A publication of the National Energy Education Development Project November 2006

New at www.NEED.org

Transportation Fuels Enigma (grades 7-12) is available for download from www.need.org. In the activity, student teams work cooperatively to try to hide the identity of their fuel while determining what fuels the other teams represent. The concepts covered include the current use of petroleum products for most transportation fuels, the expanded use of renewable fuels, the impact that different fuels have on the environment, the diversity of fuels available, the economics of the fuels and the suitability of each fuel for fleet or personal use.

The new ***Energy on Public Lands*** curriculum is available for intermediate schools on www.need.org, sponsored by the Bureau of Land Management (BLM), Department of the Interior. It emphasizes the energy resources located on public lands and how they are managed by the BLM for the benefit of all citizens. Constance Beatty of Illinois served as curriculum development consultant. To request a copy, email info@need.org. NEED workshops, hosted in partnership with BLM, are being scheduled for Alaska, Colorado, New Mexico and California. To receive registration information, email info@need.org.

The new ***Fossil Fuels to Products*** curriculum will soon be available on www.need.org. This intermediate/ secondary curriculum covers the exploration, production, refining, chemical manufacturing, transportation, marketing, and uses of petroleum and its products in the industrial sector with background information and hands-on activities. Funding for this curriculum was provided to the Center for the Advancement of Process Technology (CAPT) by Shell Oil Company and the National Science Foundation. Halliburton provided funding to NEED for distribution to schools. Melanie Harper of Texas and Regina Sizemore of Kentucky served as curriculum development consultants.

New from EIA

The new *K-12 Energy Education Resource Guide* is available from the National Energy Information Center at the U.S. Energy Information Administration. To request a copy, email NEED at info@need.org.

Coming soon to the EIA Kid's Page is an Energy Ant Activity Booklet. Visit www.eia.doe.gov/kids.

NEED Welcomes New Board Members

NEED welcomes **Phil Cochrane** to the Board of Directors. Phil is the Vice President, External Affairs, for BP Exploration (Alaska), in which capacity he is responsible for leading a team that manages BP's external relationships and corporate reputation in Alaska. He is an accomplished communicator with diverse experience in communications and issues management. He specializes in public, media, crisis, and government communications. Prior to joining BP, Phil worked in the pipeline industry, as well as in various political and policy roles within the Canadian Federal Government. A trained broadcast journalist, he began his career working in radio newsrooms in Alberta.

Phil is married and has two daughters. He also serves as a member of the Board of the Anchorage Chamber of Commerce. Welcome, Phil!

NEED also welcomes **Constance Beatty** (IL) to the Board of Directors. Constance is the representative of the NEED Teacher Advisory Board, and has been an Illinois TAB member for the past 14 years. During 2005 and 2006, she facilitated the BP A+ for Energy/NEED summer conferences in California.

Constance has been a NEED Lead Teacher for ten years and brings a dynamic educator's perspective to the Board. She is married with two daughters, including NEED student leader Lauren Beatty. Welcome, Constance!

Inside This Issue

The NEED Project

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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.

A list of NEED sponsors is available on our website and in our Annual Report.

Energy Exchange is published five times a year by NEED for educators and students, and is available at www.need.org.

NEED welcomes questions, comments, and suggestions. Please contact info@need.org.

Calendar of Events

For more information, email info@need.org or call 800-875-5029.

