

ENERGY EXCHANGE

Pacific Gas & Electric Solar Expo to Feature Solar School Program Projects

On May 6, teachers from throughout the PG&E service area in northern and central California will attend an exciting Solar Energy Expo and Conference in Stockton. Highlights of the event will include presentations and demonstrations from the more than 100 teachers who have received PG&E Bright Ideas Grants, and teacher training sessions on solar, wind, climate change, and energy management.

According to Karalee Browne, PG&E's program manager for charitable contributions, "Since the program began in 2004, PG&E has had the opportunity to provide funding to support innovative solar projects for teachers throughout northern and central California. The originality and depth of these projects is truly amazing! We are organizing the Energy Expo event to give our Bright Ideas Winners a venue to showcase their talent in hopes of inspiring others to create projects that teach students and the community about the benefits of renewable energy."



Among the teacher projects to be presented at the Expo will be Mary Funk's solar-powered habitat that she built with native plants in the middle of her outdoor energy learning center. When was the last time you built a river?

PG&E and NEED work together to provide teacher training on solar energy and related content to

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Coming This Summer

EIA's all-new energy education site.

Perfect for high school!

The Energy Kid's Page is getting a makeover!

Easier to use, easier on the eyes – same great content

www.eia.doe.gov/kids

GULF POWER TEAMS WITH NEED FOR NEW ENERGY EDUCATION PROGRAM

Beginning this month, Gulf Power and NEED will team up for a comprehensive energy education program for middle school science teachers. The program will emphasize conservation principles not traditionally promoted through existing programs, such as renewable energy alternatives.

According to Lynn Erickson, energy education coordinator with Gulf Power, "we'll be offering a wide range of programs and activities for school district science

coordinators and teachers from 39 middle schools in northwest Florida. They'll be covering such topics as coal- and gas-fired generation, alternatives like solar, wind and biomass, and energy conservation and energy efficiency."

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Gulf Power's Bob Cordes and Sharda Scott help fifth grade students graph the movement of straw "rockets" in a nature of science project demonstrating Newton's Laws.



CALENDAR OF EVENTS

April 2009

- 2** Maryland Energy Workshop sponsored by ConocoPhillips (Annapolis, MD)
- 2** H2 Educate Hydrogen Workshop at National Hydrogen Assn. conference, sponsored by U.S. Dept. of Energy (Columbia, SC)
- 7** Massachusetts Energy Workshop sponsored by ConocoPhillips (Boston, MA)
- 8** H2 Educate Hydrogen Workshop, sponsored by U.S. Dept. of Energy (Mohegan Sun, CT)
- 14** H2 Educate Hydrogen Workshop, sponsored by U.S. Dept. of Energy (Portland, OR)
- 14** Texas Energy Resources Workshop, sponsored by EnCana (Plano, TX)
- 15** Illinois Energy Workshop sponsored by ConocoPhillips (Chicago, IL)
- 15-16** Energizing Kentucky Conference (Lexington, KY)
- 21** North Carolina Energy Workshop sponsored by ConocoPhillips (Raleigh, NC)
- 21** Texas Energy Resources Workshop, sponsored by EnCana (Plano, TX)
- 22** Texas Energy Resources Workshop, sponsored by EnCana (Plano, TX)
- 23** H2 Educate Hydrogen Workshop, sponsored by U.S. Dept. of Energy (Orlando, FL)
- 25** Energy WISE Awards Ceremony (Kenton County, KY)
- 28** Oklahoma Energy Workshop sponsored by ConocoPhillips (Tulsa, OK)
- 30** Nuclear Energy Workshop, sponsored by Washington and Lee University and the Lenfest Foundation (Lynchburg, VA)

May 2009

- 3** NEED Wind Workshop at Windpower 2009 (Chicago, IL)
- 5** Detroit Energy Workshop, sponsored by ConocoPhillips (Livonia, MI)
- 6** PG&E Solar Schools Energy Expo (Stockton, CA)
- 7** Baton Rouge Energy Workshop sponsored by ConocoPhillips (Baton Rouge, LA)

