

The Geysers Steamline

GEYSERS GEOTHERMAL ASSOCIATION

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WWW.theGGA.org

SUMMER 2009

GGA Summer Barbecue set for June 23 Calpine Visitor Center

Mesquite-grilled rib eye steak and chicken, Italian pasta, string beans with almonds, fresh garden green salad with balsamic vinaigrette, tomato, basil and mozzarella salad, plus rolls, iced tea and brownies are all on the buffet-style menu for the annual GGA summer barbecue set for 11:30, Tuesday, June 23.

The location is the Calpine Geothermal Visitor Center, 15500 Central Park Road in Middletown, and cost will be \$25 per person.

If you have not received your invitation in the mail, please contact GGA PR/Program committee chairperson Margaret Lewis no later than June 18 to reserve your place at the table. Call 707 431-6132 or email lewism@calpine.com.

Time to renew—don't miss out on industry happenings

GGA dues are past due for the 2009-2010 term. Most members have already paid, but if you haven't sent us your check, please put it in the mail today so you can remain on our mailing list.

With the renewed interest in geothermal energy, GGA membership translates into opportunities for individuals to network and socialize during our three annual events. Between events the Geysers Steamline provides updates on events at The Geysers as well as other geothermal-related news.

If you have questions or wish to confirm that your membership renewal was received, call Marilyn Sanborn, membership chair at 530 472-6442 or email her at msanborn@frontiernet.net. Renewal applications are available on our website, www.theGGA.org.

Your dues help pay for our newsletter and other expenses. More importantly, they support our annual scholarship program.



President announces \$350 million stimulus allocation for geothermal

Funding for two important stimulus programs could provide new impetus for both solar and geothermal energy industries, and could benefit The Geysers and other conventional geothermal systems as well as enhanced geothermal systems (EGS) technology.

President Obama announced the two programs on May 26 upon his arrival at Nellis Air Force Base in Las Vegas, Nevada. The \$350 million geothermal grant will be administered by the Department of Energy and will be disbursed in four arenas:

- Geothermal demonstration projects (\$140 million)
- Innovative exploration techniques (\$100 million)
- Enhanced geothermal systems (EGS) research and development (\$80 million)
- A national geothermal data system, resource assessment and classification system (\$30 million)

The recently-released DOE budget draft for 2010 calls for geothermal spending on EGS only, so the President's announcement is seen as potentially good news for The Geysers.

Ron Suess, GGA President and president of Ronald E Suess Company, Santa Rosa, commented on the announcement, saying, "My own thoughts are that there is potential benefit to The Geysers, but it is unsettled as to how specifically that benefit will materialize. Developing EGS technology has real potential to help us use heretofore 'marginal' resource areas in and around The Geysers. Laser-type drilling equipment and techniques certainly have the potential to lower drilling costs."

Suess added, "At the very least, it is really gratifying to see this kind of financial commitment to the geothermal industry in general, at this time. We are a 'mature' industry but yet we are new again, and this helps make us a new renewable energy resource. The underlying challenge is to see if this stimulus funding materializes in usable form and is sustained."

Continued on page 3



President's Message

By Ron Suess

A question was posed recently as to what to make of the announcement by the federal government concerning its new geothermal "stimulus package". The question reminded me of some thoughts about geothermal energy that can re-shape how we view the future of geothermal as a truly renewable resource.

Visible and obvious geothermal resources in North America have been used for centuries. Hot springs served as a source of warmth and cleansing for inhabitants who had access to such resources. The minerals in the hot springs served as a source of healing. Moreover, people sat, soaked, and sweetened in geothermal mud caves and pools heated by the Earth, and people still like to practice this "feel good" ritual.

Since the early decades of the Twentieth Century, we began and continue to develop technologies that will allow us to probe more than ten (10) miles below the Earth's surface in search of geothermal energy. The objective is to locate and then utilize geothermal energy to generate electricity and heat homes. The combined outcome of this objective is that, currently, six million Americans are using geothermal energy in their homes. Three million Americans receive electricity from geothermal power plants, and another three million use geothermal heat pumps to heat and cool their homes.

The United States still leads the world in generating electricity from the earth's heat. As of August 2008, geothermal capacity in the United States totaled nearly 2,960 megawatts across seven states: Alaska, California, Hawaii, Idaho, Nevada, New Mexico, and Utah. Geothermally-powered electricity generation in the United States saves burning more than sixty-five million barrels of oil each year. In particular, California produces almost five (5) percent of its electricity from geothermal energy. There are 2,555 megawatts of installed generating capacity in California, which remains more than any country in the world.