November 2006

1	PG&E Solar Schools Workshop – Paradise, CA
1	MI Oil and Gas Producers Education Foundation Workshop – Manistee, MI
1	Energy Smart Students Workshop – Montgomery, NY
2	NEED participation at YES! Expo – Detroit, MI
2-4	NEED participation at the National Ocean Industries Association Conference – Palm Beach, FL
2-4	NEED Sessions at Kentucky Science Teachers Association Conference – Lexington, KY
2-4	NEED Sessions at Eastern National Science Teachers Association Conference – Baltimore, MD
3	Energy Smart Students Workshop – Olean, NY
6-7	NEED/NY Energy Smart Students Sessions at the Energy in Schools Conference – Rochester, NY
7	PG&E Solar Schools Workshop – Fort Bragg/Mendocino, CA
7	Energy Smart Students Workshop – New York, NY
8	Kentucky NEED Workshop – Pippa Passes, KY
8	Inland Lakes School District Workshop – Indian River, MI
8	Energy Smart Students Workshop – Montgomery, NY
8-9	Maine Energy Workshops – Maine Public Service Company – Presque Isle, ME
8-9	North Carolina NEED Workshops – Roanoke Rapids, NC
8-10	Renewable Energy and Energy Efficiency – Workforce Development Conference – Troy, NY
8-11	NEED Sessions at Science Teachers Association of Texas – Wichita Falls, TX
9	Kentucky NEED Workshop – Hazard, KY
9-12	NEED Sessions at the Michigan Association of School Boards – Detroit, MI
10	Kentucky NEED Workshop – Whitesburg, KY
13	Kentucky NEED Workshop – Benham, KY
14	PG&E Solar Schools Workshop – Arcata/Eureka, CA
14	Kentucky NEED Workshop – Whitesburg, KY
14	Michigan NEED Workshop – Three Rivers, MI
14	Energy Smart Students Workshop – Somers, NY
15	America Recycles Day (www.americarecycles.org)
15	Kentucky NEED Workshop – Prestonburg, KY
15	Energy Smart Students Workshop – Montgomery, NY
16	PG&E Solar Schools Workshop – Santa Maria, CA
16	Energy Smart Students Workshop – Ithaca, NY
16	NEED Biodiesel and Transportation Fuels Workshop – Fairmont, WV
16-17	Alaska NEED Workshops – Fairbanks, AK
17	Indiana NEED Workshop – Indianapolis, IN
20	Kentucky NEED Workshop – Paducah, KY
21	Kentucky NEED Workshop – Murray, KY
27	Kentucky NEED Workshop – Bowling Green, KY
28	MI EnergySmart Schools Eastern Upper Peninsula ISD – Sault Ste. Marie, MI
29	Kentucky NEED Workshop – Alexandria, KY
TBA	NEED Workshops in partnership with the Bureau of Land Management – NM

December 2006

5	PG&E Solar Schools Workshop – Stockton/Merced, CA
6	Illinois Solar Schools Workshop – Rockford, IL
7-9	NEED Sessions at Western National Science Teachers Association Conference – Salt Lake City, UT
11	Kentucky NEED Workshop – Union, KY
12	Energy Smart Students Workshop – Somers, NY
13	Illinois Solar Schools Workshop – Chicago, IL
13-14	Indiana Energy Smart Schools Workshop – Indianapolis, IN

NEED wishes our teachers, students, sponsors and staff a Happy Thanksgiving!

Calendar of Events

continued

January 2007

9 Kentucky NEED Workshop – Erlanger, KY
9 Energy Smart Students Workshop – Ithaca, NY
11 Kentucky NEED Workshop – Somerset, KY
17 Kentucky NEED Workshop – Morehead, KY
18 Kentucky NEED Workshop – Lexington, KY
19 Kentucky NEED Workshop – Owensboro, KY

February 2007

13 Energy Smart Students Workshop – Ithaca, NY

For Ohio Energy Project workshops, visit www.ohioenergy.org.

Electrifying ElectroWorks

ElectroWorks provides background information and hands-on explorations of atomic structure, static electricity, batteries, electromagnetism, electricity generation and series and parallel circuits for Grades 4-8. Recently, the curriculum underwent renovations. The kit has been revised from five to six stations (two stations of circuits) with additional and upgraded equipment. The cost of the upgraded kit is $325.00. Field testing of the updated curriculum and kit happened early this fall. The following are teacher and student reactions to the updated kit.

Kim Jenkins, science teacher, Harrison County Middle School, KY

Electricity has always been a topic of study with which students have difficulty. Students understand that the light comes on when they flip a switch, but they do not understand how it works. The ElectroWorks kit from NEED helps students understand not just how the light switch works, but also static electricity, batteries and magnets. Students are able to experience circuits, magnetic fields and making their own battery that, in turn, provides a better understanding of how things work. Students enjoy the hands-on nature of the kit. They have been told how a circuit works before, but in participating in the circuit activities of the kit they are able to move the battery, switch and load, and explore what has to happen to close a circuit and make it work.

