

## WHEN THE WIND BLOWS



Dear Mathematicians, Chemists and Physicists,

I am writing you to request your help and expertise on an important district issue. As a school district, we are attempting to plan for the future in our energy uses and consumptions. Due to the current political and financial settings, as a district, we feel it is pertinent to begin investigating options for increased energy independence on our school campuses.

As such we are hoping to enlist your expertise to help us begin to confront the issues surrounding this endeavor. As a group of collaborating scientists and mathematicians we would like you to:

- Investigate the feasibility of implementing energy production facilities on the high school campus
- Make recommendations on the best energy sources for Thermopolis while considering cost, location, available natural resources and feasibility
- Examine and analyze local data on available energy sources
- Consider the current electricity usage for the high school and make recommendations on cost saving possibilities, as well as, provide estimates of energy offsets from the decided most viable energy source
- Provide a working prototype of a viable energy production option
- Report your findings and recommendations to the school board and community on March 1, 2012

We recommend that you regularly document and communicate your research and findings using a website, we have taken the liberty of starting a site that you may use as a repository (it may be found here: <http://goo.gl/l8eJj>).

We feel it is also important to outline the tasks that we foresee each of your specialties to be best suited for, these are outlined in more detail below.

Mathematicians:

- Describe the relationship between linear and angular velocity of turbine blades
- Investigate wind speeds at a variety of altitudes and locations on campus
- Correlate blade area swept to wind speed and energy generation
- Construct wind turbine models for data collection and analysis
- Describe the various parameters of the sinusoidal equation
- Modify design and materials to perfect the turbine model collecting data to support prototype

Chemists:

- Describe the cause and effects of global warming/climate change

- Explain the implications of peak oil
- Describe the relationship between carbon footprint, carbon credits, and cap and trade
- List different types of alternative energy sources
- Explain the risks and benefits of alternative energy resources
- Determine the most feasible energy source to use in Thermopolis, WY

Physicists:

- Describe how electromagnetic induction is used to generate electricity
- Develop an operational definition for insulators and conductors
- Describe the workings of a common generator and electric motor
- Determine the best wind turbine blade configuration and construction material

As a school board and community, we look forward to hearing your conclusions and recommendations October 1, 2011 Please contact us if we can be of any assistance. We will be sending along some initial data about the energy use at the high school.

Your expertise is greatly appreciated,

A handwritten signature in black ink that reads "Dustin D. Hunt". The signature is written in a cursive style with a large initial "D".

Dustin Hunt  
Superintendent of HSCSD #1