The question now begged is: "How much more geothermal energy is there?" We are perched on the threshold of new frontiers for geothermal energy. Thousands more megawatts of electric power than those currently being generated could be developed from already-identified hydrothermal resources. With

improvements in technology, much more geothermal power will become available. The ongoing development of "enhanced or engineered geothermal systems" (EGS) will be a key advance that will significantly increase usable geothermal energy.

Usable geothermal resources will not be limited to the "shallow" hydrothermal reservoirs at the crustal plate boundaries. At a depth ranging from three (3) to six (6) miles down, much of the world is underlain, by "hot dry rock" with lots of heat but no water. EGS offers the chance to extend use of geothermal resources to larger areas of the western United States, as well as into new geographic areas of the entire U.S. More than 100,000 MWe of economically viable capacity may be available in the continental United States, representing a 40-fold increase over present geothermal power generating capacity.

So what is old is also new. Even though geothermal energy utilization is now considered a "mature industry" that generates nearly 3,000 megawatts for base load in the United States, more than 100 new geothermal power projects now under development in 13 states will more than double the country's geothermal capacity over the next five years. Factor in the significant accessibility of heretofore "marginal" geothermal resources contributed by EGS, the future growth of geothermal energy is, indeed, big and bright like a new renewable energy resource. With considerable new funding being made available by the federal geothermal "stimulus package", coupled with new technology to utilize heretofore marginal resources, the geothermal industry is poised to grow and produce competitively priced base load electricity generation capacity as a significant element of the United State's energy portfolio (10%). We at The Geysers eagerly look forward to participating in this new future of the renewable geothermal energy resource. We shall see how this new frontier unfolds.

Geysers Geothermal Association

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Vice President/Finance Officer - Ralph Aviles

Secretary - Ben Barker

Geothermal stimulus funds

Ben Barker, GGA secretary and geothermal consultant, Windsor, stated, "My guess is that the benefits to the Geysers will be somewhat nebulous because of the emphasis on new energy sources, but there are a few possibilities that come to mind: First, The Geysers is likely to be used as a proving ground for research, such as AltaRock's EGS project. Second, there could be new powerplant technology demonstrations that could increase efficiency as the temperature and pressure decline at The Geysers. Third, changes in transmission access rules to facilitate small projects elsewhere could open up new markets with higher values. Also, Geysers operators may be able to lower their cost of capital if government support gives lenders more comfort with the technology, or there are direct subsidy programs."

On a more cautious note, Barker added, "The Geysers is so big already I don't really see this government program as likely to have major effects, but I'll happily be proven wrong."

In a Reuters article by Tilde Herrera, Karl Gawell, executive director of the Geothermal Energy Association in Washington, D.C. had this to say about the stimulus boost: "In one shot, this is more funding now than in the past 20 years." He added that, according to GEA research, 126 geothermal energy projects now under development may add up to 5,500 megawatts to the nation's overall capacity, mostly in the Western U.S. "It's hitting on a lot of points that resonate with the geothermal community," Gawell said of the funding plan.

Geothermal Facts...

Did you know that 46 of California's 58 counties have lower temperature resources for direct-use geothermal?

In fact, the City of San Bernardino has developed the largest geothermal direct-use projects in North America, heating at least three dozen buildings—including a 15-story high-rise and government facilities—with fluids distributed through 15 miles of pipelines. Environmentally benign fluids are discharged to surface water channels after heat is used.

*From California Energy Commission
Consumer Energy Center*

GGA Scholarship committee announces winners

Winners of the GGA Industry Scholarships were announced in late May by committee chairman, Louis Capuano III. The two winners, Andrew Aviles, Santa Rosa and Nicholas Reed, Middletown will each receive \$1,000. Their stories are on page 5.

The panel consisted of three individuals from diverse backgrounds. Capuano said that after all names and identifying information were removed from the applications each judge was given a copy. Judges were Capuano, with an engineering and math background, Jennifer Bastian with a legal background, and Patrick Hanson, a business school graduate.

Each judge filled out a grading sheet and totals for each student were compared. Applicants with the highest two scores were declared winners. "This made the entire process an objective judgment instead of being a subjective decision," Capuano said.

EGS, Inc. tapped for Montserrat exploration

Paul Brophy, founder and Chief Geologist of EGS, Inc. announced May 4 that his company will perform geothermal exploration studies in the Caribbean island of Montserrat this summer.

