
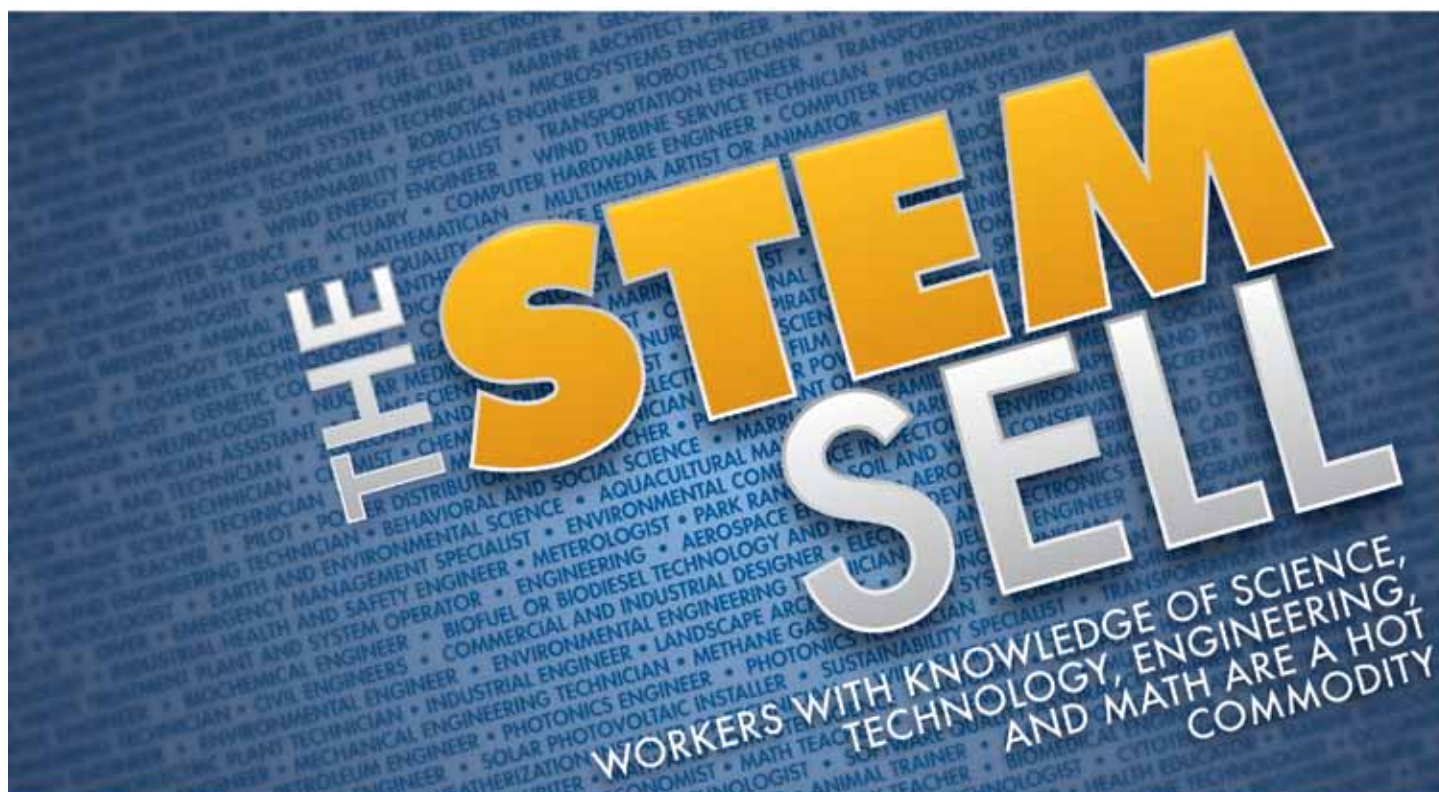


EXPLORING TODAY'S ENERGY CAREERS WITH THE NEED PROJECT



STEM — science, technology, engineering and math—is a hot topic in education. States competing in the Race to the Top Federal funding program were encouraged to develop strategies to improve STEM curriculum and STEM opportunities for their students. There are additional public and private grants for districts and schools to improve their STEM education. Teachers are attending conferences and workshops focused on STEM skills. Schools are hosting STEM days and offering STEM clubs. Why is STEM so important?

The skills learned in science, technology, education, and math have many real-world, every day applications and are appropriate for all students regardless of what career path they choose. STEM education often leads to STEM jobs, and STEM jobs are the jobs of the future and offer many benefits for those pursuing careers in STEM fields.

