Abstract

The aim of our project is to create a model for a sustainable home in New England that is more efficient and environmentally friendly than previous housing models for the main purpose of lowering the homeowners’ carbon footprint. In order to achieve this goal we have researched the main aspects in house design. These aspects include areas such as: structural materials and exterior aesthetics, interior need-based technologies, green energy options, and ideal housing and room placement. By compiling our research, we have created a model home that appeals to the general New England population. This model offers suggestions of small changes in a house that ultimately lowers its energy consumption. Also, we recommend larger remodeling projects, such as the installation of green energy sources, as homeowners’ investments. Special attention and application of the components we researched contributes to a healthier neighborhood environment. This in turn would optimally create a local appeal in sustainable housing and consequently help minimize the carbon footprint of a homeowner.

The Problem:
Housing in US
Currently homes in the United States waste large amounts of energy daily because of heat loss and inefficient appliances. This squandered energy represents an addition to our carbon footprint that could have otherwise been prevented. Generating our own clean power, revisiting housing, design, and changing home materials and appliances will lower our carbon footprint and help protect our world.

Design Challenges in New England:
1. Varying air temperatures make heat retention in the house more difficult than other locations
2. Unpredictable and sometimes extreme weather patterns present several design challenges
3. Ideas of tradition stand in the way of progress

Generating Clean Energy
There are a variety of ways to generate clean energy for a home. Small wind turbines can be used in some locations but solar panels can be fitted flat with the roof for a more subtle and less invasive set up. In many New England states, homes that produce green energy may sell excess power at retail price if they remain connected to the grid.

Energy Efficient Appliances
Appliances and general products throughout the average home use more power than necessary. By switching to more energy efficient products, such as Energy Star rated appliances, compact fluorescent bulbs, and low flow shower heads, we will be able to cut energy consumption, carbon emissions, and monthly energy bills.

Green Building Materials
The house should be built from environmentally friendly building materials. Using alternative materials instead of lumber and wood shingles will help prevent deforestation. Also, energy efficient windows are essential to conserving energy by retaining heat and coolness in the house. Utilizing recycled materials is additionally important to minimize the environmental impact of homeowners.

Orientation and Landscaping
Orientation is key to a sustainable home. Utilizing nature’s natural light allows for less electricity to be used during the day. Also, trees landscaped around the property will buffer strong winds from the house, allowing the home to retain its energy. Working with nature will help our housing model to be environmentally friendly.

Sample Floor Plan:

Measures of Success:
1. Financial savings on energy over a five year period
2. Significantly less energy is consumed in our housing model over a five year period than the average home
3. Energy consumed is clean and generated by house

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