

Alternative Energy Cost Benefit Analysis

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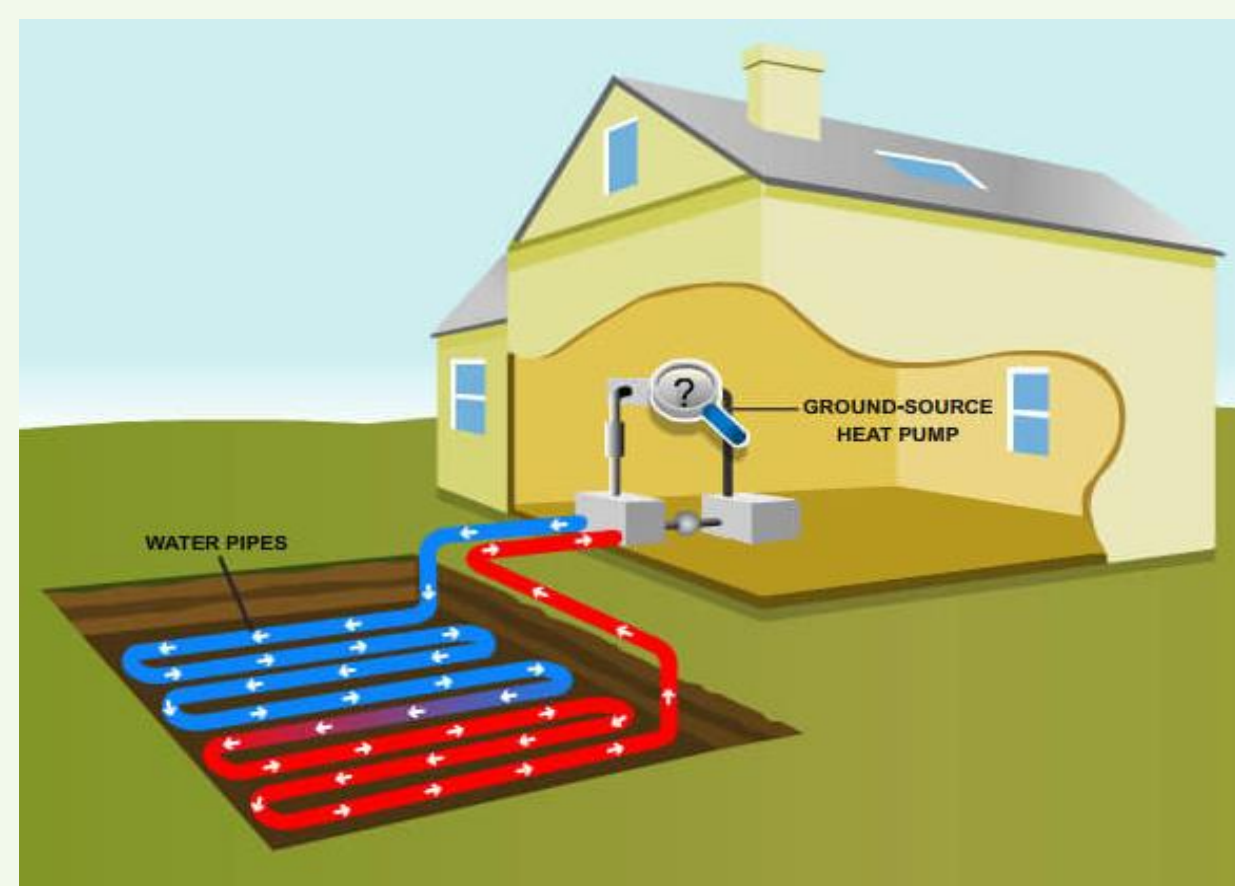
Community Partner: Bloomfield CEEC²

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Introduction

The entire world is facing an energy crisis; the demand for energy is higher than ever, and our current energy supplies cannot last forever. Nonrenewable forms of energy such as coal, oil, and natural gas are being burned at dramatic rates, emitting greenhouse gasses and contributing to climate change. Renewable forms of energy, such as geothermal, hydrogen, solar, and wind are widely untapped. These energy sources can be used to efficiently generate electricity which can be used to heat homes, power cars, and charge batteries, among many other uses. Renewable energy sources have tremendous potential to solve the energy crisis in the world, but their high installation costs compared to fossil fuel prices has limited their adoption.

In this project, we conduct a cost-benefit analysis of renewable energy vs. fossil fuels to understand the real costs of these energy sources. Can the prices of renewable energy offset and actually allow saving money when compared to fossil fuels?