7 OTC Energy Workshop, sponsored by the Offshore Technology Conference (Houston, TX)

11-13 NEED presentation at the National Hydropower Conference (Washington, DC)

13 Ferndale Energy Workshop, sponsored by ConocoPhillips (Ferndale, WA)

13 Colorado Energy Workshop, sponsored by ConocoPhillips (Golden, CO)

19 Kentucky NEED Youth Awards Ceremony (Frankfort, KY)

June 2009

8-12 Kentucky Energy Tour (Eastern Kentucky locations)

26-29 Youth Awards for Energy Achievement (Washington, DC)

July 2009

9-13 NEED Facilitator Training (Washington, D.C.)

19-23 NEED Energy Conference for Educators (Nashville, TN)

26-29 Nuclear Energy Conference for Educators (Charlottesville, VA)

Kentucky Fourth-Graders Prepare to Teach Energy to Other Students



Students in Michelle McMillen's fourth-grade class at New Haven Elementary School in Boone County, Kentucky, work on NEED's Science of Energy materials during class. Once they master the materials, they'll present them to other classes at their school.

PG&E Solar Expo (from page 1)

schools in northern and central California, and teachers attending this free program will receive NEED kits and curriculum materials.

Barry Scott, NEED's California state program director, said that "One of the highlights of the day will be the ribbon-cutting for a 1-kW photovoltaic (PV) system provided by PG&E to Venture Academy, one of the 25 recipients of the PV systems in 2008." This is PG&E's 125th school system installed as part of this service area-wide educational initiative.

"What I'm especially looking forward to," Barry added, "is seeing the projects these teachers and their students have put together since the program began in 2004. They include Mary Funk's (Burrell Elementary School in Fresno) slides of her solar-powered 150-foot long riparian habitat, a flowing river with native plants located down the center of her outdoor energy learning center, and Mike Challender's (Winters High School in Winters) student-made photovoltaic cells comprised of glass slides treated with the juices of raspberries."

This is the fifth year of PG&E's Solar Schools Program, the largest of its type in the country. It helps schools access resources to enhance the classroom experience, teaches students about solar power, and provides training to teach about energy conservation and energy resources. This year alone, PG&E will provide grants allowing up to 1,000 teachers to attend workshops and receive NEED hands-on science kits and curriculum. The company also awards \$200,000 to local schools for grants of \$250 to \$10,000 to fund solar science projects. An additional grant for 2009 allows the 125 solar schools to apply for a large rooftop PV installation valued at \$200,000.

Looking over the projects that will be displayed and discussed, Barry said "I'm fortunate enough to work with some of the brightest and most energetic teachers in the state, and we are very fortunate to have PG&E's support of our efforts."

For more information on the Expo, visit www.need.org/pgesolarschools/ssc.html.

Why are these grown men stretching rubber bands across their foreheads?



Mike Sandlin, David Collins and Kelly McCormick (left to right) showed other teachers a neat way of demonstrating how motion energy can transfer into heat energy at one of last year's National Energy Conferences for Educators. It's the kind of teaching tip you'll learn about at this summer's conference in Nashville.

Gulf Power (continued from page 1)

Activities already planned for this summer include a day-long program with training in NEED materials. Participating teachers will be provided with extensive curriculum materials and classroom hands-on kits. Erickson said that Gulf Power will also be setting up online services and materials on their web site with links to national and state education resources.

"A key component of our overall project will be our support of teachers with NEED materials and presentations," she noted. "We're starting this month with Energy Expo events for middle schools by introducing students to energy through a series of stations staffed by Gulf Power employees, giving overviews of energy sources, talking about careers and the math and science skills needed for work in the energy industry, and games and activities like NEED's Energy Jeopardy and the Rock Band Challenge. Teachers will get NEED materials with the information they'll need for their classes and the activities for hands-on student learning."