According to a July 2011 report by the U.S. Department of Commerce, Economics and Statistics Administration, STEM workers “drive our nation’s innovation and competitiveness by generating new ideas, new companies, and new industries.” There are many benefits to working in a STEM career as well. The study by the Department of Commerce found that over the last ten years STEM jobs have been growing three times faster than non-STEM jobs, and STEM workers are less likely to experience joblessness than non-STEM workers. Financially, regardless of education levels, STEM workers earn more than non-STEM peers.

The energy industry is filled with STEM jobs, and the job outlook in the energy industry is positive. In many energy industries, such as oil, gas, and electricity generation, nearly half of employees are expected to retire in the next five to ten years. In addition to a workforce that needs to be replaced, energy demand is expected to rise also creating new jobs. Many of these jobs will be “green” jobs as renewable energy standards continue

AVERAGE HOURLY WAGE, BY MAXIMUM EDUCATION

HIGHEST EDUCATION DEGREE COMPLETED	TYPE OF OCCUPATION	
	STEM	NON-STEM
HIGH SCHOOL DIPLOMA OR LESS	\$24.82	\$15.55
SOME COLLEGE OR ASSOCIATE DEGREE	\$26.63	\$19.02
BACHELOR'S DEGREE ONLY	\$35.81	\$28.27
GRADUATE DEGREE	\$40.69	\$36.22

SOURCE: U.S. DEPARTMENT OF COMMERCE

to push for further development and consumption of solar, wind, geothermal, biomass, and hydropower electricity.

In this issue of Career Currents you will meet individuals working STEM jobs within the energy industry. They represent the variety of jobs available from pile drivers to geothermal HVAC technicians and engineers, and nuclear engineers. Read their stories to find out about the opportunities that exist.

SO LONG, FAREWELL, BUT NOT GOODBYE

The NEED family is sad to see our Curriculum Director Hallie Mills leave us this month, but we know that her nine-month-old daughter, Julia, will be glad to have her mom with her more. Hallie's leadership has taken NEED's curriculum to another level – engaging students more, bringing current educational techniques and philosophies into our curriculum and training, and jump-starting our use of social media to inform and encourage use of NEED in the classroom. She's a fast Tweet on Twitter and is the mom of one of the few energy literate infants. Julia is already discussing electricity generation and solar, wind, and natural gas at home, so we know she'll be a smart NEED student too. We wish Hallie, her husband Paul, and baby Julia all the best as they embark on this new and exciting adventure.

WANT HALLIE'S JOB?

As one great NEED team member moves on, that creates the opportunity for those with expertise in curriculum and science education to consider NEED as their next career. If you'd like a copy of the job description or have questions about the position, please email jobs@NEED.org.



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THE GENDER GAP IN STEM: LET'S DO SOMETHING ABOUT IT

By Matthew Inman

The U.S. Department of Commerce recently released a report titled, "Women in STEM: A Gender Gap to Innovation." The report states that, "Although women fill close to half of all jobs in the U.S. economy, they hold less than 25 percent of STEM jobs." This is despite the fact that two-thirds of young children say they like science, according to a joint study by Florida Gulf Coast University and University of Colorado at Boulder titled, "Women in Science, Technology, Engineering, and Math."

In the early 1990's I was an undergraduate physics major at the University of Washington. One day, as part of my informal initiation into the world of academia, I attended what would be the first of many physics lectures. A renowned professor of high energy particle physics was speaking on the soon-to-be-built, he thought, Superconducting Super Collider. It's not the professor's talk I remember from that day, though. In fact, I can remember nothing about the



talk beyond its topic. What I remember from that day is the sinking feeling in my chest as I entered the large auditorium. The room was filled with more than a hundred physics faculty and students and I did not see a single woman in the group. I seriously questioned if this was a club I wanted to be a part of. Do I join this group that excludes women, be it intentionally or not?

That was nearly twenty years ago (the Superconducting Super Collider project was cancelled by Congress in October, 1993), and reports from the U.S. Department of Commerce indicate that little has changed. My personal experience in the world of STEM education and STEM jobs also tells me that we have not come very far. Why not? The joint study by Florida Gulf Coast University and University of Colorado at Boulder offers several research-based possibilities, such as classroom climate issues, lack of role models, bias or discrimination in hiring, issues of salary and status, and challenges related to balancing work and personal life. Another possibility I've come across numerous times is the idea that women are more inclined toward disciplines and jobs where they feel they will be helping people and the planet. There is at least the perception that many STEM careers don't fit this bill.