Purpose

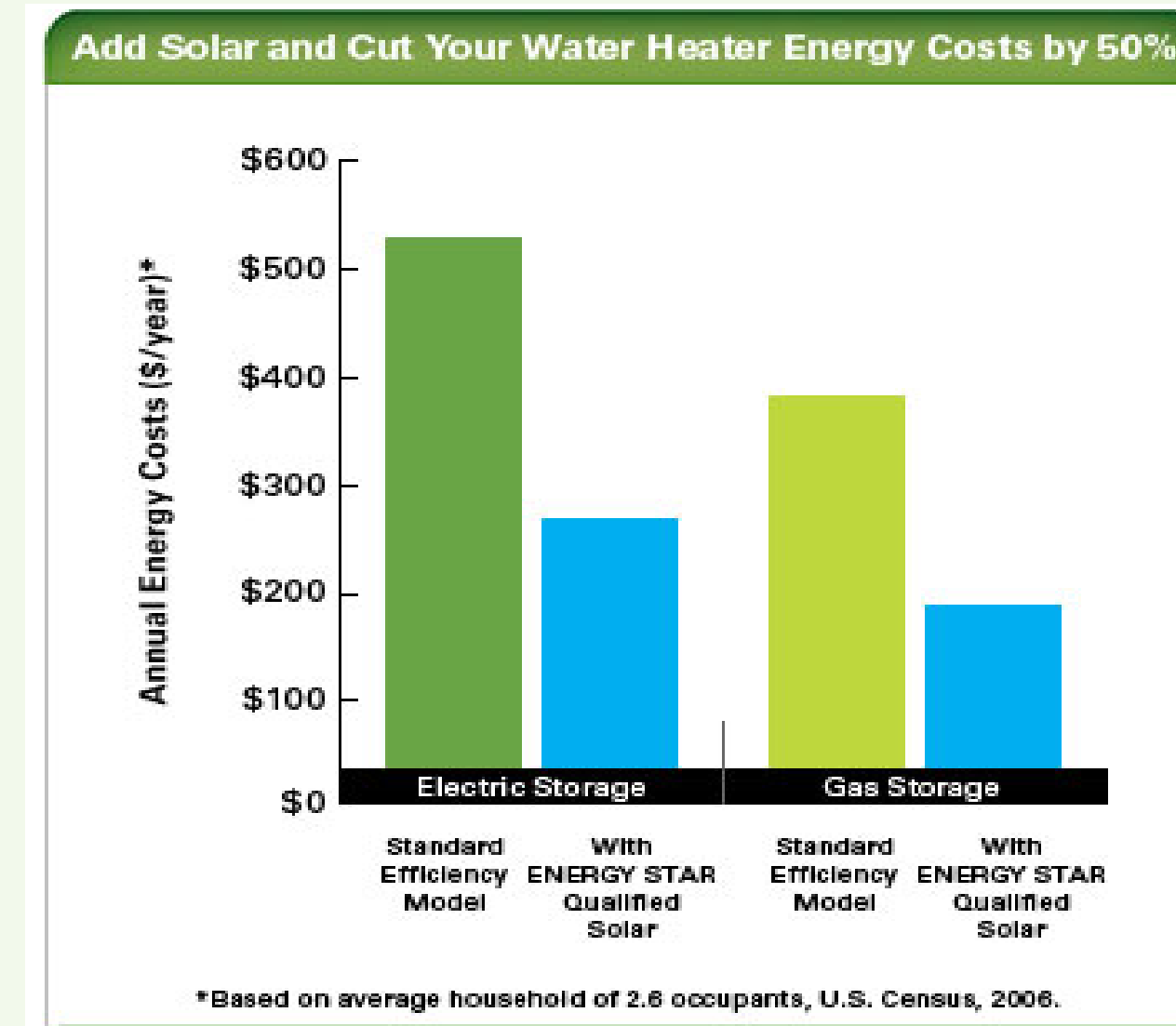
This project is being done in order to tackle the way organizations within my community conserve energy. As a whole, this will contribute to the betterment of the whole society and the businesses who choose to change the way they use their energy. This project, if successful, will lower the energy costs and though small on a global scale, reduce the amount of fossil fuels in the environment.

