Energy Education News

SMUD Energy & Technology Center

inside ...

Students set sail to learn and win

2016 — Mark your calendar for the 2016 Northern California Solar Regatta on May 13 and 14. Registered students may check in their boat and camp out in the group campground the day before their race is scheduled.

We'd like to recruit new teams. Find applications in each category--high school, middle school and college/university--at smud.org/solar-regatta. Submit them to suzette.bienvenue@smud.org. Slots are limited, so please encourage interested teams to apply soon.

2015 — At Rancho Seco Recreational Area in May, students from Oregon to Fresno raced their solar-powered boats in SMUD's fourth annual regatta. The 28 student boats competed in speed, distance and maneuverability. Students also got points for explaining the science behind their boat in their 10-minute presentations.

SMUD loaned the solar panels, and students either retrofitted boats or built their own design from scratch. SMUD also sponsored the teams so they could camp out the night before their races and interact with the other contestants.

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Regatta Winners —
High School and Middle School

REGATTA CUP: Evergreen #13
Best Video: DaVinci #12
Best Presentation: Ceres #8
Best Design - Artistic: School of Engineering and Science #11
Best Design - Technical: Folsom #7
Best Boat Design: Leonardo DaVinci #8
Best Drive Train: Folsom #7
Best Middle School: Pasteur #15
Sustainability: Boy Scouts #9
Endurance Course: Evergreen #13
Slalom Course: Laguna Creek #10
Sprint Course: Evergreen #13
Judges' Award: Folsom #7
Students' Choice Award: Ceres #8

Colleges and Universities

REGATTA CUP: Sierra College #4
Best Video: Cosumnes River College #7
Best Presentation: Sierra College #4
Best Design - Artistic: Cosumnes River College #7
Best Design - Technical: Cosumnes River College #7
Best Boat Design: Cosumnes River College #7
Sustainability: CSU Sacramento
Endurance Course: Evergreen #8
Slalom Course: CSU Sierra College #4
Sprint Course: Sierra College #4
Judges' Award: Cosumnes River College #7
PV Tech Award: CSU Chico #2
Students' Choice Award: CSU Chico #2 •

Elementary school students join regatta for the first time

Pasteur Elementary school students had no idea what they were in for when they joined the 2015 Northern California Solar Regatta competition. They found an abandoned boat by the side of the road. Score! The boat had holes. Yikes! Students learned how to ask the Orangevale community for help, and so it all began.

"I don't think these kids really knew how all the work they had been doing, mostly every week throughout the year, was going to culminate on the day of the regatta. But they kept showing up and took a vested interest in being part of a team.

"When the big day arrived, our first-time team fit in rather well as they picked up on the cues from the other teams cheering them on. In the afternoon, when all the competitions were over and all the teams were gathered around the stage for the awards ceremony, I believe it all came together for everybody. The emcee was walking around the crowd with a microphone getting the teams pumped up about engineering, building things, and being a part of the Solar Regatta.

"At one point he was asking teams one thing they learned that day. And when he asked our team, a 7th grade girl said loud and proud that she learned, 'The more you cheer other teams on, the more they cheer for you!' This resulted in a huge roar from the crowd and you couldn't help but feel proud to be part of such an event." *—Davin Bowker, teacher/mentor, Pasteur Middle School* •

Come to the Convention — California Science Teachers Association

October 2 - 4, 2015, Sacramento

Remember to register for the California Science Education Conference at **cascience.org**.

For more than 20 years, this conference has been sharing the latest in education programs with teachers like you. You'll find many hands-on, one-hour workshops by scientists, university educators and teachers. Short and field courses are also available.

Whether you're new or a veteran science educator, the conference will help you meet Next Generation Science Standards. Sessions are for pre-K through 12 and for pre-service educators. Each session will focus on one of the following tracks:

- Earth and space science
- Life science
- Biology
- Environmental science
- Physics
- Physical science
- Integrated science
- STEM
- Chemistry
- Engineering

And while you're at the conference, come by the SMUD booth and learn more about energy education for students and teachers offered by our Energy & Technology Center. •

Students work to save schools money

Can you think of a few good ways our schools could spend $280 million?

