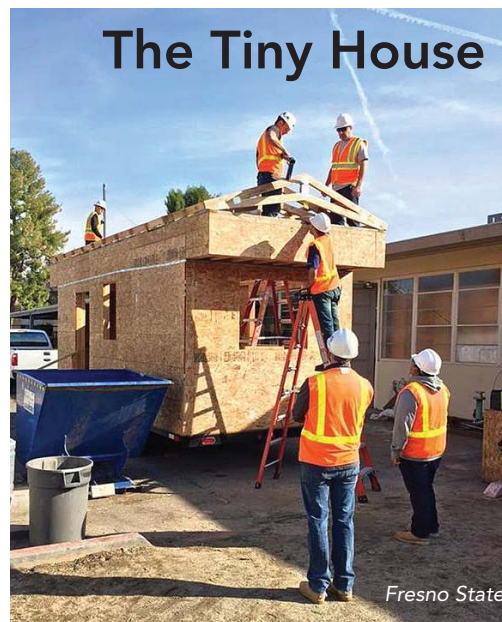


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Competition

Join us in October 2016 to applaud innovative and energy efficient off-grid tiny houses. Ten college and university teams will be vying for the best construction and design awards.

The Tiny House undertaking is a social movement in which people downsize the spaces in which they live. The competition is modeled after the Department of Energy's Solar Decathlon.

People have many reasons for simplified living in smaller spaces.

- **Financial:** Young people starting out can probably afford a tiny house, even without much credit history or cash down payment.

- **Sudden life changes:** A tiny house can be the additional space needed for the older or younger generation moving in.
- **Sustainable living, particularly in urban areas:** A tiny house has a smaller carbon footprint and low to zero energy consumption. Its greatest economic impact is in dense urban areas targeted for urban infill.
- **Recreational:** Many choose a tiny house as an affordable second home.

Tiny living is defined as any house smaller than 1,000 square feet. The Tiny House competition requires Tiny Houses on Wheels (THOW) of between 100 - 400 square feet that are designed, constructed and conform to standards of Recreational Vehicle Codes. The judging criteria for the Tiny House Competition has been simplified to four categories – architecture, energy, home life, and communications.

The Tiny Houses will be open to the public on Oct. 15.

Location: Parking Lot #E, Cosumnes River College, 8401 Center Parkway, Sacramento

Time: 10 a.m. - 3 p.m.

If your students are interested in green building technology or sustainable living, this would be a

Tiny House *continued on page 2*



Photo courtesy of Tumbleweed Tiny House Company

Tiny House *continued from page 1*

great field trip. A Tiny House Energy Expo will feature vendors exhibiting the materials and technology used in the houses, government agencies focusing on sustainable living topics and colleges promoting their programs and recruiting interested students.

The competing colleges and universities are:

California State University, Sacramento	Laney College
University of California, Berkeley	College of the Sequoias
Cosumnes River College	California State University, Fresno
Santa Clara University	San Jose City College
California State University, Chico	
University of California, Santa Cruz and Cabrillo College	•



Solar Decathlon at California State University, Sacramento

For the very first time, California State University, Sacramento (CSUS) participated in the Department of Energy's Solar Decathlon. SMUD was proud to sponsor CSUS in this competition by providing building materials, funds and sponsorship.

The CSUS team named its house the 'Reflect Home' because it's intended to reflect the values of those who live in it. The home was a model of sustainable, yet stylish and comfortable living. It was designed to allow the homeowner to generate and use power in a way that leaves a smaller footprint without sacrificing the comfort and conveniences of a modern and affordable home.

The team placed 10th in the competition and gained lots of attention from visitors, who commented that the house did not look in the least "modular." The Reflect Home can be found across the street from Capital Public Radio on the CSUS campus and will be used as housing for visiting dignitaries. •

Solar Champion Program

Through a partnership of Community Solar® and the Energy & Technology Center, SMUD provides free classroom solar kits to teachers. The goal of Community Solar is to have at least one Solar Classroom kit available at each elementary school in SMUD's service area.