Energy Comparison

Solar Vs. Nonrenewable

Facts

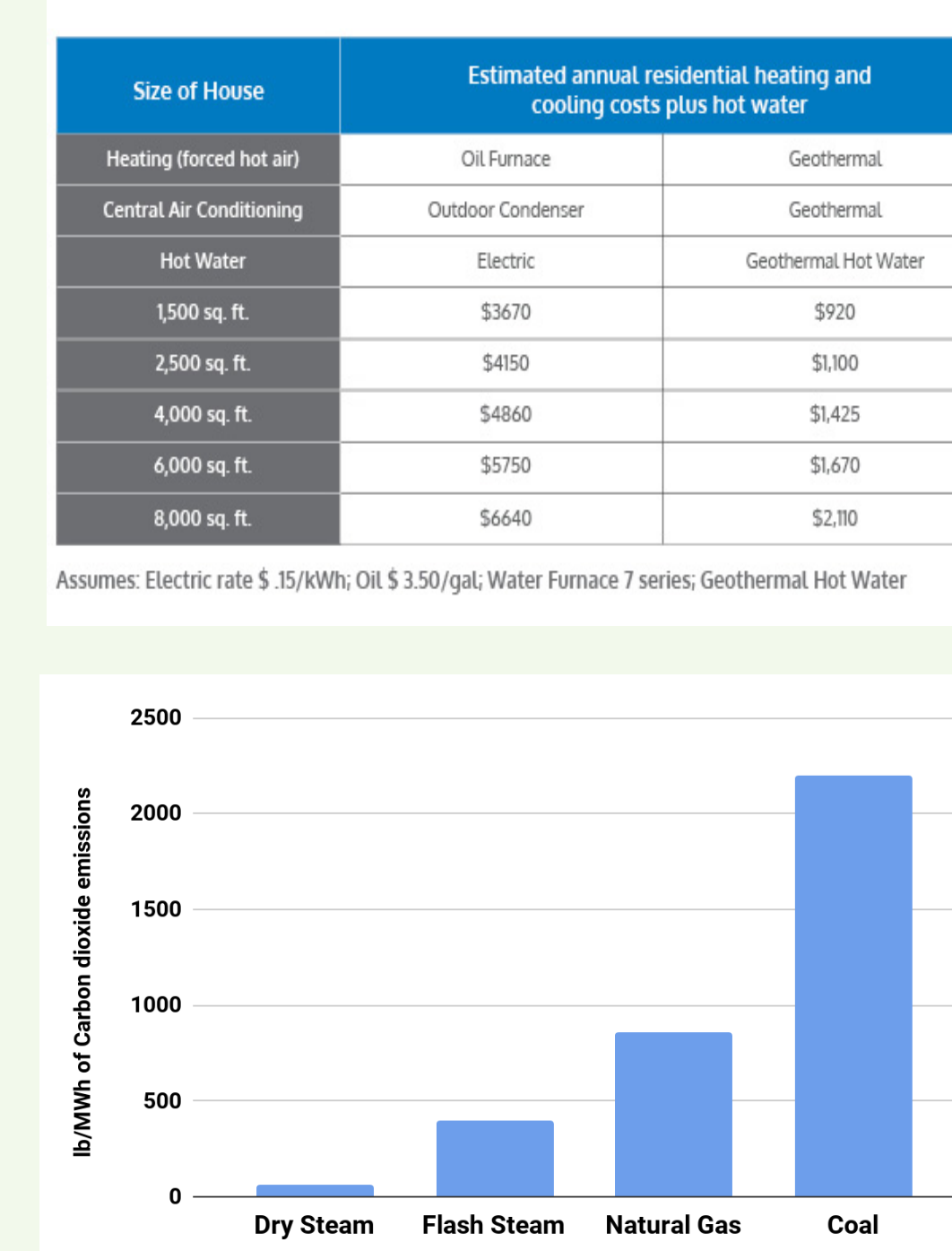
- Solar energy water heating systems usually cost more upfront to purchase and install but typically pays for itself in long run savings
- Water heating bills should drop fifty to eighty percent with the use of a solar water heater
- Personal solar water heating operation costs can be determined using the equation: $365 \times 41,045 \div \text{SEF} \times \text{Fuel Cost (Btu)}$, where SEF is the systems solar energy factor (found by energy delivered \div electrical gas energy put into the system)