California schools spend more than $700 million per year on energy, about the same as they spend on books and supplies. The California Energy Commission estimates that by implementing energy efficiency measures, schools could cut their energy expenses by as much as 40%.

We're always working with local school districts to help them save on their electricity costs. Plus, reducing electricity use helps keep all of our customers' rates among the lowest in California.

This year SMUD is enlisting the efforts of young people who know the most about how energy is used in schools: Students.

SMUD's Auditing, Conservation, and Training program (ACT) offers high school students the opportunity to learn about energy auditing and conservation, all while gaining valuable workforce skills and experience.

This year, 40 students and 8 teachers will spend a week during their summer break training with professional auditing tools and learning how to be "building doctors." After their training is over, they'll perform an audit of their own schools, producing a "bill of health" (an audit report) and recommending how their schools can stop wasting energy, reduce greenhouse gas emissions, and save money.

In October, the students will use what they learned to lead the rest of their campus in an energy efficiency campaign. Participants receive a stipend for their time after they present their overall findings to their school board.

The program is a win-win-win for students, school districts, and the community. Best of all, students are engaged in making a meaningful and lasting improvement to their schools and will take the lessons they learn into whatever profession they end up in. For some of them, that may be the energy field!

For more information on this program, contact jacobe.caditz@smud.org •

Free Teacher Development Workshops • *Fall 2015*

SMUD's Energy & Technology Center is proud to offer no-cost workshops for teachers. Classroom materials and meals are provided. Seating is limited, so register soon by visiting smud.org/workshops. Here's a rundown of the workshops this fall.

Saturday, Sept. 26 – Project WET & EEI (Grades K-12)
Effie Yeaw Nature Center
2850 San Lorenzo Way, Carmichael
9 a.m. to 4 p.m.
Presented by Linda Desai, Placer Nature Center, and Wendy Weller, EEI Teacher Ambassador. Hosted by Brian Brown, Water Education Foundation

Teachers will experience interdisciplinary activities in learning about water resources, water conservation and related key concepts. Engage in fun, hands-on, standards-based outdoor activities including water quality monitoring and water sampling in the American River. This is STEM learning at its best. You'll receive the new, Common Core-correlated Project WET 2.0 Guide and a classroom set of the grade-level appropriate Education & the Environment Initiative (EEI) unit.

Saturday, Oct. 3 – Solar Schoolhouse for Your Classroom (Grades 1-12+)
Historic Folsom Powerhouse
9980 Greenback Lane, Folsom
9 a.m. to 3 p.m.
Presented by Solar Schoolhouse and California State Parks

In this workshop, learn how to integrate solar energy education into your curriculum and teach students the value of using renewable energy sources. You'll make two take-away projects and will receive Your Solar Home curriculum and DVD as well as classroom materials. Some teachers will be eligible to receive classroom solar kits through the Solar Champions program.

Thursday, Oct. 29 – GEMS® Dry Ice Investigations (Grades 5-12)
Historic Folsom Powerhouse
9980 Greenback Lane, Folsom
4 to 7 p.m.
Presented by SMUD and California State Parks

Just in time for Halloween, this workshop will teach your students some scary-good investigation skills and help you develop their inquiry abilities, which research shows is difficult to teach. You'll review energy in sublimation and hear ways to foster student skills in observation, experimentation, and inference.

Saturday, Nov. 7 – GEMS® Electric Circuits (Grades 3-9)
Historic Folsom Powerhouse
9980 Greenback Lane, Folsom
9 a.m. – 3 p.m.
Presented by SMUD and California State Parks

If you're a fourth-grade teacher, Electric Circuits will help you prepare for Next Generation Science standards in electricity and electromagnetism. The easy, hands-on activities support science and language arts, introducing students to electricity and electric circuits. Davin Bowker of the San Juan Unified School District will lead you through activities as you learn how to build and diagram circuits and help your students support their work with expository writing. •

Teachers get everything they need to teach energy in cool ways

Middle and high school teachers learned about the unseen energy of the electromagnetic spectrum in our Invisible Universe workshop in March. They also took away SMUD lesson plans and hands-on experiments to use in class.

