

ENERGY EXCHANGE

A publication of the National Energy Education Development Project

March 2001



Climate Change

Shanghai, China, January 22, 2001: Leading climate change scientists and government officials from around the world have finalized and approved a major report confirming that the scientific evidence for human influence on the global climate is stronger than ever before.

The new assessment by the Intergovernmental Panel on Climate Change (IPCC), which is jointly sponsored by the United Nations Environment Programme and the World Meteorological Organization, projects a much larger than previously expected global warming of 1.4–5.8°C (2.25–9.25°F) over the next 100 years, which will cause rising sea levels and changing weather patterns.

Some of the report's key findings are:

- A growing body of observation data gives a collective picture of a warming world. There is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities.
- It is very likely that the 1990s were the warmest decade and 1998 the warmest year since 1861. In the Northern Hemisphere, it is very likely that snow cover has decreased by about 10 percent since the 1960s, and that there has been a 40 percent decline in the thickness of Arctic sea ice during late summer and early autumn in recent decades.

In addition to Volume 1 of the report, *Climate Change 2001: The Scientific Basis*, the final report will include a second volume on impacts and a third on response strategies. For more information and to view the reports, you can go to the United Nations Environmental Programme website at www.unep.org and the International Panel on Climate Change website at www.ipcc.ch.

Arctic Drilling



The White House announced in late January that President Bush will move quickly to implement a national energy policy, a key component of which will be to open the Arctic National Wildlife Refuge (ANWR) in Alaska to petroleum and natural gas drilling.

Most people agree that ANWR contains significant reserves of oil and gas. A recent U.S. Geological Survey study indicates that drilling in ANWR could yield 4–6 billion barrels of oil and 30 trillion cubic feet of natural gas. The United States currently consumes about seven billion barrels of oil per year and 23 trillion cubic feet of natural gas and imports about two-thirds of the petroleum and five percent of the natural gas consumed. Alaskan oil production represents about 15 percent of total U.S. domestic output.

A panel of scientists recently began a study of the impact of oil and gas drilling in Alaska and plan to quantify any biological, physical, social, or economic impacts of drilling. The results of the study could provide important data for both sides of the debate over drilling in ANWR. See www.anwr.org.

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CALENDAR OF EVENTS

For more information about the events listed, contact info@need.org or 1-800-875-5029.

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.

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Call 1-800-875-5029 for information on NEED programs in other states.

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Energy Exchange is published six times a year and is available on NEED's website.

Educators may reproduce articles and activities for classroom use.

February 2001

2/9-11 Energy Training Certification – Bloomington, IL
2/9 NEED Board of Directors Meeting – Washington, DC
2/19 Brevard County NEED Workshop – Florida Solar Energy Center, FL
2/19 Charlotte-Mecklenburg NEED Workshop – Charlotte, NC
2/20-21 Parkway School District NEED Workshop – St. Louis, MO
2/24 NEED Workshop and Jr. Solar Sprint - Science Museum – Richmond, VA
2/28 Independent Oil and Gas Association of West Virginia – NEED Presentation

March 2001

3/2-3 WV-NEED Conference – Morgantown, WV
3/8 NEED Workshop – Chapel Hill, NC
3/8 KyNEED Workshop – Frankfort, KY
3/13 KyNEED Workshop – Kenton County, KY
3/14-16 NEED Presentation at Carolina Recycling Association Conference – Myrtle Beach, SC
3/19-23 **NEED Week**
3/23 **NEED Day**
3/21-24 NSTA Convention and NEED Teachers Reunion – St. Louis, MO
Come check out the NEED related workshops at the convention!
3/22 - 8:00 a.m. *Minerals Management Service and NEED*
3/22 - 8:00 a.m. *The Coming Renewable Energy Revolution with Florida Solar Energy Center and NEED Short Course*
3/23 3:30 p.m. *NEED Workshop - Get Energized!*
3/29 Nebraska Public Power District NEED Workshop – Wakefield, NE
3/29 KyNEED Workshop – Boone County, KY

April 2001

4/15 Youth Awards Projects Due to State Coordinators/NEED Offices
4/19 Nebraska Public Power District NEED Workshop – Minden, NE
4/19-20 Alaska NEED Conference – Girdwood, AK
4/21 Renewable Energy Education Workshop – Washington, DC – In partnership with the Florida Solar Energy Center and the American Solar Energy Society
4/26 National Take Your Kid to Work Day – NEED Workshop at the Minerals Management Service – Herndon, VA
4/30 National Youth Awards Review Panel – Energy Information Administration – Washington, D.C.
TBA Western North Carolina NEED Workshop
TBA Pasquotank/Elizabeth City Schools NEED Workshop – Elizabeth City, NC
TBA Dare County NEED Workshop – Kitty Hawk, NC

