



SMART LIGHTING ENGINEERING RESEARCH CENTER

*Lighting Innovation for a Smarter Tomorrow*



Rensselaer



CENTER FOR  
FUTURE ENERGY SYSTEMS  
RENEWABLE ENERGY • ENERGY EFFICIENCY • FUEL CELLS & HYDROGEN

A NYSTAR Designated Center For Advanced Technology

# Renewable Energy

## Smart Power and Light for High School Students

June 24, 2010

Dear Summer Program Students:

Welcome to the Renewable Energy Program for high school students. This is an excellent opportunity for you to broaden your experience within the relevant area of renewable energy. The following fundamentals of renewable energy and storage systems will be discussed:

- Converting the energy from wind, solar, hydrogen, and others to usable electrical energy.
- The role of power devices and power electronics systems in energy conversion.

It is also a great opportunity for us to work with the bright young minds of future scientists and engineers.

All indications are that you are planning to attend this program. Please confirm by signing this form and handing it in on Monday, June 28 along with the other materials requested.

\_\_\_\_\_ I will be attending the Rensselaer Renewable Energy Program the week of  
June 28 – July 2, 2010, at 9:00am – 4:00 pm (exception Thursday,  
July 1 pickup @ 4:30 pm)

\_\_\_\_\_ I am NOT available to participate in the Rensselaer Renewable Energy.

Print Name: \_\_\_\_\_

Signature: \_\_\_\_\_

**This program is available at no cost because of the grant funding made available through  
the National Science Foundation (NSF)  
and New York State Technology and Research Authority (NYSTAR).**

Paperwork due on Monday, June 28, 2010

The program will begin in the Center for Industrial Innovation Building (CII), Room 3130 from 9am to 4pm. For directions to the RPI campus, please go to <http://www.rpi.edu/tour/directions.html>. You can ask your parent/guardian to park at the Visitor Information Center (VIC) on 15<sup>th</sup> Street. Park in the visitor's parking lot. Please note: If you will need to park the car for more than 10 minutes in the visitor parking lot (next to the VIC), please put quarters into the meters. Walk across the pedestrian bridge. Bldg. CII is the large white building in front of you after crossing the bridge. Room 3130 is in the left-hand side annex of the building.

Lunch will be provided each day. Bring snacks and a refillable water bottle if you deem it necessary. Please bring a composition notebook and pen or pencil.

Pick up will be at 4:00 pm at VIC everyday with the exception of Thursday, July 1. We will be returning from a field trip at GE Research and expect to return on campus at 4:30 pm.

**The following information (attached) must be completed and brought on the first day of the program.**

- Student information form – if under 18 yrs of age signed by your parent/guardian.
- Photograph permission slip completed
- Field trip permission slip
- Energy Audit Questionnaire

Questions? Or if your parent / guardian needs to contact you anytime during the day, feel free to contact Elizabeth Herkenham at 518 852-8676 or [elizabeth.herkenham@wcet.us](mailto:elizabeth.herkenham@wcet.us)

Or Rebecca Burnham at 518 276-3651 or [burnhr2@rpi.edu](mailto:burnhr2@rpi.edu)

Sincerely yours,

Elizabeth Herkenham  
Educational Outreach Support  
Rensselaer Polytechnic Institute  
Smart Lighting Engineering Research Center

## Required Preparation for the Program

Please complete the following assignments before June 28<sup>th</sup> and bring your answers with you to the program. During the course of the program, you will analyze the numbers to determine the feasibility of using only renewable energies to meet your family's energy needs.

1. Fill out the following table about electricity and natural gas usage at your home over the past 12-month period. The information shall be available from your monthly utility bills.

Energy	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Electricity (kWh)												
Natural Gas (CCF)												

2. On the average, what is the total number of miles your family drives each year (with all vehicles combined)? How many gallons of gasoline are consumed? You can ask your parents for a rough estimate.
3. Do a light bulb survey at your home, including bulbs used both inside and outside. Specifically list the number of a) incandescent bulbs, b) compact fluorescents (CFL), c) standard fluorescents, and d) solid state (LED) bulbs. Include wattages if you can.
4. Do an online search to find a) the annual total number of hours of sunshine, and b) the annual average wind speed in the Albany/capital region/area.
5. List at least three examples of how we use light in our lives besides the usual illumination inside and outside our homes associated with the light bulbs you listed above.