In the workshop, teachers play with foam core, rope, Slinkies and telephone cords to mimic and measure electrical waves. They leave with loads of creative ideas for teaching energy, physics and astronomy. The curriculum combines history, language arts, and science.

Teachers investigate things like an unexplained blast of energy during the Cold War. Was it a nuclear blast? They re-enact news reports and investigate types of wave energy using simple items you can find at home.

The next workshop is on Saturday, Sept. 19 from 9 a.m. to 1 p.m. at the Sacramento Discovery Museum. Register at **smud.org/workshop**. Questions? Contact Suzette Bienvenue of SMUD's Energy & Technology Center at suzette.bienvenue@smud.org or at 916-732-5175.•

Have a shocking good time at the Electricity Fair

The Electricity Fair (Saturday, Sept. 12 from 10 a.m. to 2 p.m.) at the historic Folsom Powerhouse targets 4th-grade science standards for magnetism and electricity. It's also educational and fun for the whole family. Children can engage in hands-on activities with Mr. Electricity and his minions.

Make solar-powered bracelets, sun-dried clay medallions, and artwork using only the power of the sun. Families can tour the historic Folsom Powerhouse, view exhibits in the museum, picnic by the American River or take a hike along the historic canal.

Various vendors and government agencies will host information booths on energy efficiency and renewable energy. Students will exhibit solar-powered boats and other projects. The Sacramento Electric Vehicle Association also will be on hand to show you how varied and affordable plug-in electric vehicles can be.

TEACHERS – If you want to send your students to the Electricity Fair for extra credit, the flier has a worksheet/scavenger hunt game on the back. Email your mailing address to suzette.bienvenue@smud.org and we'll send you a class set of the fliers. Students who visit the SMUD booth with a completed worksheet will get a prize. •

Solar Schoolhouse
Education Energized by the Sun

Become a solar champion

Want to promote solar energy technology at your school? Why not become a Solar Champion?

We'll set you up with classroom instruction, free giveaways, a Solar Schoolhouse classroom kit and a fountain kit. If you teach in SMUD's service area (primarily Sacramento County), this is for you.

Get started by attending the Solar Schoolhouse workshop on Saturday, Oct. 3 at the historic Folsom Powerhouse. Then apply by writing a short essay on how you plan to use the kit. Contact Brent.Sloan@smud.org for the form provided by Community Solar. Once your application is approved, you'll receive a Solar Schoolhouse classroom kit.

For the solar fountain kit, please design and implement a short in-service instruction for teachers at your school. Please complete the form and teacher sign-in provided by Community Solar. •

Project WET

In partnership with the Elk Grove Water District, SMUD's Energy & Technology Center recently presented Project Wet (Water Education for Teachers). Teachers learned how energy and water conservation are related and how to connect water issues and science in the classroom. Water district staff showed teachers how to do a water audit. For details on Project WET visit **projectwet.org** •

"Teaching through Solar" exhibit – free

We invite you to explore our new exhibit—"Teaching through Solar." See projects by local teachers and students who have benefited from SMUD's many outreach programs — solar-powered boats, race cars, power generators and many other fascinating solar-energy projects. See why our solar projects are so successful and how they can help you.

As a renewable form of energy, solar seems to ignite students' imaginations and motivate them to design, build and implement new devices. Learning about solar also encourages students to venture outside the classroom and interact with nature.

Teachers and outreach educators can learn how to include solar in their curriculum by taking no-cost teacher development workshops.

Sponsored by SMUD's Energy & Technology Center and Community Solar Program®, the Solar Room is open 5 days a week:
Monday through Thursday, 8 a.m. to 4 p.m.
Friday 8 a.m. to 3 p.m.

The Solar Room
SMUD Customer Service Center
Second floor, Energy & Technology Center
6301 S Street, Sacramento •

Energy and Me!

In our version of "Schoolhouse Rock," teachers from Sacramento learned some dances and songs about energy to take back to their students as energy lessons.