To request a solar workshop for your district, have your district science administrator or professional development director contact us to set up a class. You must have a minimum of 30 teachers (public and/or private) from your district to attend the workshop, which will be held at no cost at our Energy & Technology Center. Teachers receive a solar classroom kit and solar-powered fountain kit (one per school), classroom curriculum and materials, professional development hours, breakfast and lunch.

To be eligible for a solar classroom kit, a teacher must:

- Teach in a classroom in Sacramento County.
- Teach in grades K-6.
- Attend one of the following–
 - Rarus Summer Solar Institute,
 - Solar Schoolhouse – Solar Primer workshop, or
 - District-sponsored Solar Schoolhouse workshop. •



15 Tips for a Greener Classroom

1. **Let in More Sunlight** – Open blinds and curtains and refrain from posting student artwork on the windows.
2. **Turn Off Lights to Save Energy** – Assign a student the task of turning off lights when the room is empty. Lighting accounts for up to 50% of the energy costs at schools. For information on how to improve the efficiency of your classroom lighting, contact connie.samla@smud.org.
3. **Incorporate Solar Energy and the Environment into Lesson Plans** – Become a Solar Champion through SMUD and enroll in one of the Energy & Technology Center's free Solar Schoolhouse workshops. Download lesson plans from the National Energy Education Development website (NEED.org). Get free curriculum, student guides and classroom posters from the California Environmental Initiative (EEI), which will help you integrate science, language arts and social studies with interesting environmental topics. Visit www.californiaeei.org
4. **Recycle in Your Classroom** – Many schools do not recycle. Start in the classroom with recycling paper waste. Encourage students to start a recycling program and help fund school projects with the proceeds. Visit www.calrecycle.ca.gov
5. **Create a School Garden** – School gardens have been proven to increase attendance and test scores. Even if all you have is a planting container outside your door, engage your students in growing healthy food, nurturing living things and providing examples for biology lessons. Go to www.edibleschoolyard.org
6. **Solar Cook** – Who doesn't like to eat? Teach students how to make a solar cooker with materials as simple as a pizza box to more complex box ovens. Use this theme as part of a design challenge in your classroom. Learn more at www.solarcookers.org
7. **Advocate for Healthy Food** – More than 50% of students get their primary meal at school. Teach students to not only make wise energy choices but also wise food choices. After all, food is the energy which powers their bodies. Go to www.cfpa.net
8. **Energy Lessons** – Do you need help planning a science or math Family Night? Why not incorporate energy conservation lessons that will engage families by showing how they can help the environment and save money too! The Department of Energy has great activity and lesson plans for energy smart schools. Visit www.energy.gov/eere/education/teach-and-learn
9. **Reduce Consumption** – Teach students about waste in packaging. If you are crafty, have students make their own lunch bags or boxes. Teach them how to use chopsticks. Learn more at www.calrecycle.ca.gov
10. **Choose Environmentally Safe Products** – Have students research how to make environmentally safe cleaning products. Students can then test products by cleaning their personal spaces. Visit www.goodhousekeeping.com
11. **Water Conservation** – Teach the value of water conservation. Encourage the use of water bottles and other strategies students can use at home. Go to www.saveourwater.com
12. **Transportation** – Encourage students to bike, walk and carpool. Not only is it better for the environment, it's a healthier alternative. Check out the app CARPOOLKIDS.
13. **Compete** – Students love hands-on activities and competitions. SMUD offers the Solar Car Race and the Solar Regatta. Learn more at smud.org/solar-regatta
14. **Clubs** – Start an afterschool club. The focus can be recycling, energy auditing in the school or the community.
15. **Go Digital** – Reduce homework. Frontload your lessons with videos and test for knowledge with video presentations. •



Watt?

This site has a great video on general energy terms and access to lots of other educational content for your students.

www.energy.gov/science-innovation/science-education

Electricity Fair



On Sept. 6, 2015, more than 1,200 visitors came to celebrate everything electric at the historic Folsom Powerhouse.

California State Parks personnel and docents gave tours of the powerhouse, museum and grounds. Visitors learned the historical importance of this first location for long-distance transmission of power (22 miles) from Folsom to Sacramento in 1895. This transmission of electricity was a catalyst in developing the economy and the future of Sacramento.