Whatever the reasons for the STEM gender gap, I guess I'm writing this as a humble

plea to fellow STEM educators. Let's become aware of and, more importantly, educated about the issue. Let's do what we can to mitigate the problem in our educational domains. Let's work toward significantly more progress in the next twenty years than we've seen in the last.

Why work toward closing this STEM gender gap? For me, the fact that it feels like the right thing to do, the fact that I think quality of life for all will be improved if we succeed, is reason enough. Still, there are other reasons: a nation's STEM workforce, for example, has a strong impact on that nation's economy. We clearly have a large pool of untapped talent among all those women who are not participating in the STEM workforce.

If you are interested in learning more about this issue, I suggest the two reports mentioned above along with a 2010 report by the American Association of University Women (AAUW), "Why So Few?" All can be found easily online.

**Matthew Inman is a National Board certified physics and general science teacher from Spokane, Washington. Currently he is serving as an Albert Einstein Distinguished Educator Fellow at the U.S. Department of Energy. NEED is lucky to have him among its great workshop facilitator team. Matthew can be contacted at matthew.inman@ee.doe.gov.*

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.

Career Currents provides educators and students with resources to introduce energy careers. Each issue focuses on a different sector of the energy industry. No single issue is meant to be all-inclusive to either the sector profiled or all careers in energy.

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Image courtesy Louisiana Department of Transportation

PILE DRIVER

If the first thing that comes to mind when you hear “pile driving” is a wrestling move, you are not alone. Pile driving is the process of driving large support columns or



beams into, the ground to support large structures. Stadiums, bridges, parking garages, office tower foundations, wind turbines, cooling towers for power plants, oil rigs, gas pipelines and countless other large structures have to be supported by steel or concrete. This is where pile drivers come into play. As Dave Borrus, a business agent for pile drivers and Divers Local 56, the marine construction division of the New England Carpenters union in Boston, MA says, “Our best work gets covered up.”

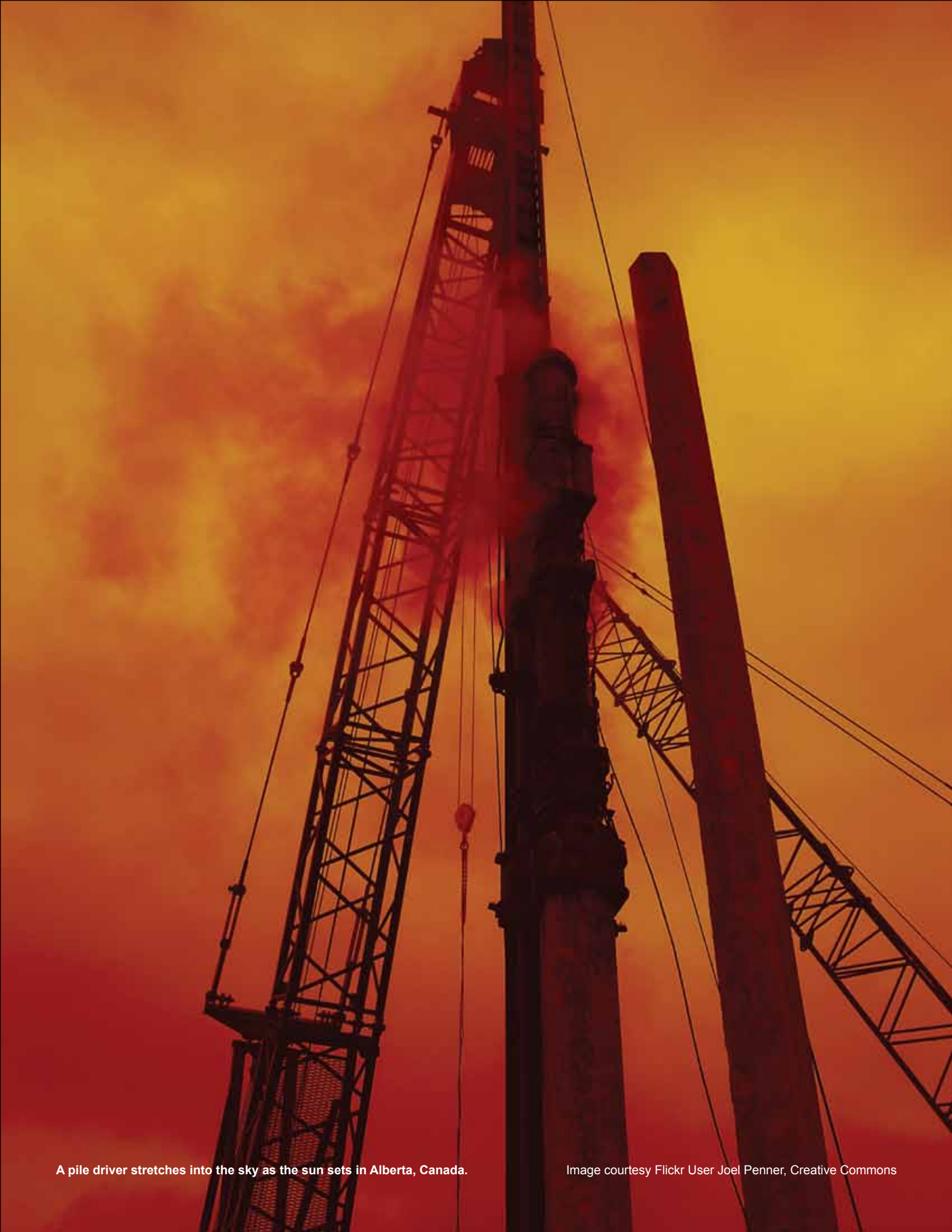
A pile driver is a person of numerous trades. Welding, rigging, diving, precision cutting, measuring, and pouring concrete are just a few of the many skills that are required. Some of the time these skills are done underwater in limited visibility, and most of the time in muddy, most unfavorable conditions. For the past ten years Dave has been one of the managers of the trade union. This requires him to work with a collective bargaining agreement between independent contractors and