"The government of Montserrat is looking to take advantage of its volcanic origins by developing the geothermal potential for a green and renewable energy source," said Brophy. "A reliable energy resource will also help with the economic redevelopment of the island."

EGS, Inc. is also working with the Government of Nevis, an island approximately 35 miles southeast of Montserrat, providing technical consulting services for the development of the geothermal potential there.

Brophy's Santa Rosa based company specializes in green fields and geological exploration with an emphasis on evaluation of renewable energy resources. In April, 2008 EGS, Inc. became a subsidiary of ThermaSource, LLC, one of the fastest growing providers of drilling, engineering and consulting services to the geothermal sector.

Brophy served as GGA membership chairperson from 2000 -2004 and as President of GRC for 2007-2008.

NCPA goes solar at southeast pumping station

Most GGA members can still recall the ripple of concern that ran through the The Geysers in the late 1980's when data showed an unexpected decline in geothermal reservoirs. Around that same time, the County of Lake was having concerns as well—what to do with all that wastewater. When a win/win solution was proposed by Northern California Power Agency (NCPA) in the early nineties, the thought of pumping Lake County wastewater 29 miles up to The Geysers for injection into the reservoirs seemed like a fanciful dream. People wondered, would it work?



NCPA photo captures a portion of the eight-acre solar array at The Geysers. See page 6 for sketch of NCPA SEGEP layout.

Twenty-one years later, two very successful pipelines deliver treated wastewater to The Geysers every day. NCPA was first to break ground in 1995, bringing the Southeast Geysers Effluent Pipeline (SEGEP) project on line in September of 1997. Calpine followed suit, unveiling its own 34-mile pipeline from the City of Santa Rosa to The Geysers in late 2003.

Both projects have been wildly successful for all parties involved. The biggest downside, according to NCPA, has been the cost for retail electricity to run the pumps. The utility was seeing its PG&E bills increase at an annual rate of 6 percent, more than doubling since startup.

This called for another winning solution on the part of NCPA, and in 2007 they proposed a solar project that would provide renewable energy to help meet the pumping load and reduce the amount of energy

purchased from PG&E. The result is green on green. As Ken Speer, NCPA Assistant General Manager for Generation put it, "This is unique—we're using wastewater to generate geothermal power, and we're using solar to power the wastewater pump!"

Today an eight-acre array of solar panels supplies power to the Southeast Treatment Plant pump station. At a cost of \$8.2 million, the project consists of a single-axis, horizontal solar tracking system configured to optimize energy capture by following the sun's path across the sky. The unit is specifically designed for large-scale deployment. SPG Solar of Novato was the contractor.

Since starting up in September, 1997, the innovative pipeline project has pumped more than 26 billion gallons of treated wastewater from cities in Lake County to Middletown and ultimately to injection wells at The Geysers. The pipeline has been in continuous operation since it started, and forecasts indicate that in 2010 injection will match steam production for the first time, providing full replacement of the steam mass produced, according to NCPA's website, www.ncpa.com.

After injections reach full replacement, the gradual decline in the level of steam production will approach a near sustainable level of 80 percent of the mass of water injected, based on a recent forecast of SEGEP operations, according to the website. Therefore, the total amount of electrical generation, as forecasted in Case 2007, of 20,554 GWhrs, is completely dependent on the amount of injectate available from SEGEP. *Keeping the SEGEP project on line and reducing the cost of operations is the key to future operations of the geothermal plants*, the website said.

NCPA is working with Lake County on construction of a second solar array at the Middletown Treatment Plant.

—Marilyn Sanborn

*Steve Eney, NCPA contributed to this article.
Pam Bordi, NCPA submitted the photo and assisted with gathering information.*

CGA Scholarship
WINNER
\$1,000
Geothermal Industry
Award

Nicholas J. Reed

Middletown High School
Middletown



Nicholas Reed is a young man with a clear vision of what he wants to accomplish with his life. Nick wrote in his application, "It took me a long time to finally figure out what I wanted to pursue. I had so many options available to me, but I couldn't decide which to take. When my dad passed away in the summer of 2008, it was easy for me to finally decide. I knew that I wanted to become a doctor."