May 2001

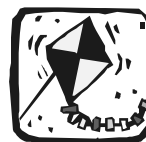
5/1 NEED Headquarters moves to Manassas, VA (see info on next page)
5/1 ILEED Youth Awards Program – Springfield, IL
5/3 Nebraska Public Power District NEED Workshop – Beatrice, NE
5/8 Kentucky NEED Youth Awards Program – Frankfort, KY
5/8 California NEED Workshop – Carpinteria, CA
5/15 Ohio Energy Project Youth Awards Program – Columbus, OH
5/31 Kentucky NEED/Kentucky Oil and Gas Association Annual Golf Tournament

June 2001

6/22-25 National Youth Awards Program – Washington, DC
Registration fee of \$500.00 covers lodging/local transportation/most meals
6/11-14 Southcentral Instructional Improvement Academy – Anchorage, AK

July 2001

7/7-11 NEED National Energy Conference for Educators – Albuquerque, NM
Registration fee of \$800.00 includes lodging/meals/materials
7/14-18 NEED National Energy Conference for Educators – Williamsburg, VA
Registration fee of \$800.00 includes lodging/meals/materials
7/15-20 Camp KEEP (Kids for Energy and Environmental Protection) – Springfield, IL
7/23-28 Camp KEEP – Algonquin, IL
7/23-29 NEED activities at the National Boy Scout Jamboree – Ft. AP Hill, VA



NEED NEWS

NEED IS MOVING

MAY 1, 2001
8408 Kao Circle
Manassas, VA 20110
or
P.O. Box 10101
Manassas, VA 20108

Colorado and New Mexico

A new regional NEED program will kick-off in March for all school districts located in the San Juan Basin of Colorado and New Mexico (the greater Durango, CO and Farmington, NM areas). Energy education training programs and curriculum materials will be provided to all interested schools. For more information about this program or to participate in one of the workshops, contact Mary Spruill at mspruill@need.org or 1-800-875-5029. This new San Juan Basin program is sponsored by BP.

Catholic School Teacher is "Energized"

Barbara Menicucci from St. Charles Borromeo School in Albuquerque, NM, recently won a national award for her science lesson plan. The unit plan, entitled "Energizing the World—An Examination of World-Wide Energy Resources" was selected as one of three state winners by the Intel-ACE Project. The project is a collaboration between Intel Foundation, Microsoft Corporation and Hewlett Packard Company to help teachers develop technology-rich lesson plans using computers, scanners, and the latest PC software. Her prize was three complete Pentium III computer systems with software to be used in her classroom. The unit plan can be viewed (along with 2000 lessons created by teachers in the ACE Project) at www.eduniverse.com.

Ohio Energy Project Reaches Thousands

The Ohio Energy Project has been busy providing energy materials and programs to teachers and students throughout Ohio. OEP typically reaches more than 800 teachers and 100,000 students each year, using its *Kids Teaching Kids* approach. OEP also coordinates Ohio's EnergySmart Schools program, teaching students, teachers, administrators, and facility managers how to use their school buildings efficiently. Their newest event, the *Energy Fair*, brings together groups of up to 500 students to explore four simultaneous sessions on energy sources, energy efficiency, electricity, and energy transformations. See www.ohioenergy.org.

Missouri

In February, Parkway Independent Schools kicked off a NEED program for its fourth and fifth grades. Educators participating in the workshops received NEED's hands-on ElectroWorks or Science of Energy kits. The two curriculum units will provide the materials to help students and teachers reach the science and energy goals of the Missouri education standards.