Deb Bruns from the California Regional Environmental Education Community (CREEC) and Linda DeSai from the Placer County Nature Center led pre-K through grade 3 teachers in activities that incorporate energy concepts. Through art, theater, singing and dancing, teachers learned to communicate complex concepts like kinetic and potential energy. The teachers had a great time and left with classroom materials and the enthusiasm to use music and dancing to teach.

To learn how you can bring music, singing and dancing to your lessons on the science of energy, please contact SMUD's Energy & Technology Center at 916-732-5175. •

Girl Scouts cook with sun power to earn energy badge

SMUD's Energy & Technology Center staff visited the Girl Scouts to teach them how to use the sun to cook food. Each girl made a Solar Cook-It to take home and share this simple and magical technology of converting sunlight to energy and yummy food.

For more information on solar cooking, visit **solarcooking.org** •

The cardboard, plywood, or whatever … regatta

More than a hundred people stopped to watch 55 boats compete in the 8th Annual Regatta at Negro Bar State Park on the American River. A variety of boats made from recycled materials competed in speed and slalom races. Some boats vied for the Titanic Award by sinking quickly.

This competition (the inspiration for the SMUD Solar Regatta) helps students learn about physics. Every day at school should be this much fun! •

Awards for Youth Energy Summit

On May 1, three groups of high school students received scholarships for taking part in the Youth Energy Summit (YES), a community partnership with SMUD, Roseville Electric, Lodi Electric and the Turlock Irrigation District.

Now in its 7th year, YES is designed for high school juniors and seniors to focus on California's energy future. This year, the theme was food and agriculture. Students took two days of interactive training in January, focusing on developments in green energy, technology and sustainability. After that, they broke into teams and created a community project relating to green energy, energy conservation or sustainability.

Students from Lodi's Tokay High School each received $1,100 for their project, "Solar Powered E-Ponics." The students created automated, self-monitoring hydroponics systems, which grow plants in nutrient-rich water without soil.

George Washington Carver High students each received $775 in scholarships for their project "Save Our Lunch, Save Our Planet." The students carried out a food energy audit, collecting data on the energy used for transportation and disposal of school lunches in their district.

Students from Grant Union High each received $500 for their project "Crawzy Ponics." The students built an aquaponics system that raised crayfish as well as vegetables.

Look for the next Youth Energy Summit in 2018. •

Solar car race at American River College

Now in its 11th year, the SMUD-sponsored Solar Car Race hosted more than 100 students who designed, built and raced solar-powered model cars. Franklin High School once again swept the races with the top speed awards. Andrew Bilan from Franklin High won the Tech Design award as well as first place. Los Rios showcased various go-karts in mock-race trials. ARC featured projects from the repair and collision departments and the new Transformer vehicle. SacEV was also on hand exhibiting nine plug-in electric vehicles.

Awards:

Sustainability –	Cordova HS team #2
Artistic –	Franklin HS team #40
Stock Design –	School of Engineering and Sciences HS team #25
Tech Design –	Franklin HS team #17
Judges' Choice –	School of Engineering and Sciences HS team #26
3rd Place –	Franklin HS team #15
2nd Place –	Franklin HS team #18
1st Place –	Franklin HS team #17

Tiny House Competition—2016

Twelve teams in California have registered for the Tiny House Competition on October 15, 2016. SMUD is sponsoring a home-building competition for really, really small homes, from 100 to 400 square feet of living space. The competition will take place at California State University, Sacramento.

Teams have submitted their check-in videos, introducing the team members and featuring their design intentions. You can see these videos on YouTube. Search for Tiny House Competition.

The students also are experimenting with various sustainability challenges. Pictured here are CSUS students who spent an afternoon bonding as a team while trying out a new balloon-type solar cooker.

For more information on this competition, visit **smud.org/tinyhouse**.

Solar Decathlon

SOLAR DECATHLON

SMUD is proud to support California State University, Sacramento in the 2015 Solar Decathlon competition, sponsored by the U.S. Department of Energy. The entry, named the "Solar NEST" (Natural, Elegant, Sustainable, Tranquil), exemplifies the future of sustainable, energy-efficient and affordable housing in the Sacramento region.