As with the other NEED kits, ElectroWorks, is a very teacher friendly kit. I love opening the box to find everything needed for the activities in one place. The teacher guide is very well written and easy to follow. The new Energy Ball activities spark student interest in the rest of the kit and help to introduce basic electricity ideas. The student guide is very easily followed and guides students to explore the six stations of the kit. The stations are set up as exploratory activities, not just demonstrations. This allows students to use their imagination and learn while they explore electricity. By participating in the ElectroWorks kit, students are able to learn a great deal about electricity and have an enjoyable time in the process.

Sara Jenkins, 7th grade student, Harrison County Middle School, KY

Electricity, electromagnets, static electricity, batteries, circuits? When my teacher said we were going to learn about all these things and more in our study of electricity, I became nervous. I had heard of some of them before and even studied some of them, but it wasn't something I felt comfortable with or was even very excited about. I thought it was going to be a bunch of boring lectures and readings. Boy was I wrong! Our study of electricity was anything but boring or routine. The very first day our teacher showed us a cool Energy Ball that lit up when you touched it. We used this ball to learn about open and closed circuits, conductors and insulators, and parallel and series circuits. It was a simple way to learn about something that has always been hard to learn.

I really liked the six stations we did in class. We worked in groups to perform the activities at each station. The static electricity station helped us realize why were able to shock each other at some times but not at others. There are some materials that do not allow electrons to move easily. Making a battery was cool. I never realized that a battery gives off heat when it is working. The magnets and magnetic fields station was very interesting. I didn't know that the earth is a giant magnet. The electromagnets station was my favorite. This was something my classmates and I had never seen before. We had a really good time seeing how many paperclips we could pick up with our electromagnet. The circuits stations were the stations I felt like I learned the most from. We were able to explore open and closed circuits and make series and parallel circuits. It was hard at first; but once we got the hang of it, we had a lot of fun. I learned a lot about electricity. I think I will be able to take what I have learned from this kit and use it to help explain why things work in the real world. It was really cool.

NEED News

California

The NEED Project was represented at Cal Expo, the California State Fair in Sacramento. As a partner with Pacific Gas and Electric (PG&E) in the Solar Schools Program, NEED displayed activities and materials from the "Schools Going Solar" curriculum. PG&E's Solar Schools Program provides grants, training, and photovoltaic installations to winning applicants within their service area. NEED provides training, curriculum, and kits to successful applicants. Plainfield Elementary in Woodland, CA, sent students to help assist with the demonstrations during each of the four days.

A successful radio and television advertising campaign has created great interest among teachers and parents in the Solar Schools Program and in bringing solar energy education into California Schools. The timing could not be better, since the governor recently signed Senate Bill 1, the "Million Solar Roofs" initiative, which will provide funding to support the expanded use of solar energy throughout California.

Teachers from San Joaquin County, CA learn about the PG&E Solar School's Program, the ENERGYSTAR® Change a Light campaign, and NEED during their fall Teacher Leader Project Day.

Indiana

The 2006-07 Indiana NEED Program is off to a great start. Six teacher workshops will be held across the state. The second Indiana Energy Smart Schools Conference will be held in Indianapolis on December 13-14, 2006. This two-day conference will provide information and tools for school facility and business managers to assess and manage energy consumption in their schools. On the second day, teachers will join the group to learn how NEED materials can be used to develop a school-wide energy plan. Registration fee is $50.00. The registration form can be found at www.need.org or by contacting kreagor@need.org.

Kentucky

Teacher-student workshops have been scheduled across the Commonwealth for the 06-07 school year. Teachers in grades 4-7 are invited to attend and bring teams of five students with them to the workshop. These one-day workshops introduce teachers and students to NEED activities available to design comprehensive energy programs. These curriculum materials are correlated to the newly revised 4.1 Core Content for Assessment. Schedule and registration form can be found at www.need.org or by contacting kreagor@need.org.