TEACHER RESOURCES

www.solar-works.com: This *Solar on Schools* program helps schools obtain funding, and provides installation assistance, training, and materials to acquire and operate solar panels to demonstrate the educational, economic, and environmental benefits of solar energy systems. Information and an application are available on the website.

www.nasa.gov: New nitrogen-powered jetpacks and other space-age technologies used by astronauts can be viewed on this NASA website.

www.ultracleanfuels.com: The Department of Energy is helping to fund a new project to convert anthracite coal waste into ultraclean diesel fuel. The facility near Frackville, PA, will convert culm (coal dust) and silt into a zero-sulfur liquid fuel.

www.nmsea.org: Free classroom materials, including *Energy Pathways*, are available to teachers from the New Mexico Solar Energy Association via their website.

www.whoi.edu: The Woods Hole Oceanographic Institution conducts research on underwater scientific projects. This website includes information on planning an expedition on the Deep Submergence Vehicle *Alvin*.

www.nationalgeographic.org: The National Geographic website has lesson plans and other resources on energy and many other topics.

www.mii.org: The Minerals Information Institute has award-winning curriculum materials available for teachers via this website.

www.ncsu.edu/coast/shell: This role-playing simulation allows students to investigate the issues concerning the fate of Shell Island Resort, a building constructed in a hazard zone on a barrier island.

www.sae.awim.org: The Society of Automotive Engineers has developed a unit available to teachers focusing on math, science and technology in the context of an authentic engineering design experience.

www.hmns.org: The Houston Museum of Natural Science offers workshops and other resources for teachers.

NEED NEWS

Rhode Island

The first NEED ESL (English as a Second Language) workshop was hosted by the Park View Middle School NEED team in Cranston, RI. The excitement at the conference proved that ENERGY is not a second language. Park View's NEED team helped students translate NEED materials into several different languages and learn all about energy.

Thanks to the support of Narragansett Electric Company, a National Grid company, NEED's Rhode Island EnergyWise Schools program will again conduct workshops and programs for schools. These workshops help students and teachers understand how to use energy more efficiently in their schools and homes.

Texas

The Houston Museum of Natural Science, a NEED partner, is announcing a new loan kit, *From Fossil Fuels to Future Fuels*, available from the Museum and Educational Service Centers. The Discovery Kit is designed to allow educators to integrate hands-on, activity-oriented science into the classroom. Each kit contains a Curriculum Guide with activities and materials to supplement and integrate easily into a TEKS-based curriculum. Using Discovery Kit materials, such as a porosity and permeability laboratory, students have the opportunity to test and explore many of the geologic processes and technological innovations involved in the formation, recovery and use of oil and natural gas. Students can also take a virtual tour of the Wiess Energy Hall at the Museum by viewing the videotape, *From Fossil Fuels to Future Fuels*, and using an interactive CD-ROM, *Petroleum 101: The Science and Technology of Oil and Gas*. Additional materials provided by NEED allow students to discover the advantages and disadvantages of utilizing potential energy sources. The activities in the *From Fossil Fuels to Future Fuels Discovery Kit Curriculum Guide* can be downloaded from www.hmns.org (click on education). For more information about the Discovery Kits or the Museum's educational programs, contact Jennifer Paschke, Education Coordinator for the Wiess Energy Hall, at (713) 639-4744 or by email at jpaschke@hmns.org.

Congratulations to NEED Teacher Misty Duncan, who was recently chosen to be the Director of Education for the Offshore Energy Center and Ocean Star Rig Museum in Galveston, TX. Misty's involvement in NEED programs began thanks to the sponsorship of Al Williams and Total Offshore Production Systems. Misty's new job will allow her to work with teachers in the greater Houston area and across the nation. We look forward to Misty's continued NEED involvement and to working with her to develop NEED programs for the Ocean Star. For more information about the programs of the Ocean Star, contact Misty at Oeceducate@aol.com.

St. Louis NSTA Conference

Join NEED at NSTA from March 21–25, 2001! Due to some scheduling changes, NEED's Exhibitor Workshop with the Minerals Management Service will be Thursday, March 22nd at 8:00 a.m. In addition, NEED will participate in a Renewable Energy Short Course on March 22nd at 8:00 a.m. and will conduct a NEED Workshop on March 23rd at 3:30 p.m. A NEED reunion will be held Thursday, March 22nd. Please let Mary Spruill know if you're available to attend this event. Email info@need.org.

South Carolina

NEED programs are growing quickly in the Palmetto State, thanks to the hard work of NEED Coordinators Angie Perry and Mary Margaret Mendenhall and a great team of NEED Lead Teachers. More than 250 schools are participating in NEED programs with the support of the South Carolina Energy Office and the South Carolina Department of Health and Environmental Control.

NEED Participates in Japanese Education Visit

NEED is pleased to be working with the U.S. Department of Energy–Chicago Regional Support Office and the Illinois Department of Commerce and Community Affairs to showcase energy education programs in the United States to a visiting team of university researchers and elementary and junior high school teachers from Tokyo and Kyoto in March. NEED schools and the innovative programs of the Department of Energy and the Illinois Department of Commerce and Community Affairs will be the focus of school visits and presentations.