His decision was motivated by compassion and a strong desire to "help people every day." Nick is well-prepared for the rigors of college, having maintained a 4.0 average throughout high school and graduating with 4.5. He credits his determination to do well in school to having to deal with challenges that stemmed from his dad's departure from the family when Nick was nine. He picked up the pieces, helping his mom as she worked two jobs to feed the family. He vowed to always be responsible and go above and beyond in everything he does—a vow that he has kept.

Nick became one of the top students in his class, one of four valedictorians and a strong presence in his community through his volunteer work. Nick was an active fundraiser for his school, helping out with Sports Boosters and Booster Concessions. He assisted in the Century 21 Easter Seals golf tournament, and participated in a 24-hour walk to help raise money for cancer treatment sponsored by Relay for Life.

Although Nick took the most difficult classes available, he still participated in Debate Club, Poetry Club and Varsity Soccer, holding the position of team captain his senior year. While it was necessary for him to work after school, he still earned awards, among them Freshman of the Year, Sophomore of the Year, Student of the Month and Golden Mustang Award. He was on the Principal's List, won the Scholar Athlete award, and an award for Most Improved Player two years in a row.

Nick's ties to The Geysers originated with his late father, who worked there for nearly 20 years. Because his uncle, William Harbaugh also had worked at The

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CGA Scholarship
WINNER
\$1,000
Geothermal Industry
Award

Andrew R. Aviles

Cardinal Newman High School
Santa Rosa



Andrew Aviles writes that he wants to go to college because, "I love learning and I want to educate my mind as much as I can." He will be heading for UC Davis this fall where he'll be an economics major. While he enjoys learning, he also wants to "help others and make a better world."

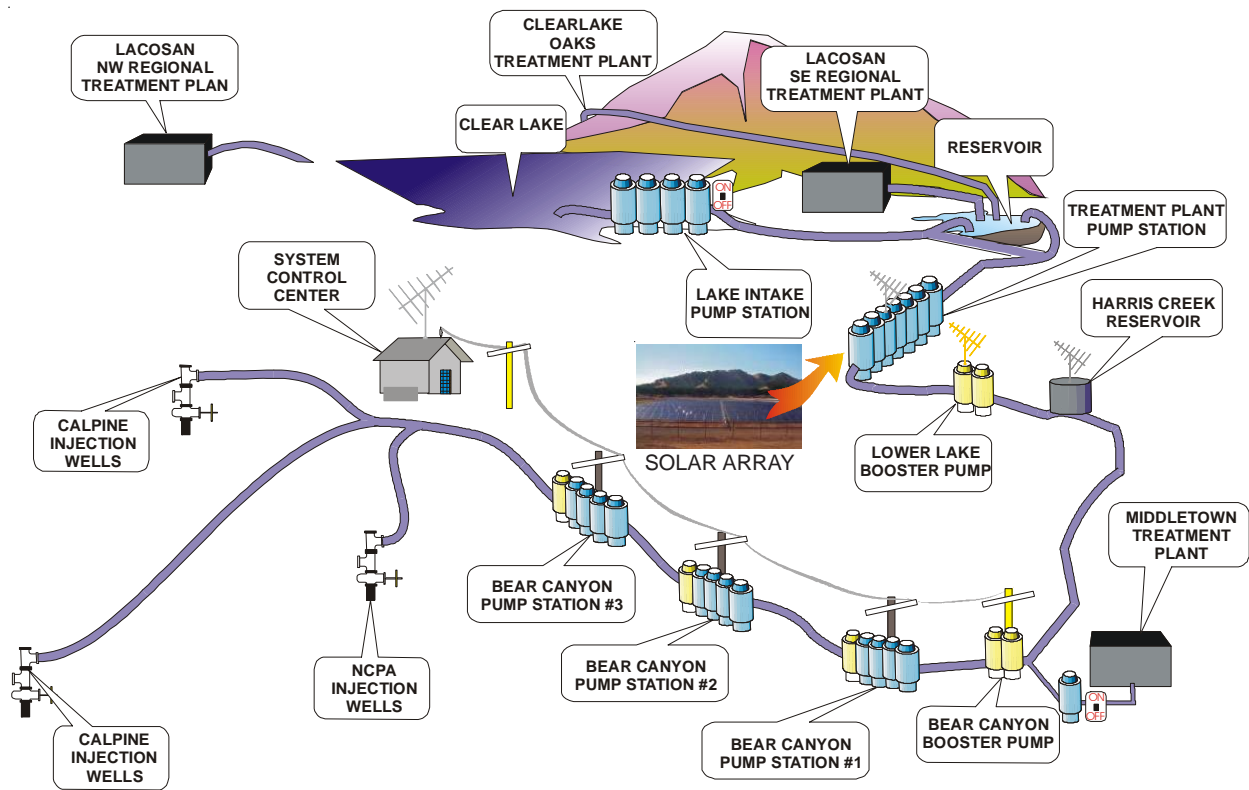
Andrew knows first hand about helping others. In all four years of high school he was involved in community service work. He helped teach a Catholic Confirmation class for two years, helped out at Project Homeless Connect in San Francisco, and for the past two years has helped build homes in Tijuana, serving as student leader his senior year.

