



Reducing Carbon Emissions for SPS Tower

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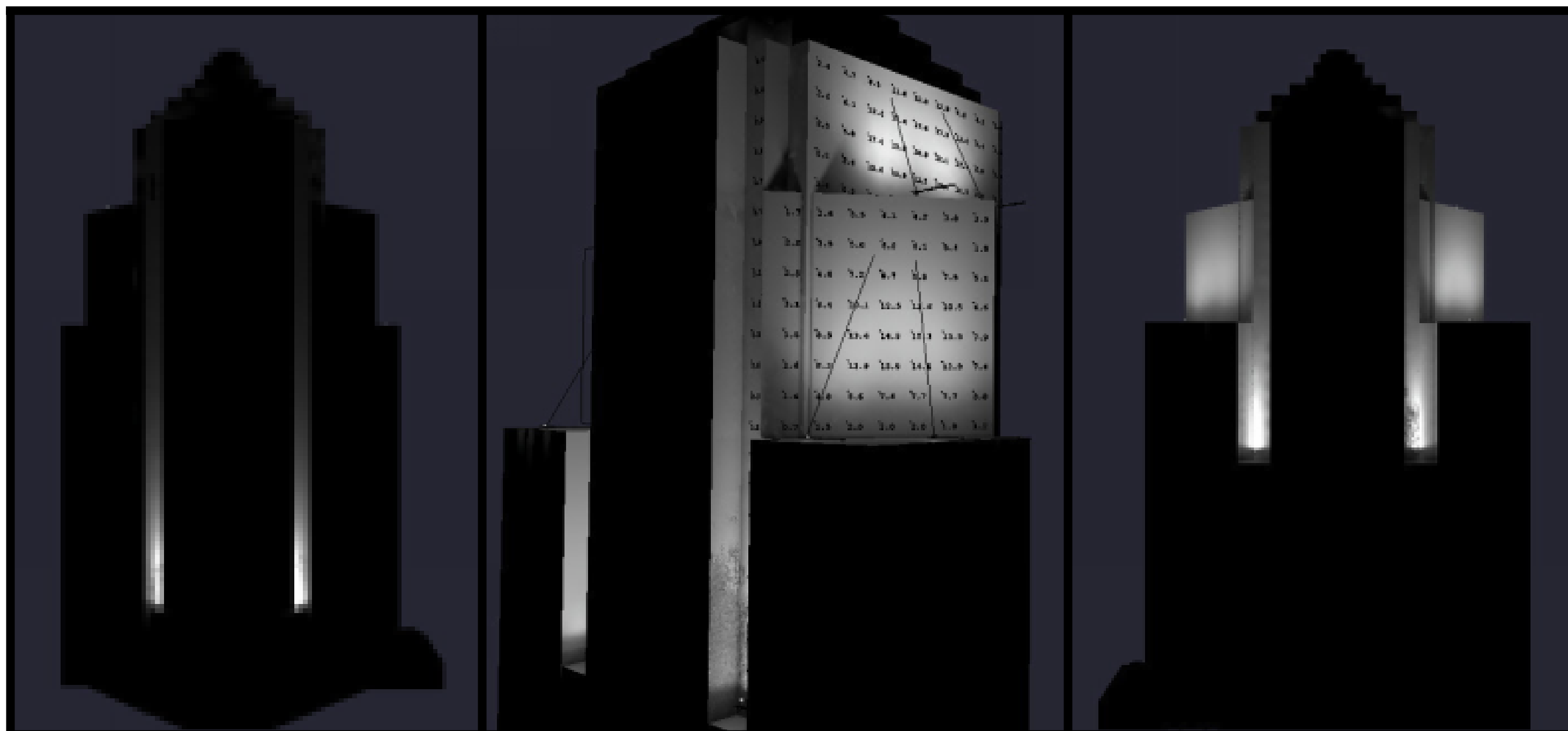
Michaud Cooley Erickson; Lisa Chaput, Lighting Designer; Michelle Matke, Advisor



INTRODUCTION

SPS Tower is located in the heart of Minneapolis, Minnesota. The building is currently operated and maintained by Transwestern, a real estate management company. After contacting the in-house building engineers, they agreed to partner with the Carbon Reduction Challenge for the Summer of 2019. The ultimate proposal includes a redesign and replacement of the building's exterior lighting. Exchanging the existing flood lights for LED equivalents will ultimately save money and reduce the building's carbon footprint. The long term goal includes a complete replacement of the additional exterior light fixtures with color changing LED's to give the building a more complex aesthetic touch.