the skilled tradesmen who perform the work. He essentially finds tradesmen with the skill set best suited for the contractor’s needs. With close to 325 tradesmen and 25 contractors part of the Local 56, Dave makes sure each worker is qualified, capable, and receives a fair wage for their work. Dave’s favorite part of his job is finding someone a job and moving production forward. He has helped workers find close to 70,000 hours of work in the energy sector over the past 4-5 years.

Keeping up with technology in the industry is one of the largest obstacles that Dave faces. “If you can stay ahead of technology and know how to use it, you can gain a lot of jobs.” Through grants and other funding Dave is able to keep the tradesman up-to-date and qualified to perform these jobs. Pile Drivers Local 56 will train qualified persons to become pile drivers through the Carpenters Union, specifically focusing on skills like precision cutting, welding, and rigging. Apprenticeships lasting three to four years are available to nearly anyone over the age of 18 that applies. Of course, any previous skills or training helps significantly. The types of knowledge and training most helpful are welding skills, carpentry skills, various aquatic or boating experience, metal working, commercial fishing, and technical programs available at the high school level. These will all contribute toward a good pre-apprenticeship background.

There are apprenticeship programs available in the Midwest, New England, Seattle, Pennsylvania, San Francisco, and Los Angeles. With a large market share in the Northeast, Dave has seen some of the highest wages for first year apprentices. Many begin making \$22 per hour and also receive a generous benefit package that is worth an additional \$27 per hour. A fully fledged Journeyman can make approximately \$36 per hour, before the benefits package. With that being said, work for these skilled people can be scarce at times. Work may consist of three weeks straight, off for three weeks, or work for three months, and off for three months. This is where Dave comes in. He finds work for these tradesman and contractors. It may take up to two years to break into the industry and get around 2,000 hours a year, so many of these apprentices and tradesman work other jobs while they are breaking into the industry. While the wage is very attractive, the work is almost the complete opposite. Working in the most unfavorable conditions is a staple of the job, whether it is muddy and wet, cold or hot, this is not a job for those who like to stay clean.

Dave has worked in the commercial diving industry for close to 30 years and has held numerous skilled positions. He has worked in agriculture, welding, construction, marine biology, and even the oil business in many different places around the world.



A pile driver stretches into the sky as the sun sets in Alberta, Canada.

Image courtesy Flickr User Joel Penner, Creative Commons

Q&A

NEED GETS TO KNOW INDUSTRY PROFESSIONALS

JAY EGG

Jay Egg is an expert on geothermal heating and cooling. He began his career as a contractor, and is now consulting, speaking, and writing about geothermal HVAC systems. Jay co-authored the book, *Geothermal HVAC: Green Heating and Cooling*.