One unique part of the program will be an Energy Challenge school competition with school district energy managers and school principals promoting competition for students to develop energy efficiency and conservation plans for their schools. Gulf Power will give prizes and other forms of recognition to the winning school and promote the best student tips and details on the biggest energy savings.

Their program will also include a mail-in energy survey to every eighth-grade student that will include a custom home energy profile with suggestions for ways to help their family save energy in their home.

For more information, go to www.need.org/.

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The NEED Project is a 501(c)(3) nonprofit education association providing professional development, innovative materials correlated to the National Science Education Content Standards, ongoing support, and recognition to educators nationwide.

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Energy Exchange is published four times a year by NEED for educators and students. We welcome your questions, comments and suggestions.

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PRIMARY LEVEL ACTIVITY

LEAF ME ALONE

Before the Investigation:

Read a book to your students about energy and/or the sun. You can use the [Primary Energy Flipbook](#) which you can download at www.need.org, or you can check out books on the topic from your library.

The Investigation

Question:

What will happen if the sun cannot reach a plant's leaves?

Materials:

-  Leafy plant(s) – You can have one for the class, or multiple ones so you can have small groups each conduct the investigation.
-  Black construction paper
-  Science notebooks or paper for recording observations

Procedure:

1. Students should record in their science notebooks predictions about what will happen.
2. Cut out 5-10 pieces of black construction paper so each piece is large enough to cover a leaf.
3. Tape the paper to different leaves. You should have some green (regular) leaves and some black (covered) leaves.
4. Students should draw a picture and label the parts of the plant with leaves covered and uncovered.
5. Place the plant in the sun for one week.
6. Uncover the leaves and examine what happened. Students should draw new pictures of the plant. They should be encouraged to draw close-ups of a leaf that was uncovered and a leaf that was covered.
7. If you have time, you can repeat steps 4-5 for another week.
8. Draw a conclusion as a class. What happened? Why?



ELEMENTARY LEVEL ACTIVITY

SOLAR ENERGY RACE

Focus Question

What makes an ice cube melt?

Materials

For each group:

- 3-5 ice cubes of same mass
- Container to hold ice cube (e.g., plastic baggies)
- Graduated cylinder or other method for measuring water
- Materials for enhancing ice cube melting (e.g., mirrors, insulating materials, glass, dark cloth)

Timer

For Each Student:

- Science notebook



Procedure

1. Assign students into small groups. Within their groups, have students brainstorm ways to melt an ice cube using only solar energy.
2. Have each group decide on the best idea and plan how to build and test their method. In science notebooks, each student should write out a list of materials and procedure for melting the ice cube. Approve each group's plan and materials list.
3. Allow time for each group to build and test their method. Each student should document observations and any changes made during testing in their science notebooks.
4. Allow time for groups to analyze test results and revise designs as needed. Have students document the final group method.
5. For the culminating Solar Energy Race, give each group an ice cube to melt. After ten minutes, have students stop and measure the amount of water they have collected. The group collecting the most water is the winner.

Conclusions

1. Name two things that impacted how fast your ice cube melted and explain how they affected the ice cube.
2. Did you change any design elements to improve how fast your ice cube melted? Was the change successful?
3. If you were stranded on a snow-covered mountain top, what could you do to make some water to drink?

Teacher Tip

You can use the materials in the Exploring Solar Energy Kit (radiation cans, concave mirrors, plastic containers and beakers) instead of having students bring in their own materials.

INTERMEDIATE and SECONDARY LEVEL ACTIVITY ENERGY HOUSE

PURPOSE:

To explore energy conservation/efficiency measures, to insulate your housing using materials from the Building Center according to the Building Code, and to calculate the energy savings over a 10-year period.

MATERIALS:

One 12"x12"x12" box for each group, scissors, glue, ziplock bags, ice cubes, thermometers, meter sticks, and the Building Materials listed on the Building Center Cost Sheet.