Virginia

NEED's Energy Management for Schools programs continue to be successful in partnership with Chesapeake Public Schools. Chesapeake uses NEED kits and curriculum to educate students and staff to use energy more wisely and reduce energy use in the district. Good luck to CPS teachers and students. CPS Energy Manager Gene Whitley is serving on the technical advisory committee for NEED's Energy Management for Schools curriculum expansion.

West Virginia

Working in partnership with NASA in Fairmont, West Virginia, NEED workshops on transportation fuels, biodiesel and hydrogen are being offered to West Virginia educators. NEED Facilitators Linda Fonner and Wayne Yonkelowitz will host the workshops with support from NASA's Todd Ensign.

H_2 Educate Workshops

NEED and the U.S. Department of Energy continue to work together on H_2 Educate hydrogen workshops. Three workshops are planned this fall in West Virginia, Ohio, and Michigan. To register, call NEED at 800-875-5029.

Wind Curriculum

With support from the American Wind Energy Association, fifteen educators, industry leaders and NEED staff met in Minneapolis, MN to kick off the development of a NEED wind curriculum. Thanks to Mike Arquin for a great tour of KidWind national headquarters and for all of his technical assistance.

NEED Energy Conferences for Educators

Two NEED Energy Conferences for Educators are planned for July 2007 in Washington, DC and Santa Fe, NM. The registration fee for the training conference is $1,000 and includes double occupancy lodging, most meals, and curriculum materials. Applications will be available in November.

NEED Facilitator Training

With so many new activities and exciting curriculum offerings, NEED will host a Facilitator Training conference July 9-11, 2007 in Washington, DC. Schools and organizations that wish to send teachers and staff to the training should contact Keith Etheridge at ketheridge@need.org. Up to 25 participants will be accepted.

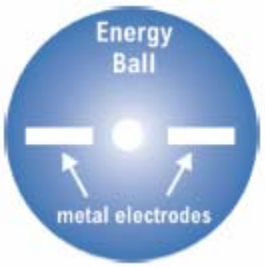
NEED Youth Awards for Energy Achievement

Mark Your Calendars!

June 22-25, 2007

PRIMARY ACTIVITY: Open & Closed Circuits

An Energy Ball is a hollow ball that contains a light and a sound device, both of which are attached by wires in series to two metal electrodes that are attached to the outside of the ball as shown in the diagram on the right. When both electrodes are touched by one person or by several people in contact with each other, the circuit is closed and the ball lights and makes a noise. An Energy Ball can be purchased from most science supply stores, by emailing NEED at info@need.org or by calling 800-875-5029.



Thanks to Linda Fonner, New Martinsville, WV for developing and sharing this activity.

Objectives
Students will be able to distinguish between open and closed circuits.
Students will be able to explain that electricity is a form of energy.

Materials
1 ball, rock, pencil or other small item per student
1 Energy Ball

Procedure
1. Turn on various electrical devices in the classroom (CD player, lights, TV, etc.). Ask students how the devices are able to work. Once students give "energy" as the answer, ask them to define it. ***Energy is defined as the ability to do work or make a change.***

2. Lead an introductory discussion about electricity (electrical energy) as a form of energy.

3. Have all the students stand in a circle, close enough to pass items from one student to the next but far enough apart that their hands just touch. Give each student a ball. Explain to the students that they have to pass the balls from one person to the next, with each person only holding one ball at a time. Give the students time to complete the task.

4. Remove one student from the circle and ask the students to pass the balls as before. They should not be able to complete the task due to the open space. Collect the balls from the students. Have the students remain in the circle.

5. Ask the students for different words they could use to describe the two different scenarios. Make a list on the board. Be sure the words "open" and "closed" appear on the list.