Volunteers from Pasteur Middle School shared engaging hands-on activities at various learning stations. Children made pinwheels (wind energy), UV bead bracelets, and solar baked clay medallions (solar energy).

On display were several solar-powered boats that had competed in the Northern California Solar Regatta in the middle, high school and college divisions. Families learned more about electric vehicles, courtesy of the Sacramento Electric Vehicle Association.

The Electricity Fair is a magnet for students in 3rd & 4th grades, and many aspects from historical to scientific meet Common Core and Next Generation Science Standards. A visit to the Electricity Fair can be extra credit for your students and their families. If you are interested in a field trip, email terri.lopez@parks.ca.gov to schedule a visit. •

Going Green Begins in the Classroom



If you're interested in becoming a teacher, consider finding a university that focuses on environmental stewardship and design your student teacher lesson plans around your passion to create a more sustainable community. If you're already a teacher and interested in ways to help students recognize and address the kinds of change that can positively affect their lives and communities, visit www.tobecomeateacher.org/green-classrooms.

Green classrooms not only equip children with the knowledge of how to make a difference in the world but also create a healthier environment that benefits students and their families. Environmentally conscious classrooms can have a positive impact on test scores and school budgets.

Higher test scores – Studies have shown that giving students hands-on, practical curriculum such as energy audits, competitions and gardens may lead to higher scores in STEM.

Savings – The Center for Green Schools noted that in 2015, green schools were best in handling their budget because of the impact of energy savings on the schools' bottom line. Many schools are implementing energy-saving programs like energy audits, recycling, day-lighting, water efficiency and waste reduction programs. •



Why is SMUD a GEMS Center?

Developed by the Lawrence Hall of Science in Berkeley, GEMS (Great Explorations in Math and Science) curriculum and teaching guides were designed to bring inexpensive experiential learning into the classroom. GEMS has built a substantial leadership base through a national and regional collection of GEMS education centers.

SMUD's Energy & Technology Center is proud to be one of these centers providing professional development to teachers and outreach educators in our community. While SMUD sponsors primarily energy-related workshops, there are more than 70 GEMS guides available to teachers. •

GEMS Teacher Workshops

The **Solar Primer Workshop** was held on October 2, 2015 at the historic Folsom Powerhouse. At this event, teachers learned how to integrate into their curriculum renewable energy using solar techniques. Teachers made pizza-box solar cookers and their very own solar phone chargers.

GEMS Dry Ice Workshop was held at the historic Folsom Powerhouse on October 29, 2015. The dry ice curriculum was developed by the Lawrence Hall of Science as one of the GEMS units. This unit deals with the study of energy transformations between gas, liquid and solid. Since the experimental material is dry ice and the workshop was held just before Halloween, we gave it a Halloween twist so that the teachers would have some fun activities to bring to their classrooms on Friday. Some of the teachers arrived in costume and left with lots of spooky ideas to take to back to their students.

GEMS Electric Circuit Workshop –held annually– is one of the most important workshops sponsored by SMUD's Energy & Technology Center.

San Juan Unified School District teacher Davin Bowker presents the GEMS curriculum. This unit is a great addition to the Next Generation of Science Standards since it blends history, language arts and science. The workshop targets 4th grade education since electricity is part of the science standard for this grade, but the curriculum can be customized and appropriate for grades 3 - 8+.

Students learn about the history of science discovery and research in relation to electricity, how scientists use journals in their work and how they, too, can write a journal to document their own research during the hands-on circuit activities. The unit culminates with teams designing and building electric contraptions and a trade show fair in which they show and market their devices. In this workshop, the teachers act as the students and get to experience the activities from the student perspective. •

Scholarships for teachers

SMUD offers five teacher scholarships to attend the weeklong Summer Solar Camp at the Rahus Institute. This is open only to teachers in schools or outreach educators in Sacramento County. For information or to apply go to www.solarschoolhouse.org

Did You Know?

