



CARBON REDUCTION CHALLENGE SUMMER 2021

Team Green Beans: Ren Haggerty, Hanka Kirby, Dariia Yehorova



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BACKGROUND

A global leader in materials, chemicals, and other technologies, Solvay has demonstrated a strong interest in sustainability. Our team connected with Solvay in hopes of brainstorming sustainable solutions for the Alpharetta location (Solvay Sustainability).



OVERVIEW

- ◇ With Solvay's help, our team identified carbon saving potential through AC reduction
- ◇ Increasing average temperature from 68-72 could result in carbon saving potential of 3,932,372 lbs per season while reducing costs by \$565,561 per season



BACKGROUND AND MOTIVATION

- ◇ Numerous employees expressed feeling cold while working in office spaces in the building. We hypothesized an increase in temperature could increase employee productivity while reducing carbon emissions.
- ◇ Employees expressed the temperature felt around 68 degrees. Using this feedback, we calculated carbon savings generated by increasing the building temperature to 72 degrees.



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REDUCTIONS AND SAVINGS

How we save money and carbon

CARBON REDUCTION AND COST SAVINGS

◇ Carbon Reductions:

- ◆ Assumed quantities:
 - ◆ Energy consumption of AC: 1-kilowatt hour (kWh) per ton per hour. = 1kWh per m³ per hour for cooling down space to 68F from 104F outside.
 - ◆ Carbon produced per kWh: 0.91 lb, 0.41kg
- ◆ Offset over 3 month is equivalent to daily emissions of 1790 cars

◇ Cost Savings:

- ◆ Net present value: \$3,865,578.57 with discount rate rate of 6.7% and duration of 1 year

\$4,930,481

Current Money Spent

34,281,793 lbs

Current Carbon Used

11.5%

Carbon Percent Saved

\$565,561

Money Saved

3,932,372 lbs

Carbon Saved





CO-BENEFITS

- ◇ One co-benefit of implementing our suggested solution is an increase in worker productivity. Throughout the duration of our project, numerous employees had expressed feeling cold in the workplace. Based on a study by Seppanen et. al maximum productivity is detected in the office spaces at 71.6F. Therefore, an increase in AC setting can have a positive effect on both CO2 emissions and productivity.



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NEXT STEPS



NEXT STEPS

- ❖ Challenges: Poor communication between coworkers, that can lead to change in thermostat settings. As well as need of some employees for a lower temperature.
- ❖ Negative outcomes can be minimized by clear communications of the project benefit to all employees and implementation of local solar-powered of energy efficient fans.
- ❖ More accurate thermostat setting are required to make calculation even more accurate.