PROCEDURE:

- ☉ Draw two windows (10 cm x 10 cm) and one door (10cm x 20cm) on your house.
- ☉ Carefully cut out the windows and the door, leaving one side of the door attached.
- ☉ Examine your house to determine its insulation needs. Read the Building Code.
- ☉ Examine the materials available and their cost. As a group, decide which materials you want to use and the amount. Record your plans and the cost in your science notebook.
- ☉ Purchase the materials and insulate your house, following the Building Code. You can purchase additional materials if you need them, adding them to your Cost Sheet.
- ☉ When your house is finished, fill a plastic bag with eight ice cubes, place it flat on the floor of the house and close the house.
- ☉ Measure and record the temperature of the classroom in your science notebook.
- ☉ While you wait, draw a diagram of your house in your science notebook. Explain the insulation measures you took and give the reasoning behind your choices.
- ☉ After 10 minutes, record the temperature of your house at ceiling level by carefully sliding the thermometer into the house through the top of the door, taking care not to allow cool air to escape. Record the data in your science notebook.
- ☉ Calculate your energy savings in your science notebooks.
- ☉ Compare your energy savings with that of other groups. What would you do differently if you could do the activity again?

BUILDING CENTER – COST SHEET			
AMOUNT		@	TOTAL COST
_____	Mailing Tape	@	\$0.50 roll _____
_____	Plastic Film	@	\$0.25 each _____
_____	Aluminum Foil	@	\$0.20/meter _____
_____	Poster Board	@	\$0.50 each _____
_____	Bubble Wrap	@	\$1.00/meter _____
_____	Cotton Batting	@	\$0.75/meter _____
_____	Padded Paper	@	\$0.50/meter _____
_____	Caulking	@	\$0.01/cm _____
_____	Weatherstripping	@	\$0.01/cm _____
TOTAL COST FOR MATERIALS:			_____
1. ROOM TEMPERATURE (°C): _____			
2. HOUSE TEMPERATURE (°C): _____			
3. DIFFERENCE (D) IN TEMPERATURE (°C): _____			
$\text{Total Savings} = [D \text{ } ^\circ\text{C} \times (\$3.00 \text{ } ^\circ\text{C/year} \times 10 \text{ year})] - \text{Cost of Materials}$			
4. TOTAL SAVINGS:			_____
5. IF I DID THE ACTIVITY AGAIN, I WOULD CHANGE:			

BUILDING CODE

- The door must open and close. If you add a storm door, it must open.
- Windows do not have to open, but you must be able to see through them.
- The ceiling must be at least 5 cm above the top of the door.
- Insulation on the floor and walls cannot exceed 1 cm in thickness.
- No insulation can be exposed. All insulation must be covered by a ceiling wall or floor (poster board).

To view the complete [Energy House Guide](http://www.need.org), go to www.need.org.

NEED NEWS

Deadline Coming Up for 2009 Youth Awards

There's still time to submit a project for NEED's 29th annual Youth Awards Program for Energy Achievement to be held June 26 – 29 in Washington, D.C. Deadlines for projects to state coordinators is April 15 and to NEED headquarters by April 20. The program combines educational opportunities, community outreach, and a commitment to student leadership with recognition for outstanding teachers and students involved with NEED during the past year, acknowledging those who achieve excellence in energy education in their schools and their communities.

A teacher who attended last year's Youth Awards says:

"The NEED Youth Awards gives an opportunity for me and my students to celebrate together the year of hard work put into our NEED project. The team grows closer, has a blast attending the NEED events, meets other students from across the country, and learns about our nation's history as we tour Washington D.C. Thank you to all of the NEED staff who make this awesome event possible. We are already making plans and can hardly wait til June for the fun to begin!!"

-- Connie Bond, Huntingdon (TN) Primary School

ENERGY STAR^(R) Expands 2009 Recycling Campaign to Clothes Washers

From April through July, ENERGY STAR^(C) encourages you to recycle old appliances and purchase new, more efficient ones. NEED is pleased to work with ENERGY STAR on this year's campaign on recycling clothes washers, and is currently preparing a *Recycle Your Clothes Washer Teacher Guide*.