The Solar Decathlon will be held in Irvine, California from October 8 to 18. To learn more about it and how architecture and engineering can be built into your curriculum, go to **solardecathlon.gov**.

This is Sac State's first foray into the nationally acclaimed Solar Decathlon. To learn more about the students' progress, visit **solardecathlon.gov/team_sacramento_state.html**

California Foundation for Education in Agriculture

Dependent upon the success of agriculture as a business, California is faced with challenges ranging from the water shortage to land quality issues. At the same time, children and young people are becoming further removed from the production of agriculture.

Energy has a direct link to agriculture all the way from water conservation to the transportation and delivery of food. Learn to link energy topics to agriculture. The California Foundation for Education in Agriculture offers materials you can use in the classroom to educate children on agriculture's critical contribution to California society and economy.

To download classroom materials go to **cfaitc.org** •

California Education and the Environment Initiative (EEI)

This free, California Department of Education K-12 curriculum teaches science, history and social science through environmental topics. Help your students understand their relationship to the environment while preparing to be future stewards of California.

The curriculum consists of 85 units that complement existing instructional materials, allowing you to supplement or substitute portions of the textbooks. The EEI curriculum builds student knowledge in areas such as agriculture, water and energy without adding instructional time to the teacher's schedule.

An example of how to integrate energy issues into your classroom is the sixth grade units, "Energy, Pass it On" and "Energy, It's Not All the Same to You."

The units and wonderfully detailed maps were designed by National Geographic. To order your set of classroom materials, visit **californiaeei.org/curriculum/** •

Folsom Powerhouse Electricity Fair

September 12, 2015 • 10 a.m. – 2 p.m.

Folsom Powerhouse State Historic Park
9980 Greenback Lane, Folsom 95630

FREE
admission to the park and the event.

Spend a day by the river learning about electricity.

- Family fun
- Children's activities
- Interactive museum exhibits
- Tour of the Powerhouse
- Electric Vehicles
- PRIZES

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FRIENDS OF THE Folsom Powerhouse

CALIFORNIA STATE PARKS SINCE 1864

SacEV.org

FOLFAN Friends of Lakes Folsom and Natoma

SMUD® Energy & Technology Center

Folsom Powerhouse Electricity Fair Scavenger Hunt

Name one of the most important things that was powered by the new transmission line to Sacramento in 1895.

Draw the geometric shape which represents the penstock.

In what year did the Folsom Powerhouse start to generate electricity?

What was your favorite part of the Electricity Fair?

Does an electric vehicle have a tailpipe? Yes No (please circle)

What was the name of the celebration to commemorate the electricity service to Sacramento?

How many miles of transmission lines were built from Folsom to Sacramento?

Is the electricity in your home AC or DC? (please circle)

Draw an example of how magnets repel each other. (Label the magnet ends)

a	b	i	d	h	y	d	r	o	b	s
c	l	n	g	n	e	t	y	t	o	r
o	y	s	l	a	v	r	e	p	e	l
m	t	u	b	u	o	q	w	l	o	g
p	h	l	c	t	d	o	e	u	s	m
a	t	a	a	n	f	r	l	g	o	a
s	r	t	u	r	b	i	n	e	l	g
s	s	o	a	m	e	r	i	c	a	n
a	m	r	c	o	h	d	r	p	r	e
i	t	y	s	t	a	t	i	c	a	t
c	o	n	d	u	c	t	o	r	h	p

1. A device in which a magnetic needle points to magnetic north
2. Electric power generated by the sun
3. General term for a material which stops electricity from moving easily
4. Electric current is created when a _____ passes through a coiled copper wire.
5. Electric power generated by moving water
6. General term for a material which allows electricity to move easily
7. What "P" stands for in PHEV
8. Type of electric charge which gives a shock or makes hair stand up
9. Name of river adjacent to the Folsom Powerhouse
10. With electromagnetism, opposite charges will attract and like charges will do this_____
11. Rapidly moving water turns this object in the Powerhouse

Teacher Name _____ School _____

Student Name _____ Grade _____

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