

# Analysis of Energy Consumption in the Palo Alto High School Media Arts Center

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## INTRODUCTION

When thinking of ways to combat global warming people often jump to the conclusion that it means spending more money on advanced tech such as solar panels or electric vehicles. These are effective but very expensive means to help the environment. However, there are ways to fight global warming while saving money by limiting unnecessary consumption. Big commercial buildings are a huge cause of pollution due to heating/air conditioning, wired lighting and technology. One of the most effective ways to help cut down energy consumption and save money is to limit the usage of lighting, technology or air conditioning in a large building near you.

According to the U.S. Department of Energy the Commercial sector, which includes office space, retail space and education facilities, represents just under one fifth of U.S. energy consumption.

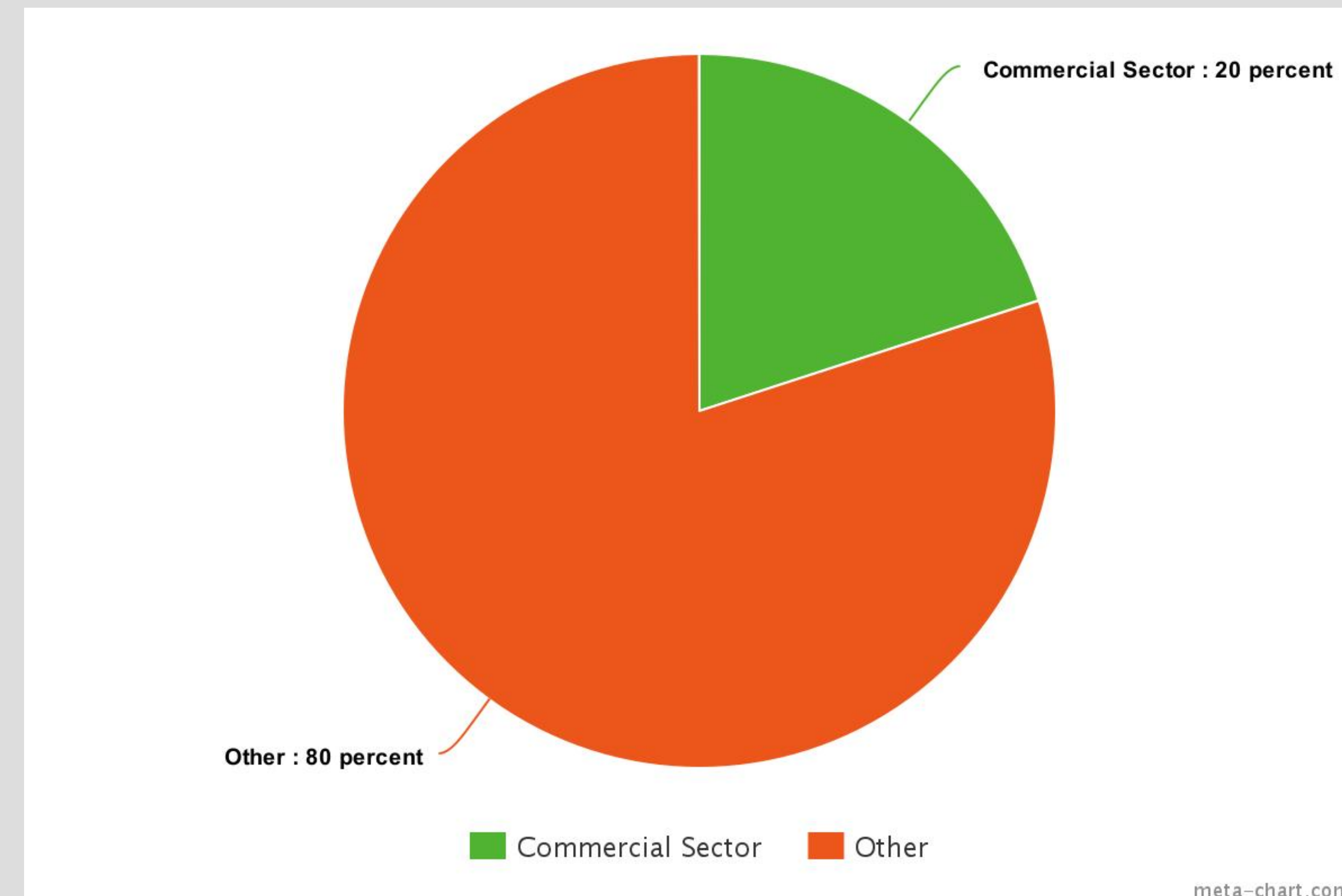


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## MATERIALS & METHODS



Based on this information, for our project we decided to research how we could implement this idea at Palo Alto High School. We decided to focus on consumption of energy in the Media Arts Center. Our hope was to look at the expenses of each piece of technology, test different variations to cut down usage.

To start by auditing the building to get inventory, then track those behaviors to see what people are leaving on, and what opportunities for reduction exist. By testing different methods, we wanted to quantify the data by comparing the utility bills before and after our tested variations.

## METHOD

1. We started by taking inventory of the total number of Mac computers and other computer like devices in the Media Arts Center and found that there are 175.
2. We then analyzed the 2015 - 2016 academic year energy cost data from Palo Alto Unified School District.

## RESULTS

1. We found that the average cost per kilowatt hour was 14 cents
2. Then based on an average assumption about how much each computer uses per hour we determined that the energy usage per hour is about 50 watts
3. Using this data we found that annual cost to run a computer in PAUSD is \$40
4. Since there are about 175 computers (or computer type devices) currently in the MAC, the computers in the MAC cost about \$7,000 per year to run presently.

## RESEARCH LIMITATIONS

It is really difficult to calculate exactly how much energy a computer uses because the district doesn't provide specific energy consumption data.

## PROPOSED IMPLEMENTATION

1. Our hope is to reduce this cost by making changes so the computers no longer run for more than nine hours per day from 7 to 4 on weekdays and are off on the weekend.
2. Based on our calculations this can potentially reduce the annual cost to run the computers in the MAC from \$40 to \$23, and the annual total operational cost from \$7,000 to \$4,025.
3. We talked to Palo Alto High School's technical support team and they have already been working on shutting down the computers
4. Using the Media Arts Center as a test subject is one way of figuring out the most effective ways to conserve energy, we can replicate the process we used in different areas of the school; and cut down energy usage at Palo Alto High School as a whole.

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