

Introduction

We in the US use approximately a quarter of the energy produced in the world and yet our population is only 4% of the world population. "It's as if every American citizen had 300 laborers working 24 hours a day for him alone."

On the other hand, energy-efficient habits and recycling can greatly reduce our energy consumption. Currently several experimental practices are under way to improve the learning of energy conscious habits and recycling at middle and high school level.

We take a responsible citizens' approach towards reducing our energy consumption through encouraging energy-efficient practices and recycling.

Aim: We propose to develop a computing program to improve awareness of efficient energy use and recycling, and test the effectiveness of such approaches and inform relevant policy makers that energy efficient and recycling policies are working.

Assumption: The program starts on the basis that students in middle and high school are being taught energy-efficient measures and recycling concepts.

The users: are middle and high school children, parents and school boards and energy state and federal authorities

Large Impact Importance: The computing project is in the arena of renewable energy and energy efficiency, one of the most important societal topic and one of national important.

Show that Energy Efficiency and Recycling Learned in Schools are Implemented at Home

- Using a checklist data set either provided (or created), track the energy efficient measures students learned at school that students applied at home
- Using a checklist data set either provided (or created), track energy self audit practices students learned at school that students practiced at home
- Indicate what percentage of students actually sat with their parents and looked at the energy awareness websites
- Indicate how many parents actually learned energy efficient measures from their children or learned together with their children
- Track how often throughout the year, students interacted with their parents on energy awareness issues (topics)

Project Inputs

- Design a form (electronic and/or hardcopy) to gather information
- Allow the data collection form to be updated (Electronic and/or hardcopy)
- Ensure that the system can track: state, County, School District, states and Household size, e.g. does California practice more energy efficient measure than Florida?

Show that Energy Efficient Practices Learned at School are Being Adopted at Home and are Producing Positive Effects – Expected Data Compilation and Analysis:

To the family household:

- The computer program should be linked to the family's monthly energy bills (at the utility company), or the family should be able to input the monthly electric and water bills for the past 3 years into the program.
- It should be possible to demarcate in the program, the time when energy efficient measures were first adopted by the family.
- The program should be able to make statistical analysis (to be provided) and graph the energy saving in innovative and attractive ways.
- This should be presented as net water and electricity saved, including the monetary value. The program should be able to make adjustments for inflation for comparisons with past years and calculate the net saving after first energy efficient measures were first practiced by the family.
- The program should also make seasonal adjustment
- Allow household to make comparisons of their savings with similar household in the districts, state, across the country and even worldwide. This involves pulling lots of information from other databases.

Federal Agency/Education District

- The software should be able to compile and amalgamate the large data sets from several users and conduct statistical analysis
- The analysis should include combined analysis on kilowatt-hours of electricity saved, water and corresponding monetary savings.
- The software should be linked to databases and the analysis should be broken down into states, counties, and school districts.
- The program should display the data in innovative ways including graphing etc.

Recycling

The program should be able to direct students to sites with information on recycling

A list of recyclable products should be provided in the software so that students can tick against it.

The software should be linked to a pre- and post questionnaire provided to determine if students improved their recycling habits.

Also Please Read the Itemized Version on the next page

Re-Written in Itemized Format:

Computer program should do the following:

General Processing

1. Gather Initial Data for each household, 3 or so years of electric and water data
2. Gather updates from each household
3. Allow users to update/correct records
4. Allow managers to run reports
5. Allow managers to freeze/lock entry for any given time period (for end of quarter/year report processing)
6. Gather information from other databases

Project Inputs

1. Design a form (Electronic and/or Hardcopy) to gather information
2. Allow the form to be updated (Electronic and/or Hardcopy)
3. Insure that the system can track: State, County, School District, and Household-size

Project Outputs

- Ability to let users login
- Allow user to login if they forget password i.e. security test questions
- Allow user to input email address
- Ability to send alert or reminder emails to users if they have not put in monthly data
- Ability to email reports
- Ability to handle missing data in statistical analysis e.g. mean vs. average
- Produce statistical analysis reports
- Group by either of the following or any combination of the following: State, County, School District, etc.
- Display report in data format (column headers, details, totals)
- Display data in graph format (Chart(s))
- Pull information other databases
- Allow Drilldown between the report groupings
- Inform the user where their household compare within the district, County, School District, State and even worldwide etc. (5-stars means excellent for example)
- Consider informing the user where his/her household may improve in energy consumption.
- Allow reports to filter by date range
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Project Constraints/Opportunities

- Public library does not allow users to install software on the computers
- Data details from your own electricity bills may be used for design and testing

- Consider common denominators between electricity bills obtained from Several Counties e.g. monthly bills.
- The system should be able to identify and flag outrageous data inputs for re-entry or for exclusion.
- Electric and water rates will be different for different counties and states, consider combinations of actual rates, adjusted rates, and leverized rates etc
- Could be more visual?
- Design system to be user friendly (given the client's age range and experience)
- Information on databases to be included in the program will be provided to the students

More Justification- One Example

Renewable energy is currently one of the most important topics, politically, socially, and economically. Among the major threats the world faces are climate change and energy issues, the cause of several wars in recent history. Energy issues will only likely get worse as the world population continues to grow. Energy efficiency practices will help alleviate many of the energy issues. For example Congress mandates that light bulbs be at least 25% more efficient by 2012, through the use of compact fluorescent lights (CFL). While compact fluorescent lights currently cost more than the regular lights, estimates show that an average household could save \$360 through the use of CFL in the first year and up to \$638 per year by year seven (Shahriari, 2009). When inflation rates and other factors are considered, if the 125 million American homes adopted CFL, that would add up to a national saving of \$426,875 million per year (Shahriari, 2009). The \$426,875 million energy savings figure is through adopting the use of CFL alone, when other energy efficient measures are practiced, that figure grows up exponentially. This corresponds to reduction of millions of CO₂ emission per year.