption and cost in 2018 for O'Neill and Conte Forum. We assumed a \$0.13 kWh cost as an average for the state of Massachusetts.

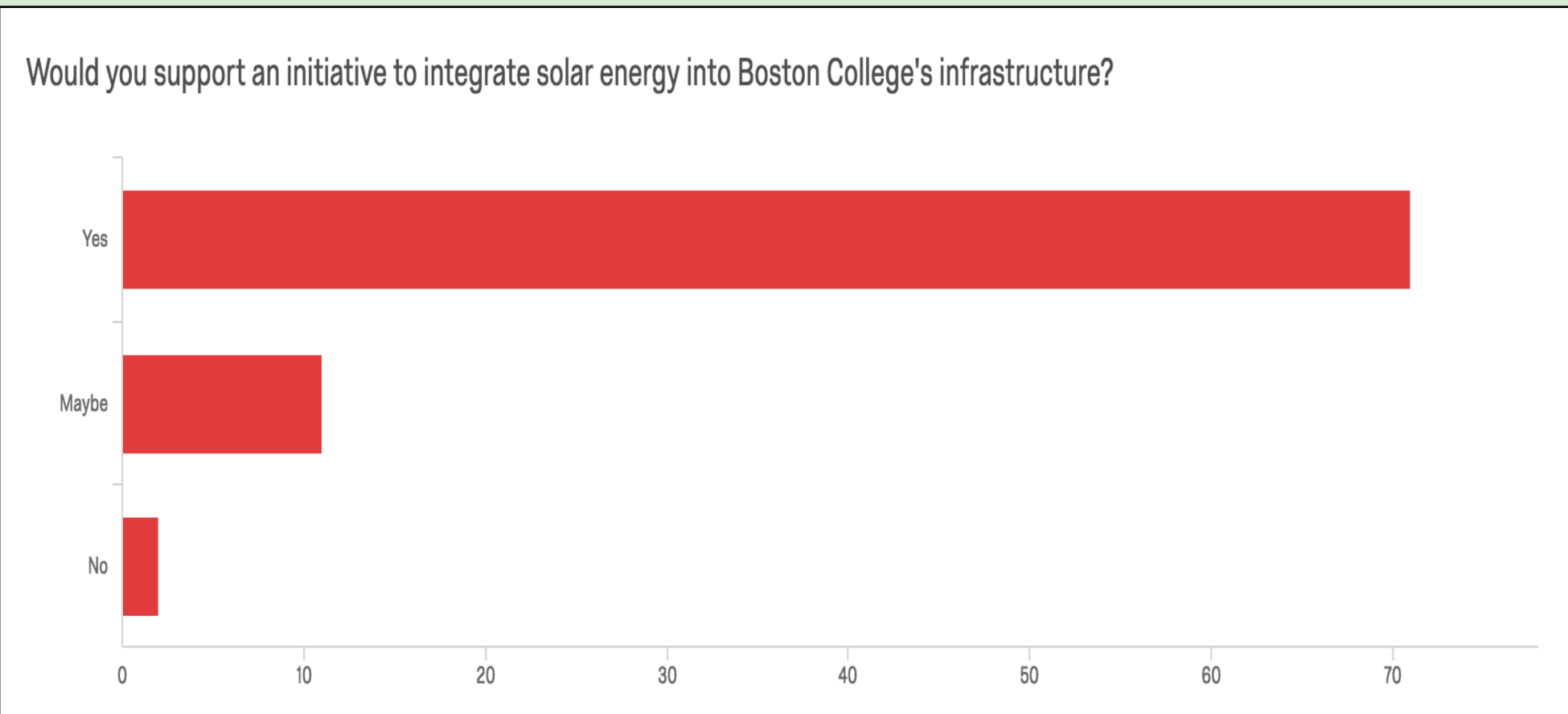


Figure 3: Details BC students and faculties' desire for a solar project on campus.

Green Revolving Fund Case

58 institutions across the country have committed \$122 million to build out green renewable funds. These self-managed revolving funds achieve reductions in operating expenses and greenhouse gas emissions while generating funds for future projects. Harvard's Green Loan Fund was created with a \$1.5 million investment in 2001 and has since financed over 200 projects and now has grown to \$12 million. Low-interest loans and short project payback periods fuel the Green Loan Fund's growth. The fund is managed by a multi-stakeholder committee including construction staff, consultants, energy auditors, members of administration, and students. The committee aims to scrutinize proposed projects from multiple diverse viewpoints and is responsible for confirming calculations of implementation costs and cost reduction on operating expenses. Today, Harvard's Green Loan Fund yields an average Internal Return on Investment of 29.9%, an average payback period of 3 years, and over \$4.8 million of annual savings.