YOU ARE CURRENTLY A GEOTHERMAL CONSULTANT AND AUTHOR. HOW DID YOU GET TO WHERE YOU ARE?

I started out as a contractor for air conditioning (AC). I was working one day on my own home and found an issue where the compressor had failed. I went to replace it and had the idea to use the earth and ground water to help cool the compressor – and it worked really well! I thought I was onto a new idea and would make a push to put this type of system in the industry. Then I discovered geothermal exchange systems were already in place.

So, I went to Oklahoma State University where the International Ground Source Heat Pump Association (IGSHPA) is headquartered. I took all of the training classes they had to offer and returned to Florida and worked hard to promote the technology. We did all of the types of AC that a contractor would do – new homes, hospitals, shopping centers. Business really progressed.

In 2009, one of my staff came to me saying there was a customer that had installed a geothermal system and he was asking for his federal tax credit. I hadn't heard of such a thing, so we did some research and realized that the Federal stimulus package included a 30 percent geothermal credit! It was then I realized geothermal was probably back into the mainstream so I worked hard to put my 20 years' worth of knowledge online to educate people about the technology and its applications. Four months later I was asked to write a book on geothermal technology. Now, I have turned over my contracting operations to another company, and I am consulting almost exclusively.

SO THIS IS NOT A CAREER PATH YOU ANTICIPATED WHEN YOU WERE YOUNGER?

No, not at all. I didn't go to college. I immediately went into the Navy, I am one of a very few people who made it in an educated world without having gone to college. If you work hard to learn all you can and to do a good job, you can make your career whatever you choose if you stick with it.

WHAT IS A TYPICAL WORK DAY LIKE FOR YOU NOW?

When I am home and not traveling, I start the day answering emails and phone calls, then I'll write for the second half of the day. I usually travel every other week. On travel weeks, I typically go to three or four cities consulting with government or private sector companies about doing geothermal projects.



Image courtesy Jason Hodges

Tightening the fan mounts on a geothermal heat pump.



Image courtesy Jason Hodges

Wiring geothermal pool heat pumps.

HOW HAS THE GEOTHERMAL HEATING/COOLING FIELD CHANGED IN THE LAST FIVE-TEN YEARS?

The biggest development was the tax credit that came in the American Recovery and Reinvestment Act of 2009. The second largest development was the increase in energy costs for electricity and natural gas. These costs make it more expensive to heat and cool a home and that allows geothermal to be a good choice economically. Understanding of geothermal systems has grown as more projects have been completed. More people know about geothermal and want to learn about it and other renewable technologies too. People know about renewables and have at least heard of geothermal energy.

WHAT CHALLENGES DOES THE GEOTHERMAL INDUSTRY FACE?

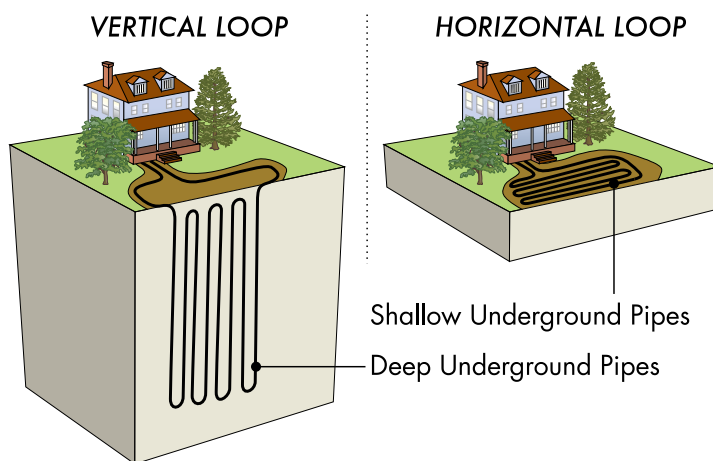
The number one challenge is educating the public. Consumers have often heard of geothermal, and understand there's a tax credit, but they still feel like they are guinea pigs, or that the system doesn't work properly, and they don't want to feel like they're the first ones trying it out. However, it's not a new industry and geothermal heating and cooling is being used in three percent of new homes right now.

Regulation of the industry is another challenge. I'm working with the U.S. Department of Energy to develop a national standard for geothermal contractors. We need quality training and curriculum embedded into the professional standards so we have dependable installers so that the technology is a success.