PROPOSED LIGHTING DESIGN



GOALS AND INITITATIVES

GOAL: To reduce the carbon emissions of the building by installing higher efficiency LED flood lights on the exterior of the building.

DESIGN PARAMETERS: (i) Achieve a payback period of less than three years. (ii) The new design must be equivalent to or improve upon the existing lighting.



PROJECT COSTS

Item	Quantity	Cost per Fixture	Total
500W LED	4	\$2,233.00	\$8,932
300W LED	8	\$871.00	\$6,968
Labor	N/A	N/A	\$6,500
Total			\$22,400

SCOPE OF WORK

- 1) Demo 20 existing metal halide light fixtures;
 - a) 6 1000W on 5th floor,
 - b) 4 1000W on 7th floor,
 - c) 8 1000W on 21st floor,
 - d) 8 1000W on 27th floor
- 2) Install 12 LED flood lights;
 - a) 2 500W - on 5th floor,
 - b) 2 500W - on 7th floor,
 - c) 4 300W - on 21st floor,
 - d) 4 300W - on 27th floor

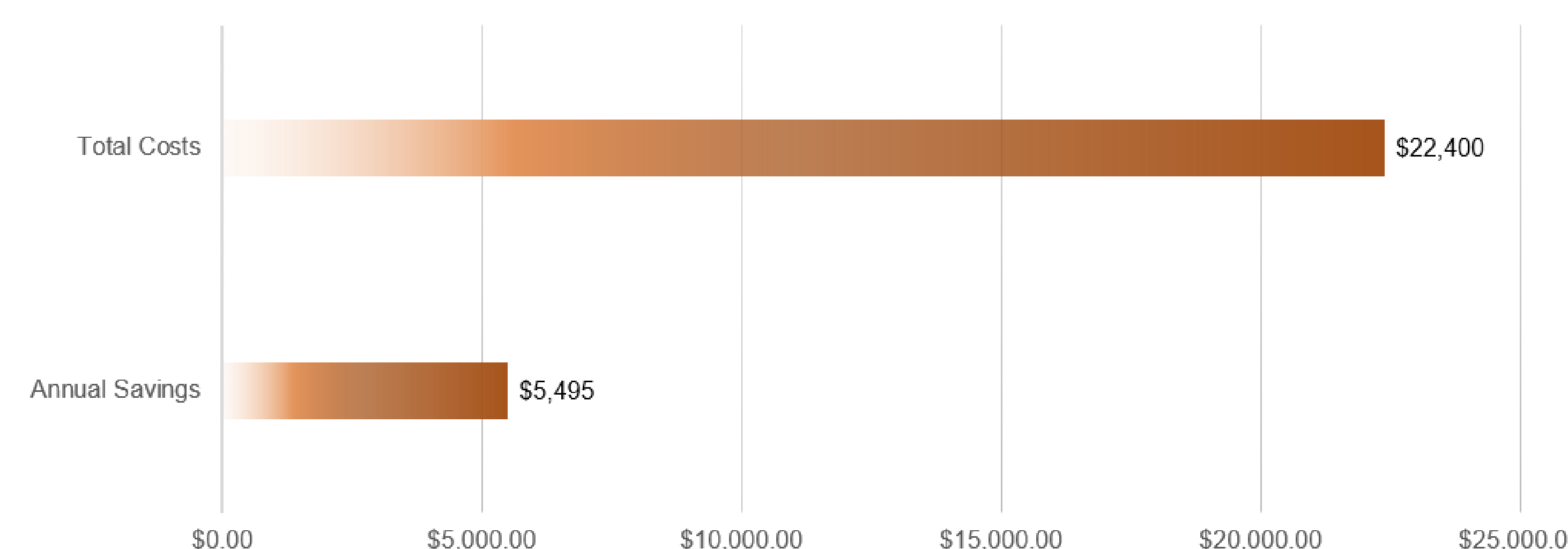
Annual wattage savings = 49,937 kWh*

*Based on an average nightly runtime of 6 hours

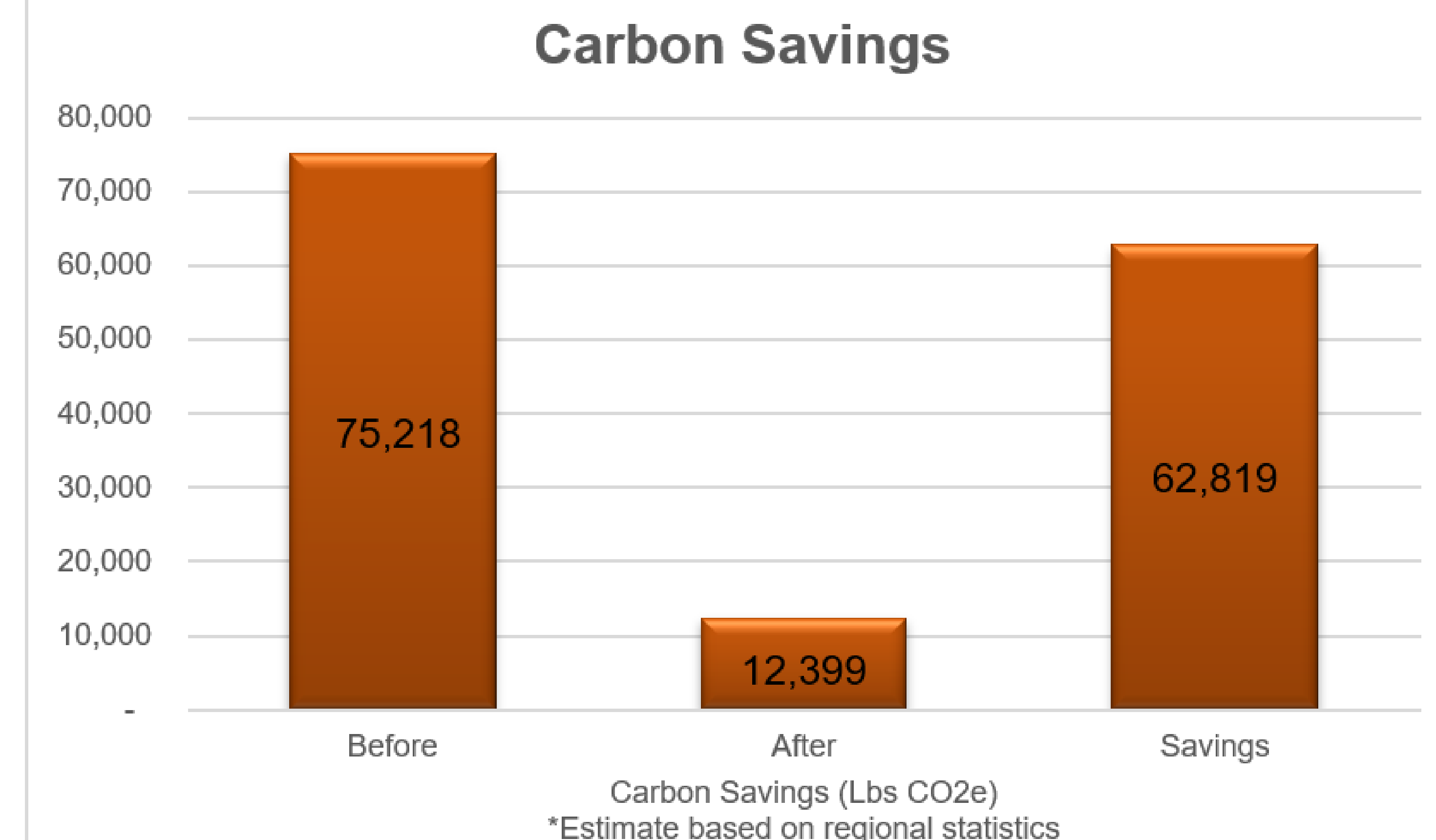
SAVINGS

Item	Savings
Annual Energy Savings	\$3,995
Xcel Rebate (est)	TBD
Annual Maintenance Savings	\$1,500
Total Annual Operating Savings	\$5,495
Payback Period	4.08 Years

COSTS VS. SAVINGS



ANNUAL CARBON SAVINGS



WHAT'S NEXT?

NEXT STEPS: After presenting the final project proposal to the Transwestern management team, they agreed to include this request in the upcoming fiscal year budget. After the requested amount has been approved by the owners of the property, the implementation can begin. By the end of next year, the hope is to have the lights completely installed and functional.

FUTURE GOALS: The lights addressed in this proposal are just a fraction of the overall lighting on the building. There are approximately 300 mercury vapor light fixtures that could be replaced with LED equivalents.

ACKNOWLEDGEMENTS

First and foremost, I want to thank Dr. Cobb and Dr. Tolktay from Georgia Tech for their support and guidance. Your council is greatly appreciated. I'd like to thank Lisa Chaput and Michelle Matke from MCE for their contributions to the project. I am thankful for the time you all generously volunteered to help execute the project. Lastly, thank you to the management team within the building for their assistance throughout the summer.

Carbon calculations: https://www.epa.gov/sites/production/files/2018-02/documents/egrid2016_summarytables.pdf

Cost per kWh based on average determined by building management.