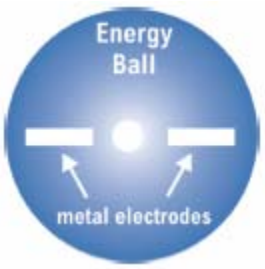
6. Tell the students they are going to pretend that their arms are wires that carry electricity. Have them touch palms in the circle. Hold the Energy Ball between two students and have them stop touching palms. Ask each of the two students to touch a metal strip, but not touch each other. The Energy Ball should light and make noise.

7. Have one of the students stop touching the metal strip, then touch it again. Have a student in the circle stop touching another student's palm, then touch again. Allow all students the opportunity to open the circuit.

8. Ask the students to compare what happened in the circle with the Energy Ball to what happened in the circle when they were passing the balls around.

9. Wrap up the activity by explaining open and closed circuits, emphasizing that electrical energy needs a closed path to do work.

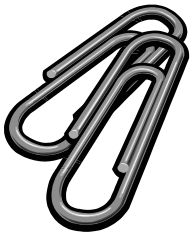
ELEMENTARY ACTIVITY: Insulators & Conductors



An Energy Ball is a hollow ball that contains a light and a sound device, both of which are attached by wires in series to two metal electrodes that are attached to the outside of the ball as shown in the diagram on the right. When both electrodes are touched by one person or by several people in contact with each other, the circuit is closed and the ball lights and makes a noise. An Energy Ball can be purchased from most science supply stores, by emailing NEED at info@need.org or by calling 800-875-5029.

Thanks to Linda Fonner, New Martinsville, WV for developing and sharing this activity.

Objectives
Students will be able to define insulator and conductor.
Students will classify objects as insulators and conductors.



Materials
1 Energy Ball per group of four-five students
Objects made of metal, glass, wood, paper, fabric and plastic

Procedure

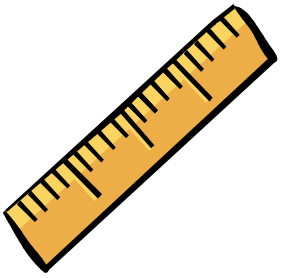
1. Review open and closed circuits as needed. Put students in groups of four or five. Have each group make closed and open circuits using an Energy Ball and their hands.

2. Have two students in the circuit hold a large paper clip or other metal object between their hands instead of touching hands. The Energy Ball should light and sound. Ask students why they think it does this. Lead a short discussion of the characteristics of conductors and insulators.

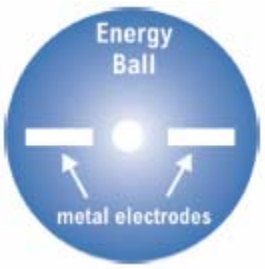
3. Show students the other objects and have them predict whether they are insulators or conductors. Have them test their predictions in their circuits. Make sure students stand still as they test objects. A discharge of static electricity may produce inaccurate results.

4. Let students explore other objects that are in the classroom to see if they are insulators or conductors. Make sure the students realize that many objects contain both insulators and conductors. For example, a wooden pencil has a rubber eraser (insulator) surrounded by a metal tip (conductor).

5. End the activity with a discussion about the uses of insulators and conductors. Have students develop their own definitions for the words.



INTERMEDIATE ACTIVITY: Series & Parallel Circuits



An Energy Ball is a hollow ball that contains a light and a sound device, both of which are attached by wires in series to two metal electrodes that are attached to the outside of the ball as shown in the diagram on the right. When both electrodes are touched by one person or by several people in contact with each other, the circuit is closed and the ball lights and makes a noise. An Energy Ball can be purchased from most science supply stores, by emailing NEED at info@need.org or by calling 800-875-5029.

Thanks to Linda Fonner, New Martinsville, WV for developing and sharing this activity.

Objectives
Students will understand electricity follows the shortest/easiest path.
Student will understand series, parallel and short circuits.