In 1895, the first long-distance power line in the western US spanned 22 miles from Folsom to Sacramento, powering streetcars, streetlights, a brewery, and a handful of grand houses. Sacramento celebrated this milestone with the Festival of Lights. Streets and prominent buildings were lit up for the first time at night, and the electric show was so bright it could be seen for 50 miles. Within 15 years, most of the city became electrified. •



New Exhibits in Our Energy & Technology Center

Teaching Through Solar

Are you considering integrating renewable energy in your curriculum but don't know where to start? Come and visit the new Teaching Through Solar Exhibit on the second floor of SMUD's Energy & Technology Center.

You'll be amazed at the innovation and ingenuity of students who are passionate about their environment.

You'll find samples of these solar projects from local schools. The projects are sponsored by SMUD's Energy & Technology Center and Community Solar® programs.

Solar Powered Boats	Solar Cookers
Solar Race Cars	Solar Suitcase
Solar Go-Kart	



EnergySmart Home

Are you interested in getting your students to integrate math studies in a real-life situation? Introduce the topic of energy management and how new technologies can be used to save their families money.

That's the idea behind SMUD's EnergySmart Home. More comfort, more convenience and greater livability can be seen here using today's smart technologies to lower energy costs. Come and see:

- How "smart" appliances lower energy costs.
- How efficient lighting can improve livability and save money.
- How windows and window coverings control both light and energy use.
- How the sun can power a home and charge an electric vehicle.
- How you can manage all these from your smart phone or tablet.

Both of these exhibits are located at SMUD's Customer Service Center, 6301 S Street, Sacramento, in the Energy & Technology Center—first floor, southeast wing. The displays and exhibits are open to the public Monday – Friday from 8 a.m. to 6 p.m. •

New Workshop at SMUD

This workshop is open to every SMUD customer.

Residential Time-of-Use Rates for EV and Solar Customers

Saturday, March 19, 10 a.m.-12 noon • Saturday, June 18 (repeat workshop)

Get an overview of our new Residential Time-of-Use (RTOU) rate available to customers who lease or own an electric vehicle or solar system. We'll explain why SMUD is making this change and provide tools and information to help you prepare for the new rate. We'll also give you tips and tricks to help reduce and shift your electricity usage. •

Solar Regatta

The 2016 Northern California Solar Regatta is scheduled for May 13 and 14 at the lake at Rancho Seco Recreational Area. Come learn about solar as you watch and cheer middle-school, high-school and college students racing their solar powered boats they have designed and constructed.

Here is a list of participating schools.



Middle schools

Louis Pasteur Middle School
Evergreen Middle School
Leonardo da Vinci Middle School
Will Rogers Middle School

High schools

Valley High School
School of Engineering & Sciences
Ceres High School
Encina High School
Boy Scouts of America
Laguna Creek High School
Cosumnes Oaks High School
El Camino Fundamental High School
San Juan High School
Natomas High School
San Ramon Valley High School
Folsom High School
John F. Kennedy High School
Ridge View High School
San Joaquin County Office of Education
Pacific Beach High School

Colleges and universities

Cosumnes River College
California State University, Chico
California State University, Sacramento
California State University, Humboldt
Sacramento City College
Skyline College
San Joaquin Delta College
City College of San Francisco
Simpson University
West Valley Saratoga
California Maritime Academy – Engineering
California Maritime Academy – Design
Chabot College
Sacramento City College – MECHS Club
Ohlone College
Butte College
University of California, Davis
Bakersfield College – Women Engineers
Sierra College

Solar Regatta Helps “at-risk” Students



The Northern California Solar Regatta requires that each team have a minimum of two pilots who have passed a California Boating Safety exam. Teacher Chris Van Meter was responsible for having an unprecedented 87 of his students take the California Boating Safety Exam. By incorporating the regatta into his curriculum, he helped students learn to value California waterway rules just as they value having a driver’s license. “When the students find this value, they feel empowered and own the responsibility of safety,” Mr. Van Meter said.

Mr. Van Meter teaches at the Ceres High School Manufacturing Production and Green Technology Academy (MPGT), which began in 2008. This is a school within a school that offers a student-centric learning environment for “at-risk” youth. Many of these students, who face domestic violence, homelessness, drugs and gangs, find comfort in this program, which can fill the support role of a surrogate family. He has found that the Northern California Solar Regatta is a great way to help students focus on a senior-level project that incorporates many facets of MPGT curriculum, electrical design, Computer Aided Drafting (CAD), mechanics and physics.