NEED Summer Conferences

Sponsorships for NEED's Energy Conferences for Educators are still available for several states and regions. If you'd like to attend a conference, please complete the registration form in this newsletter and fax it to NEED at (703) 471-6306 as soon as possible. Complete agendas are available on our website at www.need.org.

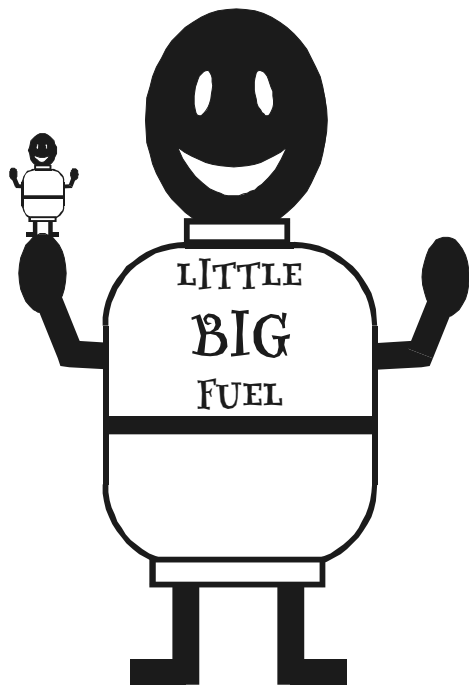
National Youth Awards for Energy Achievement

Mark your calendars for June 22-25, 2001, for the NEED National Youth Awards Conference at the Hyatt Regency Crystal City in Arlington, VA. The registration fee is \$500.00 and includes lodging and most meals. For a complete agenda, check out www.need.org.

Indiana

Eaton Elementary School's NEED students continue to do a great job with their energy education programs. They've designed a website about energy that will soon be available at www.need.org/eaton. Eaton is also excited to have NEED National Student Leaders Bekki Lamb (IL) and Heidi Nees (OH) participating in their after school energy activities. Bekki and Heidi attend Ball State University in Muncie, IN.

PRIMARY ENERGY STORY: The Tale of Little Big Fuel



My name is Little Big Fuel. It's a strange name, I know. Lots of people think I'm strange. I think I'm magical. This is my story.

I've been underground for millions of years. No one knew I was there. I'm invisible – you can't see me. You can't smell me. You can't feel me either; I'm a gas. I hide in rocks with petroleum and natural gas.

Ninety years ago, Dr. Snelling found me. He named me **propane**, but my friends call me Little Big Fuel. Here's the reason why.

When everything is normal, I'm a gas. You can't see me, but I'm full of energy. You can burn me to make heat.

I can heat your house. I can cook your food. I can run lanterns and tractors. I can help make things you use everyday. I can run big machines inside buildings because I'm so clean. I can even take you for a ride in a hot air balloon.

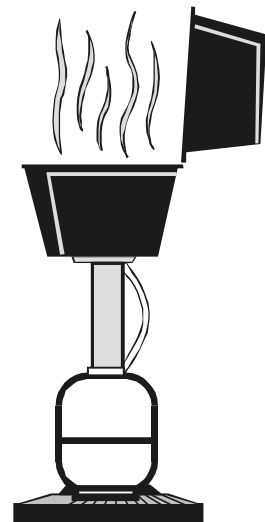
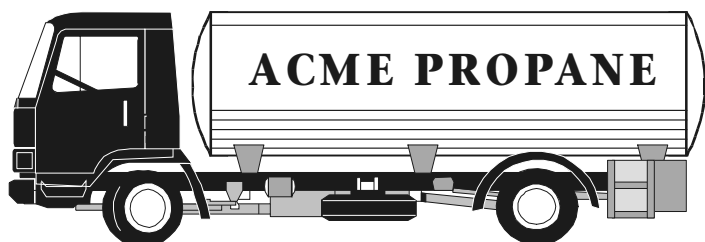
All these things I do are very good. But they aren't the thing that makes me special. This is my secret: you can turn me into a liquid and make me very, very small. If you squeeze me – **compress** me – I'll turn into a liquid.

See the big picture of me? That's my size as a gas. The little guy is my size as a liquid. I'm 270 times smaller! I still have the same number of molecules and the same amount of energy. I'm just squeezed together.

People squeeze me into small bottles so they can carry me with them. They take me camping to cook their food and light their lanterns. People put me into tanks on their barbecue grills.