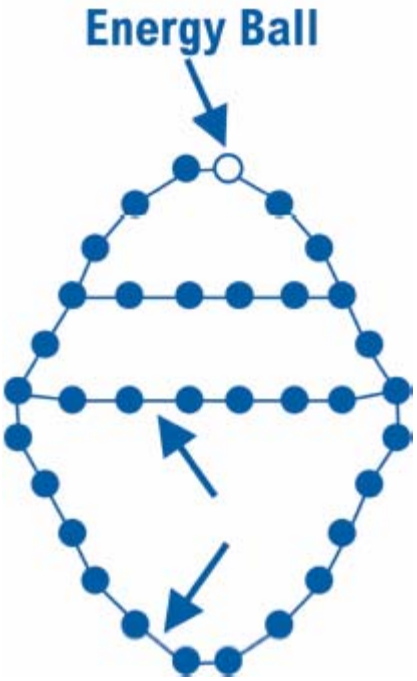
Materials
1 D cell battery per student
1 insulated wire (15 cm) per student plus 15 extra wires
1 flashlight bulb per student
1 Energy Ball

Procedure
1. Provide each student with one battery, one wire, and one light bulb.

2. Ask the students to make the light bulb light, using only the materials provided them. Allow students time to complete the task. Review as a class how they were successful.

3. Group the students in pairs. Ask the students to light one bulb using both of the batteries and wires. Allow students time to accomplish the task.

4. Ask the students to light both bulbs, using only the materials from their pair. Allow students time to complete the task. Review as a class the successful configurations.



5. Have the students form groups of three-five. Ask the students to light as many bulbs in as many different configurations as possible, utilizing additional lengths of wire as they wish. Review as a class the successful configurations.

6. Ask the students to design a set up that allows them to light a bulb, disconnect one end of a wire, and still have the bulb light. Allow students time to complete the task and review successful configurations.

7. Pose this problem to the students to solve as a class: Using only the Energy Ball and your hands, design a circuit in which two people can let go of their hands and the Energy Ball will still stay lit. Have students diagram their planned circuits. Allow time for students to test their circuits and solve the problem.

8. Review with the students the various configurations of circuits they completed, including the terms open, closed, short, series and parallel.

SECONDARY ARTICLE: Distributed Energy

When we think of electricity generation, we usually envision central power plants that generate electricity for large numbers of customers. These power plants are mostly fossil fuel and nuclear, but also include hydro, natural gas, and wind. The electricity can be generated far from the customer and sent long distances over transmission lines, sometimes with outages due to an overly-taxed grid infrastructure or extremely inclement weather. To provide reliable electricity to customers, such as hospitals, that require an uninterrupted power supply, new emphasis is being focused on distributed energy.

Distributed energy is generated and stored near the point of use. The benefits of using distributed energy instead of central power plants includes providing greater reliability, decreasing congestion on electric transmission lines, strengthening energy security and controlling price fluctuations. By siting smaller, more flexible systems near energy consumers, distributed generation avoids transmission and distribution power losses and provides a choice of energy systems to the utility customer.

Customers likely to use distributed energy include those that are far from central power grids, those looking for less expensive power sources during peak periods or those needing dependable, high-quality power to run sensitive equipment.

Distributed energy encompasses a range of technologies, including fuel cells, photovoltaic arrays, microturbines and reciprocating engines. Typically, distributed energy technologies are fueled by natural gas, but renewable energy technologies such as solar, biomass and wind are also popular and hydrogen will likely play an expanding role in the future of distributed energy.

Gas-Fueled Technologies

Natural gas is a popular choice for distributed energy systems. It is readily available, up-front costs of natural gas systems are typically less expensive than other sources, and the generators themselves are more compact than most other systems. Gas-fueled systems include fuel cells, gas-fired reciprocating engines, industrial turbines and microturbines.

- Fuel cells are electrochemical energy conversion devices that convert hydrogen and oxygen into electricity and heat. Fuel cells often use natural gas as the source of hydrogen.
- Gas-fired reciprocating engines, also called internal combustion engines, are a wide-spread and reliable technology. Due to their small size and low capital cost, they are a popular distributed energy choice. Reciprocating engines can use a variety of fuels, including natural gas, methane from waste treatment and biofuels.
- Industrial turbines use high-temperature, high-pressure gas to move the turbine blades. The gas is produced by burning a fuel in air. They are compact, lightweight, quick starting and simple to operate. They are used by hospitals, universities and colleges, and commercial buildings to produce electricity, heat and steam.
- Microturbines are small combustion turbines that are about the size of the refrigerator. They have a small number of moving parts, lower emissions and can use waste fuels. They are designed for use on sites with limited space for power production.