Andrew explained, "The volunteer focus of my senior year has been Esperanza International. This is an organization that helps poor people in Mexico build houses. My friend and I helped raise money for this organization and organized a trip for kids from our school to go to Mexico and take part in building houses. I went to Tijuana with the mindset that I would help others, which we did. I did not realize that the people we helped would also help me. They taught me that no matter how little you have, life will always be good if you focus on the right things, such as family and friends. This is a lesson I really needed to add in my life. I learned that I can always learn from others and that I find happiness in helping others."

High school subjects that he especially enjoyed were economics and physics. He has taken AP courses in math, English and Spanish. His college counselor, Tony Greco, writes that Andrew has a work ethic that goes unmatched, adding that Andrew is a role model for his classmates, and accepts any leadership role with grace and determination.

Molly Bone, Cardinal Newman's coordinator of the Esperanza Tijuana trips, described Andrew as "simply one of the most genuine, large-hearted young people I have ever worked with in my twenty years in education."

Continued on page 6



NCPA sketch shows the solar array supplying power to the Southeast Treatment Plant Pump Station. Story on page 4.

Continued from page 5

Reed Scholarship Winner

Geysers (17 years with NCPA), he offered to serve as the family connection to the industry and submitted a document verifying his experience there. He added his praise for his nephew, saying that Nicholas is one of the hardest working and deserving young men he had ever known—prejudice aside. He noted that in spite of numerous struggles, Nick kept his grades up, stayed out of trouble, and assumed the role of ‘man of the house.’

Continued from page 5

Aviles Scholarship Winner

Some of Andrew’s achievements include Highest Honors all four years; Scholar Athlete Awards for outstanding achievement in football, basketball, and track and field and Certificates of Honors in Spanish, English and weight training. He earned Oxford Scholar distinction from Cardinal Newman by invitation only.

Andrew’s parents are Ralph and Lorie Aviles. Ralph started at The Geysers working for Unocal Geothermal, and is presently a financial analyst for Calpine.

Western GeoPower lease

Western GeoPower Corporation announced early last month their acquisition of approximately 3,000 acres of private geothermal leases in South Brawley, Imperial County, CA. The agreement includes the right to develop the confirmed high-temperature geothermal reservoir and build a plant for electricity generation.

Four abandoned deep wells plus a side-track of a well, are on the lease property, and a new data review by GeothermEx, Richmond, confirmed temperatures up to 278°C or 532°F. Pressure interference testing has demonstrated the existence of high flow and storage capacities within the reservoir. A wellhead productivity of 700,000 pounds per hour (equivalent to about 7 MW) had been demonstrated by earlier well testing. However, these wells had a narrower diameter than is conventional for geothermal wells today and the wells showed major formation damage. New wells with a larger diameter drilled on the property should have a much higher productivity according to a Western GeoPower news release.

More information at www.geopower.ca/newsp1.htm.

Submitted by Nick Voegtly

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Renewable resource maps point the way for transmission line projects and new geothermal development

A newly completed series of maps highlighting geothermal resource areas throughout California and the Western United States has laid the groundwork for siting new transmission line corridors necessary to support the Obama administration's mandate for clean and reliable energy. Some maps include wind and solar as well as geothermal.

Having power lines available in these key resource areas will be a tremendous boost for geothermal energy, making new projects financially more feasible. Entities involved in the mapping study include the states of California and Nevada, the Western Governors Association, and U.S. Geological Survey.

The following four potential transmission corridors to emerge as the result of the studies include: Sunrise Powerlink from the Imperial Valley to San Diego; Green Path, from Imperial Valley to Las Vegas; a North-South Nevada line to Las Vegas; and a Northern California line potentially linking Oregon and Nevada to the San Francisco Bay area.

For maps and more information regarding proposed California transmission line corridors, visit www.wapa.gov/transmission/ttp.htm or www.tanc.us.

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