

Pre-Workshop Instructions for April 16, 2015

The Challenge: "Design a Solar Photovoltaic System for Your School"

Updated: 3/26/2015

Students are expected to accomplish the following prior to the workshop:

1. View the short PowerPoint on Solar energy sent for your class.
2. Have an understanding of the differences between Watts, Kilowatts, Megawatts, Kilowatt hours, DC and AC power.
3. Determine how much electricity (kWh) their school consumes annually, and the total annual costs of acquiring this energy.
4. Determine the location of unimpeded space that could be used to place solar panels (parking area, empty fields, roof tops etc.).
5. Use free solar energy system design software ([HelioScope](#); see details below and attached) to determine the space and components needed to build a system (panels, rack mounts, electrical components, etc.)
6. Use a solar energy calculator (attached XLS) to determine the amount of energy cost savings and reduction in CO2 emissions from the system they have designed.
7. Identify potential project implementation issues.

DETAILED INSTRUCTIONS

1. Find out how much electricity your school used in 2014 (this is best found on your school's electric bill and is in the form of kilowatt hours), and the total amount it paid for that electricity. If your school currently has a solar array, try to use the utility bills for the year *prior* to installation.
2. Regardless of whether your school does or doesn't already have a solar array, visually identify all the locations of unimpeded spaces that could be used to place solar panels (parking area, empty fields, roof tops etc.).
3. If your school does not have a suitable location for a solar system, choose another school building in your district or neighborhood.
4. Sign in to HelioScope at the following link <https://www.folsomlabs.com/>. See ***Tips for Using Helios Software***.
5. For the class' final project design, enter the Username and Password below that has already been set up for each school
 - A. User: **BergenSolar@vcrn.com** , Password: **Bergen*HS**
 - B. User: **MorristownSolar@vcrn.com** , Password: **Morristown*HS**
 - C. User: **ObamaSolar@vcrn.com** , Password: **Obama*HS**
 - D. User: **RahwaySolar@vcrn.com** , Password: **Rahway*HS**

Note: Any student also can set up their own free HelioScope account to experiment with but ONLY the ACCOUNT ABOVE CAN BE USED TO SAVE THE FINAL SOLAR DESIGN FOR YOUR ENTIRE SCHOOL OR CLUB TO USE AT THE WORKSHOP.

6. Create a new project and a design for your school's solar system -*refer to attached for specific tips on using HelioScope*
7. Complete the XLS Calculator (attached) by inserting a) your school's energy use and cost, and b) the calculations made by HelioScope for the your recommended array for 1) number of panels, and 2) number of inverters, 3) the Theoretical Nameplate Capacity (DC kw) generated by the system. Note: As you enter these values, other calculations (e.g., system cost, savings) will be automatically made by the spreadsheet.
6. Save a final version of the calculator for the entire class or club using the **filename** below appropriate to your school.
 - E. **BergenSolar.XLS**
 - F. **MorristownSolar.XLS**
 - G. **ObamaSolar.XLS**
 - H. **RahwaySolar.XLS**

Note: ONLY THE FILENAME ABOVE SHOULD BE USED TO SAVE THE FINAL SOLAR CALCULATIONS FOR YOUR ENTIRE SCHOOL OR CLUB TO USE AT THE WORKSHOP

8. Email the final class/club spreadsheet file to jcloud@fdu.edu by *no later than April 14*.
9. Identify a list of potential issues you might expect to have to deal with in order to actually implement the solar array you have recommended for your school. All students should bring this list of implementation issues to the workshop.