Renewable Energy Technologies

Distributed power generation systems using renewable energy sources have advantages and disadvantages over traditional fossil fuel systems. Most renewable power technologies emit far less pollution and are a secure and stable source of energy. Except in the case of biomass, the fuel is also free. However, some sources provide intermittent power and the generating equipment itself is often more expensive than that of traditional fossil fuel equipment. Renewable energy technologies for power generation include biopower, solar electric, concentrating solar power and wind.

- Biopower technologies convert renewable biomass fuels into electricity and heat using boilers, gasifiers, turbines, generators and fuel cells. Biopower capitalizes on two of America's strengths—highly productive farmlands and forests. Biopower systems are designed for customers outside of central power grids with excess biomass.
- Solar electric technologies generate electricity for customers that are far from central power grids. A solar electric system consists of photovoltaic cells, batteries, battery chargers, and often a backup generator and inverter. For very remote locations, solar technologies can be the cheapest choice for electric production. For customers that are close to the electric grid, solar electric systems are usually more expensive than other fuels.
- Concentrating solar power (CSP) systems capture the sun's heat and transform it into electricity. Mirrors focus sunlight onto a receiver that houses a gas or liquid. This gas or liquid then transfers heat to a power generation system such as a steam turbine and generator. While large CSP systems are already in use, small systems are being developed for distributed energy applications.
- Wind power is versatile, adaptable and affordable. Homeowners and businesses in windy rural areas can use small wind turbines to reduce their electric bills. Zoning and land use regulations can limit installation of wind turbines. Stand-alone turbines that provide power to non-grid connected areas must have backup power systems that can significantly increase the cost of wind systems.

Hybrid Power Technologies

Hybrid power systems are combinations of two or more energy conversion devices or two or more fuels used for the same device. The combination of devices or fuels can overcome disadvantages inherent to a single system, making a more balanced power system. Examples of hybrid power systems include a wind turbine with a backup diesel generator, a photovoltaic system with battery storage, or a fuel cell combined with a microturbine. Hybrid system benefits include higher efficiency, enhanced reliability and lower emissions.

While all distributed energy systems have advantages and drawbacks, many distributed power systems produce so little noise and emissions that they can be located inside or immediately adjacent to where the power is needed. Distributed energy systems offer reliability and flexibility to electric customers that need it the most.

For more information, visit www.eere.energy.gov/de/.

Energy Education Nationwide

The ENERGYSTAR® Change a Light, Change the World campaign is well underway. Schools across the nation are hosting exciting events to encourage communities to save energy by replacing incandescent bulbs with compact fluorescents. NEED students and teachers have incorporated the campaign into their energy education efforts this fall.

According to NEED teacher **Judy Reeves**, "The St. Margaret Science Club at St. Margaret Catholic School (Lake Charles, LA) started this year running on a greener tomorrow. We are promoting the ENERGYSTAR® campaign and put the Pledge form on our school's website. The club is participating in the International Keep America Beautiful Campaign, winning first place for collecting over 20 bags of trash and the most unusual item—a car motor on the lake front—during a recent clean-up event. We are also leading a project with Recycle for Humanity, and have joined our mayor's initiative to recycle paper phone books. Since our area uses a roving recycling truck, we started a regular pick up site at our school."

Debbie Bodkin, NEED teacher at Picadome Elementary (Fayette County, KY), tells us, "We kicked off our Picadome and Staff Pledge drive with an interview on the morning news with our janitor, Mr. Hill. He has replaced his major lights with CFLs and is saving $5 a month on his electric bill. We are asking the children to take home the Pledge. If they are successful, they will have mom or dad take a picture of them with the new light. We will post the pictures in our 'energy hall of honor' during the month of October. Each child will receive a special sticker that says, 'I did my part!' and his/her name will be put on a yellow star for the classroom."