Farmers fill big tanks with me as a liquid. I can heat their barns and houses for a long time. Big trucks take me to farms to fill the tanks. When I leave the tanks, I'm not under pressure anymore. I turn into a gas again and get big; I **expand**. Then I am burned to make heat.

That's why I'm called Little Big Fuel. I am amazing, don't you think?

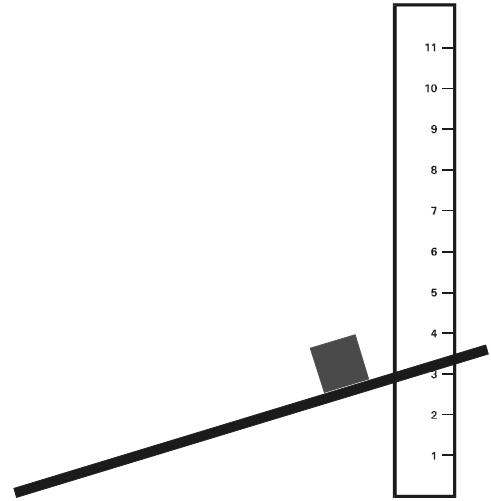


ELEMENTARY EXPLORATION: Friction

GOAL: To explore the force of friction between several materials.

MATERIALS:

- 2 Rulers
- 1 Wood block
- Construction paper
- Aluminum foil
- Waxed paper
- Tape
- Scissors



PREPARATION:

1. Set up a center with the materials listed.
2. Schedule the students in groups of four to explore the center at five minute intervals.
3. Make one copy of this page for each student.

STUDENT PROCEDURE:

1. Friction is the force that opposes or slows the motion of objects.
2. Which do you think will produce the most friction with the ruler: the wood block or the block wrapped in construction paper, aluminum foil, or waxed paper?
3. In the column marked Hypothesis, number the materials from 1 – 4 with the 1 representing the material that produces the most friction.
4. Hold one ruler upright, like in the diagram.
5. Place the wood block on the smooth side of the second ruler and slowly raise one end until the block begins to move. Record the height of the ruler at that point.
6. Wrap the block in a small piece of construction paper, using the tape to hold the paper tightly in place. Using the same procedure, find and record the height of the ruler when the block begins to move.
7. Follow the same procedure with the aluminum foil and the waxed paper. Record the data.
8. From your data, determine which material produced the most friction with the ruler. In the result column, number the materials from 1 – 4, with the 1 representing the material that produced the most friction.
9. Was your hypothesis correct? What did you learn from this experiment?

Material	Hypothesis	Data (inches)	Result
wood			
paper			
aluminum foil			
waxed paper			

INTERMEDIATE ACTIVITY: Exploring Balancing Forces

GOAL: To develop students' critical thinking skills and introduce them to the concepts of force, balancing forces, and force relationships.

MATERIALS:

- 12 rulers (2 per group)
- 6 pencils (1 per group)
- 6 nickels (1 per group)
- 6 quarters (1 per group)
- 6 dimes (1 per group)



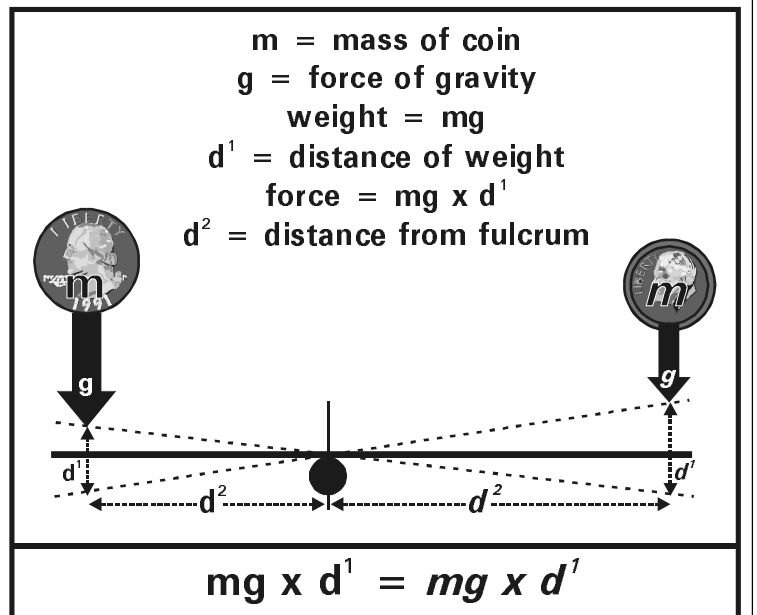
PROCEDURE:

1. Place students into six groups. Give each group one set of the materials listed above.
2. Using the diagram, explain that the force of the coin equals the weight of the coin over the distance it is moved. Instruct the students to work together to complete the assignment below.
3. After 20 minutes, discuss and evaluate the activity with the students.

