Navitas, It's Latin for Energy

New Mexico
Supercomputing Challenge
Final Report
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Team #27
Bosque School

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Summary:

Our project this year is a project based on solar energy. We have decided to model our school, its energy use, and how solar energy could replace our current source of power for electricity. We have taken PNM bills from our school and compiled them to find a daily and monthly average for energy usage. We have also found how many watts to the dollar we get from PNM. Our plan was to replace our entire energy system with solar panels; however, we found this to be unrealistic with how much energy the school uses. It would take a solar farm of about 16square miles to help fill our power needs, in terms of electricity. We are not taking gas

(heating) into account. Our model so far is showing us that even with the right number of solar panels that their efficiency might hurt in filling our power needs.

We are still working on our model and what variables we might add in. As for right now we are looking into larger solar panel systems (larger than 200 watt). We are also finding out if creating a small solar farm for our school would nock out a large amount of energy use and if we would actually prosper in the long run (i.e. selling energy back to the grid, mostly during the summer when there is little use of the system).

If we have time left before the expo we hope to make a future plan about what is plausible for our school in creating a small solar farm. Our school is right on the banks of the Rio Grande and we do our best to be green. This type of plan should help us achieve our goal, or at least get it a few steps farther.

Problem:

Our school is known for being green. Most of our buildings are built to use natural lighting and the glass used on all doors and windows in thick to help keep heat in the buildings. However we have noticed that even with these practical tools we are still using a great amount of energy and with our struggling economy that is money we can't afford to waste. We need to look to alternative energy sources that can be replenished.

Method to Solve:

Even though there are a number of alternative energy sources out there we plan to work with solar panels to help our schools energy "crisis". Since we live in sunny New Mexico solar energy would be a wonderful place to start in our resources search. We plan to find how solar panels work, how much energy the school is using and gather an idea of if solar energy can

fulfill our needs. Our model will have several variables including weather, number of panels, efficiency, and possible costs.

Results/ Conclusion:

After working with the numbers and our model we have found that the results of our study are very unrealistic. In order to make a facility like our school run using only 200 watt solar panels we would require a space of 16 square miles. First of all we do not have that kind of space at or around our school, but further more it would be a waste of space and possibly other valuable resources, or nature. We think that we can create a small solar farm using the roofs of the buildings at our school which could nock of a good chunk of energy used from the PNM power grid. Unfortunately as our project comes to an end we have just discovered large solar units that might have been more realistic to our project. It is unfortunate because we have practical no time to adjust our project and gather more information about this new system.

Products of Work:

For our code we have switched over from Java to NetLogo. We have also produced a flow chart of how the code works. It models first the input of energy, starting with the weather and the number of solar panels influencing how much energy is coming into the system, and there was also a random factor in the output even though it was always fairly steady.

We also found how long it would take to repay the investment in these solar panels. This we did through finding not only the cost of solar panels but also the cost of watts per dollar. Thus when we had excess energy we would sell it and decrease our debt. We are currently working with these numbers and testing them on our model to find our how long, and how much energy it would take to pay the school off. We should have them by the expo.

Achievements:

Our greatest achievement would have to be, by far, realizing that it was impractical to completely convert to solar energy and then problem solving to figure out ways that we could incorporate the energy that is being used now with solar energy. The reality of having something thought up and then seeing how it realistically plays out changes your whole outtake on what's happening. Accepting and realizing the limits and having to change things in order for them to be more realistic was a major achievement. Having to all work together to brain storm on different possibilities and then problem solve to see which would work best.

Acknowledgment:

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