Power Your School: Working with Dallas-Fort Worth Schools to identify alternative energies for their campus

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Abstract

K-12 curricula worldwide lack a strong emphasis on alternative energies, particularly solar and wind power. To counter this, the University of Cambridge has developed the "Power your School" initiative, a program where students learn to map their school and local area, predict where the best sites for solar panels may be, use scientific equipment accurately, record results, and make conclusions. TCU Chemistry Club has partnered with this initiative to help local elementary schools implement and investigate the benefits of renewable energy, assist in calculating the financial benefits of solar panels over a span of multiple years, and to help young students use proper design and debating skills to persuade the decision makers of Texas into investing in renewable energy by creating a poster and presenting it to them directly. Methods and results of this project will be presented.

Energy Mapping Challenge - Global

(US, UK, Spain) / US : Texas

Energy Mapping Challenge

Goal: Teach young students (ages 8-11) about the benefits of renewable energy through an interactive online, open-access data logging platform.

- The students **become** the researchers!

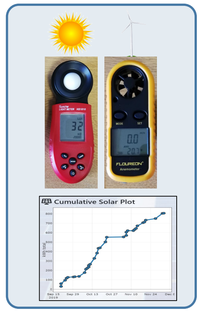
We ask students to collect wind and solar measurements and log their data at frequent time intervals over a multi-week period (duration school dependent).

We provide:
- Introduction session and demonstration
- Measurement instruments and website access
- Evaluation surveys before/after challenge

Our Fort Worth School Partner:

Cambridge UK Partners
Dr Beth Tennyson / Stuart Macpherson / Dr. Sam Stranks

Platform & Equipment (robust and low-cost)



Train Elementary Students to Collect Scientific Data

• Choosing locations

Locations were selected based on the amount of direct sunlight present. To demonstrate the reasoning for each location, elementary students were given UV beads that would change colors when exposed to the sun.

• Collecting data

- **Time & Location**
- **Weather**

Sunny | Partially Cloudy | Very Cloudy | Stormy

- **Wind Direction**

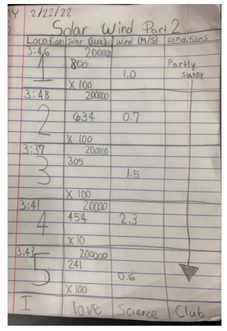
Determined by dropping grass or a flower and following the direction it would fall.

- **Wind Power**

With help from TCU volunteers, document the number on the screen of the Anemometer in units of m/s.

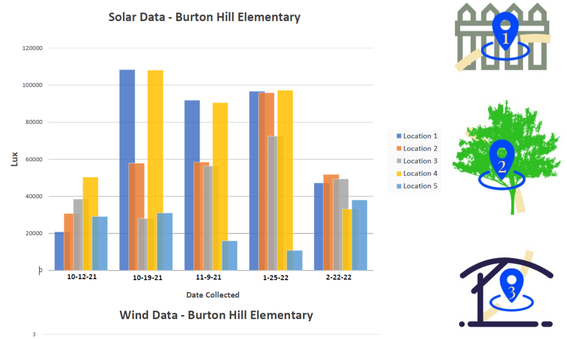
- **Solar**

Point the Sunche Light Meter at the sun and record the number in terms of lux.



Example of Student Notebook

Solar & Wind Data



Data Interpretation

- The solar data depicted (top, above) suggests that location 4 receives high intensity sunlight throughout the five dates of data collection. Location 4 corresponds to the location with 100% sunlight i.e. data collection was done in an open field. Thus, as expected, it would make an excellent location for the installation of solar panels.
- The wind data suggests that location 2 is a good place to install wind turbines. It receives a relatively high intensity of wind. Most importantly, the wind intensity at this location is the most consistent among the five dates of data collection.

Challenges Faced

Local

- Issue of renewable intermittency creates volatility in determining a dependable source of energy

State

- Exacerbation of energy sprawl
- Not maximizing potential of wind and solar energy

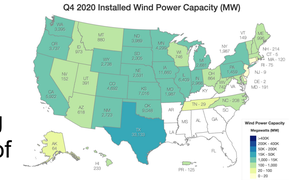


Fig 1. Wind Power Capacity
(Source: American Clean Power Association)

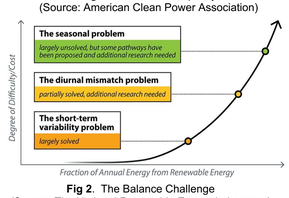


Fig 2. The Balance Challenge
(Source: The National Renewable Energy Laboratory)

• Texas has the most wind energy capacity in the U.S. (33,133 MW) represented in Figure 1.
• Potential Capacity: 1.3 mill MW

National

•Balance Challenge
• Assessing the economic pressures of the supply and demand of renewable sources based on timescales shown in Figure 2.

Outcomes

- Students gained an understanding of how to collect and record data
- Spanish manual produced by TCU Biology colleague, Dr. Lara Luque

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