BALANCING FORCES

Questions: If a nickel weighs 0.05 N (newtons), how much does a quarter weigh? A dime?
What is the relationship between the distances d^1 and d^2 ?

Hypotheses:



- Procedure:**
1. Make a balance with the pencil and ruler.
 2. Place the nickel at one end of the ruler and the quarter at the other. Move the ruler over the pencil until it is in balance.
 3. Use the other ruler to measure the d^1 and d^2 distances, as well as the d^2 and d^1 distances.
 4. Calculate the weight of the quarter using the information and formula above.
 5. Repeat Steps 2–4 with the nickel and the dime. Calculate the weight of the dime.
 6. Repeat your calculations using the d^2 measurements.

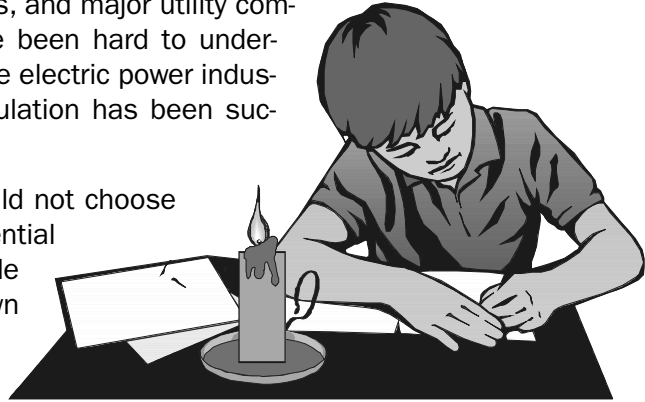
Results:

Conclusion: Is there a relationship between d^1 and d^2 ? Explain the relationship.

SECONDARY ARTICLE: The Power Crisis in California

The newspapers have been filled lately with stories about the electricity crisis in California, with rolling blackouts, enormous electric bills, and major utility companies on the verge of bankruptcy. Explanations have been hard to understand, but many people have blamed deregulation of the electric power industry. That is only part of the story in California. Deregulation has been successful in many other states, including Pennsylvania.

For most of the last century, electricity consumers could not choose their supplier. Electricity was considered such an essential commodity that states allowed monopolies to provide guaranteed power. Local utilities generated their own power, transmitted it to their service areas, and delivered it to customers who had no choice. The states, through public utility commissions, regulated the price to make sure it was reasonable.



Consumers had no way of knowing if the prices were really reasonable and the monopolies had no incentive to figure out ways to lower prices. Many people advocated making electricity generation a competitive industry by letting customers choose a generator, while the local utility continued to deliver the power. This arrangement is what is called deregulation. It is, in fact, only partial deregulation, since the local utilities would still be regulated.

In 1996, California prided itself on being on the cutting edge of deregulation. The state hoped their plan would lower the high electricity prices residents were paying and become a model for the country. Needless to say, the plan backfired, not because the idea of deregulation is wrong, but because the California plan was flawed.

The California plan did not allow true competition even in the generation of power. It provided disincentives to customers who sought independent suppliers by imposing a transition charge that basically made all retail prices the same. California also established a retail price cap, which meant that high wholesale prices could not be passed on to customers. Therefore, consumers had no reason to switch to independent producers, who left the state for lack of business. Local utilities had to buy electricity at soaring wholesale prices and sell at the low retail price cap. The utilities were paying more for the electricity than they could charge their customers. Furthermore, consumers had no reason to conserve power, since prices were capped.

To compound the problem, California has perhaps the most stringent approval process in the country for companies trying to build new plants. The difficult process of siting and building new plants discouraged companies from doing so. And the traditional market forces, such as rising prices, that would usually have triggered the building of new plants were not obvious under California's plan. Therefore, new plants were not built to keep up with the ever-expanding demand of California's growing technology industry. In short, supply has not kept pace with demand. And, in an industry that must maintain a fifteen-percent surplus in capacity to meet peak demand, the problem has exploded.