"My NEED kids are also designing posters to pass out to their parents' work places. We hope this will encourage them to sign the Pledge on the web. We are setting up a table in the children's room of the Energy Expo, and are planning two sessions in front of Lowe's and Wal-Mart to educate the public about CFL bulbs. We will have a speaker from the light plant here in town bring us a collection of CFL bulbs to help us understand all the small details."

Anne Marie Bergen, NEED Teacher and A+ for Energy Grant recipient (Oakdale Joint Unified School District, CA) shares information about her school's Passport to Science program. "Passport to Science is an energy program that trains Title One 5th and 6th grade students to help facilitate 2nd and 3rd grade energy labs. After their lab experience, the primary students take home 'energypacks' filled with energy activities and books. To expand our program this year, we are implementing the Energy Detective Club. To become a member, students have to complete energy conservation readings and activities that promote energy conservation at home. After they complete these activities, they sign the ENERGYSTAR® Pledge and receive a compact fluorescent light, energy bookmarks and stickers, 'turn off the lights' light switch plate covers, and an ENERGYSTAR® zipper pull."

Joanne Spaziano, NEED Lead Teacher and Teacher Advisory Board member (Cranston, RI) says, "Our Energy Expo was pretty cool. There was a display comparing the temperature of operating incandescent and compact fluorescent light bulbs. We had Energy Hog visit with us as well as our governor. National Grid came to our school on National Change a Light Day (October 4, 2006), which was also our Open House Night, and gave free CFL bulbs to people that signed the Pledge. We were so excited to have all our guests here."

Amy Constant, NEED Lead Teacher and Teacher Advisory Board member (Raleigh, NC) says, "After teaching the energy club students about incandescent and compact fluorescent bulbs, they jumped at the chance to participate in the Change a Light campaign. The club decided to make posters bordered by 'Change a Light' in a variety of languages. With a very culturally diverse school, the students were able to ask their classmates and families to translate the phrase into a variety of languages including Korean, Spanish and Vietnamese. Students looked at websites to translate 'Change a Light' into additional languages."

"The club has been working on our recycling project as well as doing energy patrol on a regular basis. Our next activities will be directed at energy efficiency and being e-buddies with a class in Massachusetts."

Haven't gotten your students involved yet? It is not too late. Visit www.need.org to download NEED's Change a Light Teacher Guide and visit www.energystar.gov/index.cfm?c=change_light.changealight_about to learn more about the campaign and register your school's activities on the ENERGYSTAR® website.

We'd love to hear what your students are doing to raise energy awareness in your community. Share your success stories with us by emailing info@need.org.

Short Circuits

EPA Goes Green

The U.S. Environmental Protection Agency (EPA) is now purchasing 100 percent of its annual electricity use from renewable energy. This means that the EPA is buying nearly 300 million kilowatt-hours of green power, equal to the amount of electricity needed to power 27,970 homes. The EPA is the first federal agency to meet all of its electricity needs from renewable energy. For more information, visit www.epa.gov/greeningepa/greenpower.htm.

Diesel Cleans Up at the Races

The Audi R10 TDI accomplished a feat no other diesel racecar has before. It won a major auto-racing event—the Le Mans 24 hour endurance race. The diesel powered engine was more fuel efficient than the other cars, averaging more laps between pit stops. Why the fuss? Racecars are the embodiment of technology for an automaker. American automakers are looking toward cleaner diesel technologies for production vehicles to get more power and better fuel economy. For more information, visit www.audi.com.

The New Electric Sports Car

Tesla Motors unveiled a sleek performance electric car this past summer. The Tesla Roadster can go from zero to 60 in about four seconds and has a 250-mile range on a single charge. It comes with a home charging system, but customers can purchase mobile charging kits as well. Charge time is about three and a half hours. The limited-edition series of 100 cars sold out within three weeks, required a $100,000 deposit and will be delivered in mid-2007. Reservations for the next series are already underway. For more information, visit www.teslamotors.com.

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