The Northern California Solar Regatta is woven through high school learning in this program. 10th and 11th grade students begin studying logic, design, electrical control, construction and electronics. 11th and 12th grade students develop boat designs and work on the final boat design.

“Every year, students look forward to the competition and demonstrate their concepts, designs and

Solar Regatta *continued on page 9*



Solar Car Race at American River College

May 6, 2016 10 a.m. – 2 p.m.

If you're a high school student or teacher and like to design, construct and compete, consider racing in the 2016 Solar Car Race at American River College. To be eligible, your school or outreach group (such as Scouts or clubs) must be in SMUD's service area and students must be in grades 9 – 12.

To start racing, have your teacher or mentor contact us. We'll distribute up to six solar car kits and the Junior Solar Sprint race rules. You may have up to twelve students racing at the event at American River College. Student teams will design and construct the race cars, which will have a removable solar module.

Some schools choose to have an earlier race-off at the school, with winners moving on to the American River College for race day. It's a fun race and is held on the same day as the Arts and Tech Festival, an annual showcase for existing and prospective students to learn about the technical and arts classes offered at ARC.

The race venue also will feature examples of the automotive technology shop work, innovative fuel models and technologies, and exhibit personal electric vehicles courtesy of the Sacramento Electric Vehicle Association. This is a great way to sit behind the wheel and discover what you may be driving after graduation.

The deadline to register for the Solar Car Race at American River College is February 15. Email kaelin.sherrel@smud.org or suzette.bienvenue@smud.org to register your school and get your free solar car kits.

See <https://www.smud.org/en/about-smud/environment/renewable-energy/solar-car-race.htm>

All race participants will be given an event t-shirt. •

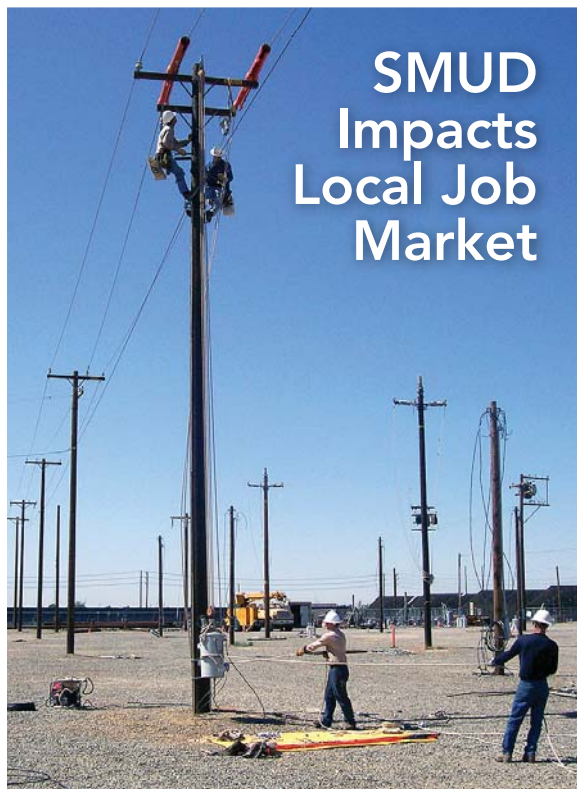


SMUD Impacts Local Job Market

SMUD will boost our local economy with a new regional training center. SMUD Power Academy will be a premier school to train future utility workers. The Academy will support development of a skilled labor force for SMUD and other utilities across the West. The California Department of Industrial Relations recently approved SMUD's apprenticeship standards. SMUD is the first large-scale Northern California utility to partner with the Division of Apprenticeship Standards. The academy will open later this year.

SMUD-trained lineworkers are in high demand by other utilities because of their excellent skills. In addition to lineworkers, the center will develop substation and network electricians, cable splicers and locators, electrical technicians, telecom technicians, meter technicians, designers, engineers, construction management inspectors, vehicle and equipment operators, and support staff.