California's problem is difficult and the long-term solution will be, too. Getting rid of deregulation isn't the answer. California must develop a plan that will provide the necessary capacity to close the current gap and keep up with growing demand. It must encourage conservation by all its consumers and add flexibility to its power plant siting and approval process. Californians no longer have the luxury of a 'not in my backyard' philosophy.

The information for this article was taken in part from the Prepared Testimony for the Senate Committee on Energy and Natural Resources Oversight Hearing, presented by Lawrence Makovich, Senior Director of Cambridge Energy Research Associates (CERA). For more information about the California power problem, go to the Department of Energy's Energy Information Administration website at www.eia.doe.gov and the CERA website at www20.cera.com/news.

NEED SUMMER CONFERENCES FOR EDUCATORS

The NEED 2001 National Energy Conferences for Educators provide teachers with the most up-to-date information on all aspects of energy, including energy sources, consumption, electricity, efficiency, and environmental and economic impacts. Teachers have the opportunity to speak with experts in the field and visit interesting energy-related sites near the conference.

Teachers receive the instruction and materials to implement hands-on, interdisciplinary energy units in their classrooms. Teachers also receive the training to conduct workshops and inservices in their areas to introduce the NEED Program to others. Participants receive the individual instruction they need to develop classroom programs that meet the needs of their students and the requirements of their state standards of learning.

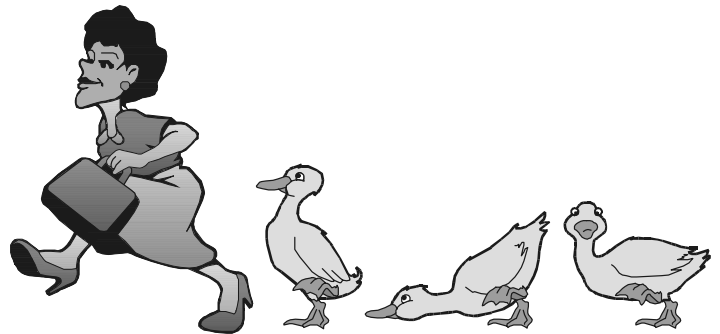
Conference Registration Form is on the next page.

COST

The **\$800** registration fee covers most meals, lodging (double occupancy) and classroom and conference materials. Single room surcharge is **\$350**. Travel is not included in registration fee.

Registration fees and travel expenses are usually paid by school districts or sponsors. Check with your school district for available funding. Contact The NEED Project at 1-800-875-5029 to see if there are sponsorships available in your area.

Three graduate credits are available to conference participants from Virginia Commonwealth University for an additional fee of **\$405**.



"The NEED Conference helped me get my ducks in a row to teach an amazing hands-on energy unit!"

CONFERENCE DATES

REGISTRATION DEADLINE	April 15, 2001
ALBUQUERQUE, NM	July 7–11, 2001
WILLIAMSBURG, VA	July 14–18, 2001

Conference Agenda

- Saturday 2:00 pm** Meet fellow participants, set goals and objectives, and investigate the **Science of Energy**. With hands-on experiments, teachers explore light, heat, motion, and sound and learn about the forms of energy and their transformations.
- Sunday** Explore the **Sources of Energy**: how they are formed, found, recovered, produced and consumed, as well as their economic and environmental impacts.
- Monday** Participate in hands-on activities designed to teach about **Electricity, Energy Efficiency** and **Energy Conservation**.
- Tuesday** **Experience Energy** by visiting energy sites in the conference area—nuclear power plants, coal mines, refineries and photovoltaic manufacturers.
- Wednesday** Learn how to develop a **NEED Program** in your classroom with NEED's inter-disciplinary activities for all grade levels and learning styles. **Adjourn 11:00 a.m.**

Check out the complete agenda on NEED's website at www.need.org

National Energy Conference for Educators Registration Form

Please mark first choice.

JULY 7–11, 2001

Best Western Rio Grande

Albuquerque, NM

JULY 14–18, 2001

Patrick Henry Hotel

Williamsburg, VA

PLEASE PRINT OR TYPE *(must be completed by participant)*

Name

Sex (if you require lodging)

Subject/Grade You Teach

School/Organization

School Address

County

City, State

Zip

(Area Code) Phone Number

Fax Number

Home Address

City, State

Zip

(Area Code) Phone Number

email

1. Please note any special needs you have (disabilities and/or dietary requirements): _____

2. Do you require lodging? _____ Roommate preference? _____
(Lodging is double occupancy. If a single room is required, a \$350 surcharge will apply.)