Geothermal vs. Nonrenewable

Facts

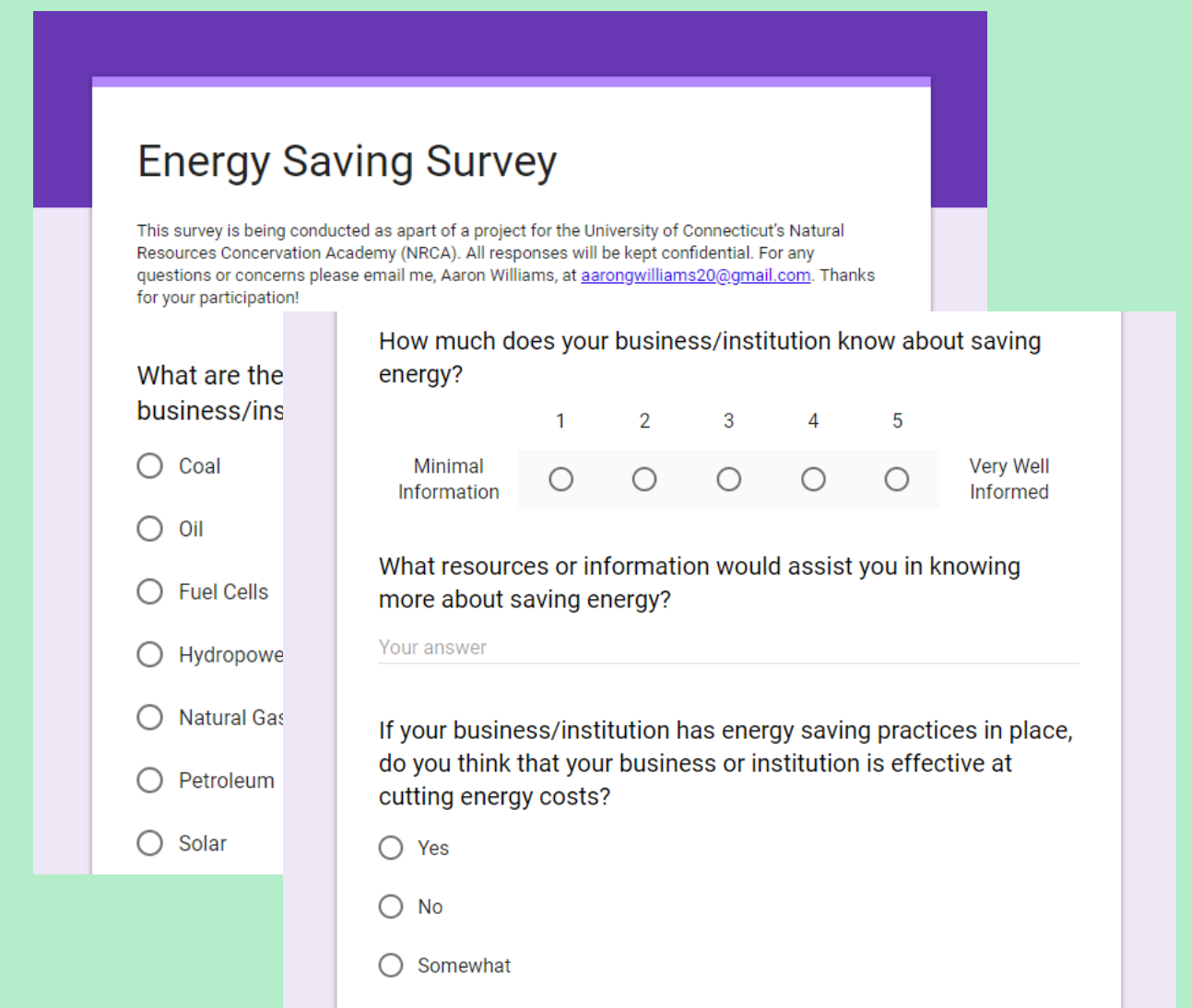
- With geothermal energy, heating costs will be reduced to zero. Using geothermal energy, WaterFurnace units are from 300% to 500% efficient while oil furnaces are only 60% to 85% efficient
- The average cost of installing a geothermal heating or cooling system is about \$8,000
- Installation costs are more expensive for geothermal energy than their other non-renewable counterparts.
- But, a geothermal HVAC setup typically pays for itself in 2-10 years, with \$30,000-\$70,000 in savings



Bloomfield Outreach

Energy Survey

- The survey was distributed to about ten businesses, in hopes that at least five would respond. We are still accepting responses.



- Based on the results, we hope to get an idea of how much information needs to spread about the benefits of energy conservation for both the businesses and the environment.

Main Takeaways

- By switching to a solar water heater in your home, all of your energy needs can be met, while simultaneously reducing 1.12 tons of carbon dioxide emissions.
- When using geothermal energy you aid to a immense amount of carbon dioxide reduction. Geothermal resources used to produce electricity in the United States annually offsets the emission of 4.1 million tons of carbon dioxide.
- When helping in the efforts to reduce CO2 you aid in the reduction of chronic health issues such as asthma or emphysema, aid plant growth, and decrease the likelihood of intense precipitation found in some regions.

References

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Method and Materials

Energy Comparison

- Geothermal and solar energy were chosen to be compared vs. fossil fuels. This reasoning was due to their numerous amounts of practical uses in Bloomfield.
- Use of internet and textbooks for research about cost, emissions, and amount of change required, was gathered in order to conduct a cost benefits analysis of the different energy types

Bloomfield outreach

- Met with Town of Bloomfield officials in order to create a survey which was used to gain an understanding of what Bloomfield businesses knew about energy conservation.
- Contact information for recipients of the survey was found through online research of the companies, and the survey was created using Google Forms.