The training center also will give SMUD a better opportunity to connect with potential employees locally, particularly those in disadvantaged communities. SMUD will coordinate learning opportunities through local colleges. •



Upcoming SMUD-Sponsored STEM Events

WAPA-Hosted Science Bowl
Saturday, February 27, 2016
Folsom High School @ 9 a.m.

Science Olympiad Division B/C
Saturday, March 5, 2016
California State University,
Sacramento

Science Olympiad Division A
Saturday, April 2, 2016
Mira Loma High School

**Sacramento Regional Science
and Engineering Fair**
Saturday, April 2, 2016
American River College @ 8 a.m.

Solar Regatta *continued from page 7*

hard work. Our students really live the mantra of ‘Built not bought’ by completely designing, fabricating and building every aspect of the boat from the hull to the drive system,” Van Meter said.

The students assign project leaders and builders and work in a cohesive team, knowing their roles and jobs. Many of these students will gain immediate manufacturing careers, internships and college entrance after graduating high school because of their participation in the MPGT program.

Mr. Van Meter’s advice for teams participating for the first time in the 2016 Northern California Solar Regatta is, “Nothing works perfectly the first time. That is why you need to test, practice and trial. Get the boat in the water a month before the race and you will witness many of the mistakes before the race. Use this time to help the students redesign, reengineer and teach valuable life lessons.” •

Sacramento Regional STEM Fair

The NorCal STEM Education Foundation has teamed up with American River College to host the annual **Synopsys Sac Regional STEM Fair** on April 2 at American River College in Sacramento. (Set-up day is April 1.) The Fair is a prestigious 12-county competition for students in grades 6-12.

Student winners in the Fair will advance to both the California State Science Fair and the Intel International Science and Engineering Fair, among others. The grand-prize winners in the high school division will be sent on an all-expenses-paid trip to compete in the Intel International Science and Engineering Fair in Phoenix, AZ in May.

The STEM competition isn’t the only way to be a part of the fun: There is a “showcase” division. Here, students can get all the valuable experience of preparing for and being a part of the Fair without the added stress of interviews by the judges.

Also, we’re always in need of volunteers to help run the Fair, so we’d welcome any help in that capacity. You can find a detailed list of duties and times for volunteers at <http://www.sacstemfair.org/judges—volunteers.html>. Once you’ve chosen a position that interests you, sign up to volunteer at <http://www.jotformpro.com/form/51967496143971>.

In addition to the Fair, a College & Career Expo will be open to the public from 2 to 5 p.m. the same day. Representatives from local colleges, trade schools and service organizations will be onsite to help kids navigate the multitude of career options available in our region.

Learn more at www.sacSTEMfair.org. Questions about the event? Contact Nadia Compton at ncompton@sacSTEMfair.org •

Next Generation Science Standards

The implementation of the Next Generation Science Standards and the state of science education in California is an important topic often absent in local media stories.

The California Science Teacher Association (CSTA) is working collaboratively with several other organizations in the recently formed California Alliance for the Next Generation Science Standards (CA4NGSS). Through their work with CA4NGSS, CSTA curriculum board members and other California education organizations will be developing a series of communications and messaging to raise awareness of the standards among teachers, administrators, parents, business and the media.

Check in with your local district to see how these changes are being introduced. The Energy and Technology Center will be following up with appropriate professional development workshops. •



SMUD®

Sacramento Municipal Utility District

Energy & Technology Center

6301 S St.

Sacramento, CA 95817-1899

Independent Living Skills and Solar



SMUD's Energy & Technology Center team recently donated raw materials (mostly recycled solar modules) to a group of Independent Living Skills high school students at Laguna Creek High School. The students are cognitively impaired and autistic. With the help of their teacher, Eric Johnson, the students built solar phone chargers. Mr. Johnson used his free prep time to teach about renewable energy and the science of wiring and soldering by helping the students build their own chargers.

Students also learned a variety of skills, since this project introduced ancillary educational components like art, design and writing. These kids were empowered with tools they have never been entrusted to in the past and by doing so have experienced, a more normalized education. ●