3. Have you used NEED or other energy materials? _____

4. Why do you want to attend this conference? _____

5. Sponsorship: _____ I have a sponsor. Name of sponsor & billing info: _____

_____ I need a sponsor. _____ Please bill my organization (attach purchase order).

6. Three Graduate Credits are available from Virginia Commonwealth University for \$405. _____ I'm interested.

The NEED Project accepts VISA, Mastercard, and American Express. Please call to register using a credit card.

PLEASE RETURN FORM BY APRIL 15, 2001
FAX YOUR FORM—IT SAVES ENERGY! FAX: 703-471-6306

or send to:

MARY SPRUILL • THE NEED PROJECT • PO BOX 10101 • MANASSAS, VA • 20108

TELEPHONE: 1-800-875-5029

2000-2001 NEED Evaluation

We want to make sure we are providing quality activities to meet your energy education needs. Please take a moment to complete this evaluation and mail or fax to NEED at the address/fax number below or email the information to info@need.org. Thank you for your input!

Name _____ Grade Taught _____
School Name _____ Phone Number (____) _____
School Address _____ City _____ State ____ Zip _____
Fax Number (____) _____ Email _____

Do you have a school NEED/energy website? What is the URL? _____

Number of students taught this year _____ Major Discipline _____

When/How did you find out about the NEED Program?

What NEED training have you attended?

Was NEED training important to the success of your program?

How long have you used NEED materials?

Do you have a NEED club?

How long (days/weeks) was your energy unit?

Did you use NEED materials during the 2000-2001 school year?

If no, why not?

If yes, which materials did you use? Please circle each activity you used.

Blueprint for Success	Energy Infobooks	Games & Icebreakers	Primary Stories
Monitoring & Mentoring	Learning & Conserving	Building Buddies	Energy Enigma
Science of Energy Kit	Energy on Stage	Energy Carnival	Today in Energy
Energy Jeopardy	Electric Puzzles	Rock Performances	Mission Possible
EnergyWorks	ElectroWorks	Energy Expo	Current Energy Affair
Marine Energy	ThermoDynamics	Transparent Energy	Exploring Energy
Energy Geography	Energy in the Balance	Energy Around the World	Energy Debate Game
Conservation Contract	Museum of Solid Waste	Energy Math Challenge	Yesterday in Energy
Projects and Activities	Global Trading Game	Mystery World Tour	This Mine of Mine
Energy Fair	Energy Exchange Activities	Other _____	

Is the Blueprint for Success a helpful curriculum guide for planning your energy unit?

Are there activities you would like to see developed and what are they?

Do you use the NEED website www.need.org?

Are there resources you'd like to see available on the website?

Do you find the format and content of the *Energy Exchange* newsletter helpful and useful?

Short Circuits

Fusion in a Pop Can

Researchers at the Department of Energy's Los Alamos National Laboratory and the U.S. Air Force Research Laboratory in Albuquerque, NM, are investigating a way to create fusion energy in a cylinder about the size of a soda can. Magnetized Target Fusion (MTF) research shows the potential for producing smaller fusion energy sources at a cost far less than current approaches. Fusion energy offers a potentially unlimited source of energy, but scientists have thus far been unable to create fusion on a small, controllable basis. The MTF experiments could provide the basis for a technology that eventually could change that situation. See <http://fusionenergy.lanl.gov/mtf.htm>.

Reducing Greenhouse Gases at the Source

Scientists at Ohio University are studying how algae can absorb carbon dioxide produced by coal-fired power plants. OU's Coal Research Center research team has proposed growing and harvesting algae directly in the exhaust gas from power plants. As the carbon dioxide exhaust moves toward the smokestacks, it would pass through tubes of running water, creating bicarbonates. The water would then flow through a bioreactor containing a series of screens on which algae would grow. The algae would basically drink the bicarbonates.

Once the algae grow to maturity, they could be harvested and used for fertilizers or soil stabilizers. It is estimated that an average-sized power plant using this technology could process 20 percent of its carbon dioxide emissions and produce 200,000 tons of algae per year.

Superconducting Tape

Researchers at the Department of Energy's Superconductivity Technology Center at Los Alamos National Laboratory have developed a new process for producing high-performance superconducting tape that operates at the temperature of liquid nitrogen. A single piece of this tape can carry 200 times the electric current of an equivalent copper wire. Electric motors, transformers, transmission cables, and levitated trains are just some of the applications that might use hundreds of kilometers of these flexible tapes, which can carry vast amounts of current with no resistive losses. See www.lanl.gov/science.



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