Some Facts about Clothes Washers:

- An estimated 84.1 million households have a top-loading washer, and 24 million of these are 10 years old or older.
- Combined, these inefficient appliances cost consumers nearly \$5.3 billion per year in energy costs.
- Clothes washers manufactured before 1999 use more than four times the energy of today's ENERGY STAR models.
- An old washer could be wasting nearly 30 gallons of water every time you do a load of laundry. Over the lifetime of the washer, you'd be wasting water equivalent to 10 and a half years of daily baths!
- If every American home replaced their old washers with ENERGY STAR qualified models, together we would save enough water to fill the Rose Bowl more than 8,000 times, enough energy to light nearly 6.2 million homes for an entire year, and more than \$1.3 billion in annual energy costs.

Nuclear Energy Conference and Workshop Series Set for Educators

As NEED, Washington and Lee University, the Lenfest Foundation, and the Council on Foreign Relations complete the new NEED Nuclear Energy module, plans are under way for the **Nuclear Energy Conference for Educators** scheduled for July 26-29. Up to 40 educators from across the country will be accepted to participate in this training program to be held in Charlottesville, Virginia.

The conference will include presentations from noted experts in the nuclear field, including Dr. Frank Settle of Washington and Lee University and Dr. Charles Ferguson of the Council on Foreign Relations. The conference is a mix of presentations and hands-on activities designed to expand knowledge of energy and nuclear energy while providing teachers with resources to take back to their classrooms and use this fall. The conference will also include a tour of the North Anna Nuclear Information Center and AREVA NP Inc.'s facility in Lynchburg (AREVA is the world leader in the design and construction of nuclear power plants and research reactors, engineering, instrumentation, and related services to the nuclear industry).

Educators teaching grades 6 - 12 are encouraged to apply. All expenses will be covered by the conference sponsors.

NEED is also pleased to launch a **one-day nuclear workshop series** beginning with an April 30 workshop at Central Virginia Community College in Lynchburg, Virginia. The workshop will provide local educators with the opportunity to learn more about energy and nuclear power while exploring workforce development opportunities for their students. There will also be a tour of AREVA NP Inc.'s facility. Workshops will include such topics as how the forms and sources of energy connect, generation of electricity from uranium, used/spent fuel storage, licensing and permitting, building new reactors/power stations, and workforce development. Classroom lessons and activities will help teachers explain radiation, the nuclear fuel cycle, nuclear energy and society, and other topics of current interest.

To apply for the conference or register for the workshops, visit www.need.org/nuclear.

NEED Workshops Set for New England

Two NEED teacher workshops will be held in Massachusetts this spring as part of a new program with the Independent Petroleum Association of America (IPAA). The workshops will bring NEED curriculum and teacher training to Massachusetts educators.

Barry Russell, IPAA's president, explained that the teacher program "is designed to help IPAA reach students and teachers in areas outside the oil-producing states. We wanted to come to New England and talk to students and teachers about today's energy mix in our country. One of the great strong points of NEED is their ability to reach over 65,000 classrooms each year."

Mary Spruill, NEED's executive director, added that "NEED is pleased to have support from IPAA for these workshops, especially since many energy companies only support energy workshops in their local areas. To have IPAA, who represents the nation's oil and gas producers, provide resources for educators in a non-oil and gas-producing state, is a great step in the right direction – making sure students who do not live near oil and gas development understand energy and its relationship to their lives, and learn about the many parts of the country's energy mix."

Oil Industry Celebrates 150th Anniversary in August

It was 150 years ago this summer -- on August 27, 1859, when Edwin L. Drake and the Seneca Oil Company struck oil near Titusville, PA., marking the beginning of the modern petroleum industry. To celebrate the occasion, a number of organizations have developed a variety of teacher and student educational materials covering a century and a half of oil and natural gas industry development. One excellent site for materials for classroom use is www.oil150.com/.

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