Energetic House

New Mexico

Supercomputing Challenge

Final Report

April 2, 2013

Team 72

Melrose Middle School

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Executive Summary

Our project is the study of energy resources available to an average American home to determine which ones will be more economically viable, a solar electrical panel, passive solar heating, wind turbine, or geothermal energy. Are there other possible options? We have found out how a typical American family can use an alternative energy source to benefit themselves and the environment.

Problem Statement:

Our project is the study of energy resources available to an average American house. We have found ways that an American family can use an alternative energy source and how it is beneficial to them, as well as to the environment. The importance of our project is to help an average American family save money on energy and to find the best design for alternative energy. The main reason why we are interested in this topic is because so many people waste energy and it costs a lot for them to pay the bills. I know that my project works the way I thought it would because the commercial program we are using could make the overhang of the roof longer to close off the sunlight from entering the home.

Description of Method:

We have used StarLogo TNG to model the energy from the sun and wind for an average New Mexico home. We have used StarLogo TNG to model a house and show different designs for different energy uses. Some of the basic variables that my model takes into account in working on and solving problems are the size of the home and the number of people in the home. We can change the lengths of the roof on top of the house to determine where the sunlight goes through the window. We can also change where the sun is in the sky to figure out how we have to angle the roof to block the sunlight from coming into the home.

Model Verification:

We have compared our project with commercial programs that we have found on the internet. We have found out that our project is very similar to the commercial programs. We have used this program to model a house and how to use an alternative energy source that can be beneficial to an average American family, as well as to the environment. This commercial program has helped our project a lot.

Results of Study:

We have done research on different energy sources and finding how much power they create and how much they cost and what location they work best in. Some of the most important things I have learned about this topic are that you could change the length of your overhang roof to block sunlight from coming in and making the house warm and need the A/C turned on. We researched conservation practices about insulation effectiveness, alternating the direction of windows and awnings in a home, changing thermal mass design, using insulation to conserve energy, and making use of the building components to collect, store, and distribute solar heat gains to reduce the demand for space heating.

Conclusion:

$146 billion money is *wasted on energy* each year. This topic is important because there is a lot of energy wasted each year. Others should be concerned because one day we may not have the resources to make energy to live off of. We have built a model of a home that can show how it can be energy efficient and how it can be produced at a reasonable price. We can prove that it can be beneficial for everyone and the economy by using alternative energy sources. We also found out how we will use

green energy in the future are to lower temperature settings, use compact fluorescent bulbs (CFLs), fixing any leaks in pipes and ducts, reducing the amount of hot water, use low-flow showerheads and faucets, turn off unused devices, control the opening of doors and windows. If we had to explain our project to someone who knows nothing about my topic, or how computers can 'model' a situation, we would tell them that our project is about energy in a home. And finding ways that a home could be modeled to find others ways to energy sources such as, wind, solar, and geothermal energy.

Products of Work:

We have currently done research on different energy sources and finding how much power they create and how much they cost. We have found the amount provided by wind, solar, and geothermal energy; all of which are options for homeowners who wants to save energy. Our research on conservation is mainly about insulation effectiveness. We found research on many websites and books from our local library.

Significant Achievements:

This is the first time we have ever been in Supercomputing. We have learned new things about computers and Starlogo TNG.We have learned how to make PowerPoints and how to make models of energetic home for our project. Some main things we have learned about computer programming are how to make power points and how to use Starlogo TNG. Some things we have learned about 'problem solving' and 'teamwork' in a science activity are that you have to be flexible in order to work with a teammate. The hardest parts about our project were learning how to make a PowerPoint and how to use Star Logo TNG.

Acknowledgements:

We would like to thank the Supercomputing staff for letting me present our power point earlier. Thanks for reading my interim and my proposal as well. We have had wonderful times learning about 'problem solving', 'teamwork' and computer programming. We would also like to thank my sponsors for helping us with this project.