Perceived Impact on Boston College's Gothic Architecture

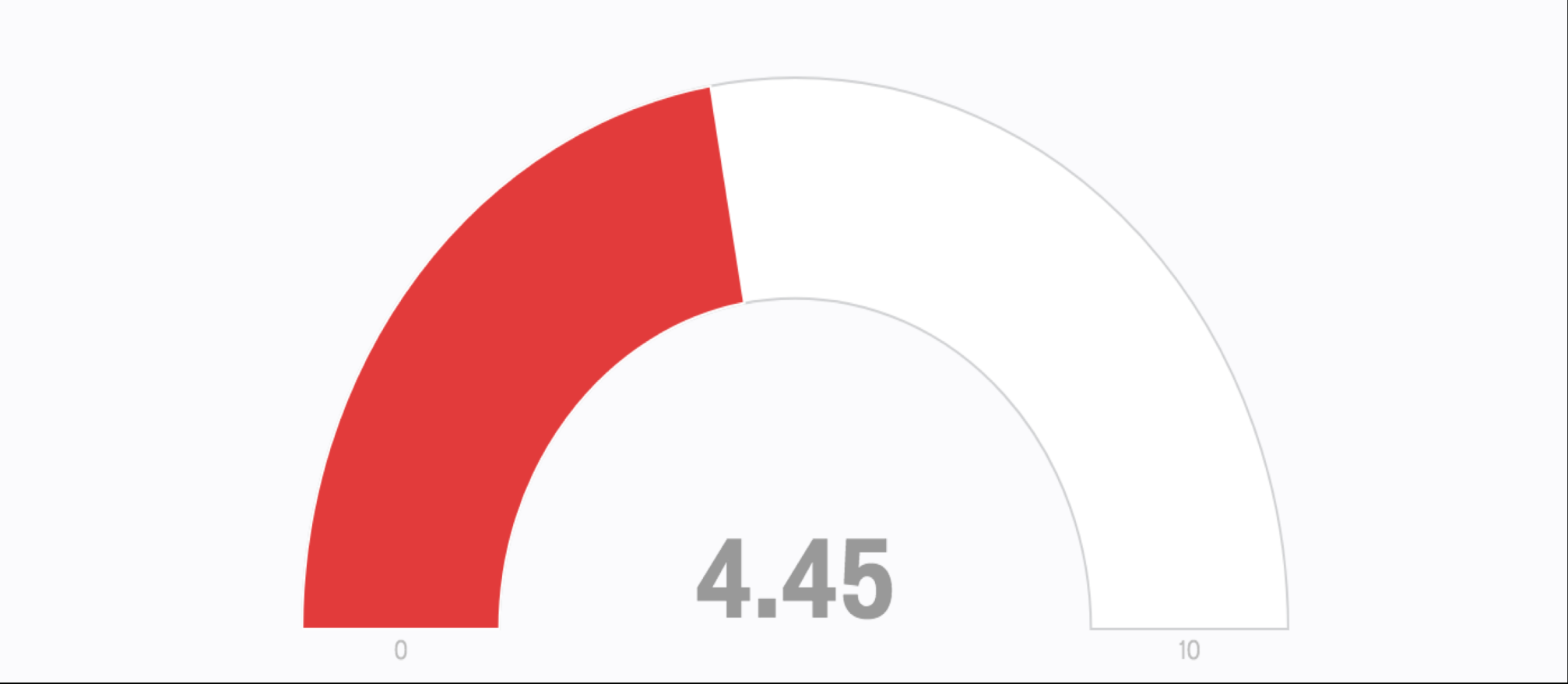


Figure 2: Details BC student and faculty opinions on how solar panels would affect campus buildings. The total score was out of 10 with 10 having the least impact.

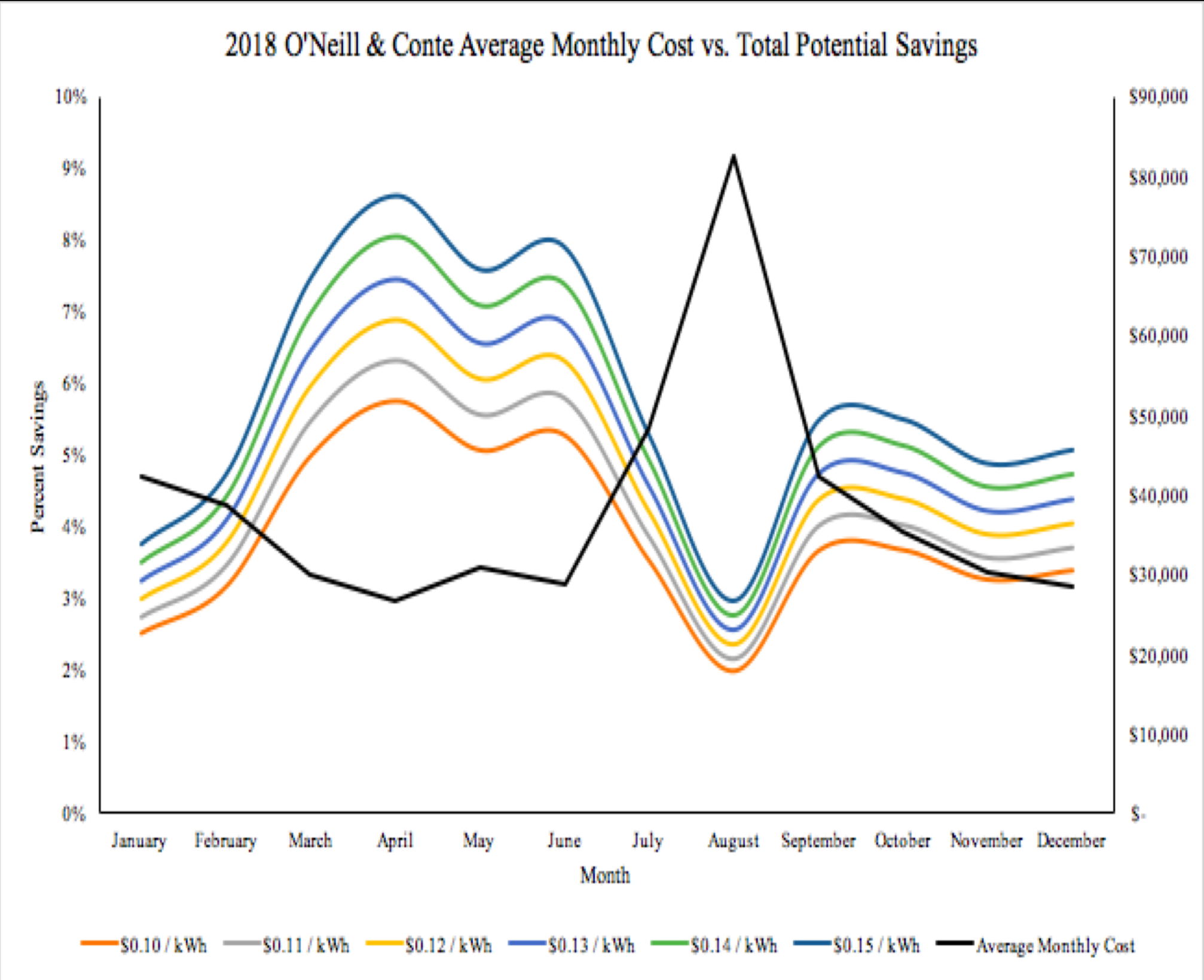


Figure 4: This graph details the potential electricity cost savings per month of O'Neill and Conte Forum. This is based on the total energy savings of two 50 kW solar panel systems both 1000 square meters.

Results

1. After conducting our survey, it can be concluded that the vast majority of students and faculty want solar power to be implemented into BC's energy consumption.
2. From our survey we can also conclude that solar panels on middle campus would hinder BC's gothic revivalist aesthetic.
3. BC currently uses on average 322,356 kWh per month between O'Neill and Conte Forum.
4. BC currently spends on average \$41,900 per month on electricity between O'Neill and Conte Forum.
5. Implementing Solar Panels could reduce BC's expenditure on these energy intensive buildings.

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Recommendation

Given the high monthly energy demand of both Conte Forum and O'Neill Library, their consistent energy demand throughout the year, and their flat roof structures, we'd recommend solar panels on the top of their roofs. Not only would solar panels provide an alternative to the traditional mass consumption of electricity on campus, but they would be out of sight of the general public and wouldn't interfere with the overall aesthetic of Boston College. Using a Power Purchase Agreement (PPA) to deal with the initial cost if necessary, the feasibility of a project like this is incredibly high. Based off of monthly electricity prices ranging from \$0.10/kWh to \$0.15/kwh, there is the potential to save 2%-9% per month on electricity costs. A project such as this one would save BC money that could be invested in other endeavors, allow the university to move towards a greener future, and set an example for other universities and prospective students.

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