WHAT ARE THE BENEFITS TO WORKING IN THIS INDUSTRY?

I love working in an industry where I feel like I am creating opportunities and jobs and positions for people. To put in a geothermal system it takes a drilling contractor, electrician, AC

RESIDENTIAL GEOEXCHANGE UNITS



contractor, engineer, and sometimes a carpenter. It puts a lot of people at work to do this, and it is work that everyone can feel very good about.

WHAT ADVICE WOULD YOU GIVE TO A YOUNG PERSON WHO IS INTERESTED IN WORKING IN YOUR FIELD?

Seek a college degree and get as deep an education as possible. If you have an engineering aptitude get involved in mechanical engineering and focus on renewable energy such as geothermal—or wind or solar. Focus on the developing market. But you don't have to be an engineer. You can be a contractor or tradesman—just get involved!

Q&A

NEED GETS TO KNOW INDUSTRY PROFESSIONALS

GREG TROYER

Greg Troyer was born and raised in Lynchburg, VA and is currently a fourth year student at the University of Virginia (UVA). In the spring he expects to graduate with his Bachelor's degree in Engineering Science, with minors in Materials Science and Mechanical Engineering. Greg is able to complete his degree thanks to a partnership between Central Virginia Community College (CVCC), University of Virginia (UVA), and AREVA.



YOU ARE PREPARING TO WORK IN THE NUCLEAR ENERGY INDUSTRY. HOW DID YOU DECIDE TO YOU WANTED TO WORK IN THIS FIELD?

I was working in construction, but knew that wasn't a long term position. I've always been interested in math and science which fall together into engineering as a practical application. I was at CVCC and AREVA demonstrated interest in my education and supporting me through the Engineers Produced in Virginia program. AREVA is a global energy company primarily associated with nuclear energy. They offer services related to every stage of the fuel cycle, nuclear reactor, design and construction, and related services. AREVA is also expanding into renewable energies.

TELL US A LITTLE ABOUT YOUR JOB YOU ARE WORKING TOWARD AND WHAT YOU WILL BE DOING AFTER YOU GRADUATE.

Nuclear energy is a field I am happy to be in. It puts me in a position to have a positive social impact. Energy is critical to society. To be a part of a large international organization that supports energy development is appealing.

I am getting involved in the analysis side of the industry, specifically materials engineering. We consider what happens when components of a system get old. Are the materials susceptible to cracking or embrittlement? Materials issues are limiting factors of how long a system can be in use. Most of my work is tied to analytical work, predictions of how materials will degrade over time.

TELL US ABOUT THE EDUCATION PROGRAM YOU'RE IN. HOW DOES IT WORK?

I started at CVCC, but other Virginia community colleges have similar programs. You participate in a two year program with regular classes on the community college campus. If you have a high enough GPA (3.4) you are guaranteed admission to the University of Virginia.

At UVA all of my classes have been taken electronically. Online learning sounds terrible to some people, but when we're taking classes at UVA we're sitting in on real live classes. There's a professor lecturing to 30-100 students and we have video feed into the classroom, desktop sharing so I can see the PPT the

class sees, and two-way audio so I can ask a question in real time to the professor. If I have a question I press a button and my voice is piped into the classroom. All I need is a reliable internet connection. I take classes from my desk at work, or from my desk at home. I prefer this type of setting and the flexibility it gives me.

WHAT COURSES HAVE YOU BEEN REQUIRED TO TAKE? WHICH ONES HAVE BEEN EASIER FOR YOU, WHICH ONES HAVE BEEN MORE CHALLENGING?

I've enjoyed almost every technical course I've taken. Of course you have to start with four semesters of calculus, chemistry, and general education classes. You just have to slave through those and learn the material because it will come back to bite you if you don't.

Some of the more challenging classes have been those that examine the social implications. The topics we consider are personally stretching, such as, how do the decisions I make as an engineer impact society? How does the globalization of an engineering workforce affect me? The country?

YOU WERE IN SCHOOL DURING THE EARTHQUAKE AND TSUNAMI THAT HAPPENED IN JAPAN WHICH CAUSED DAMAGE AT NUCLEAR POWER PLANTS THERE. HOW DID THAT AFFECT WHAT YOU TALKED ABOUT IN CLASS?

To me, the tsunami and earthquake demonstrated that if our oldest designs can take a tsunami and earthquake and come away with no loss of life, maybe we're on to something.

In one of my classes at UVA we actually had about 30 students from a German university participating in the course at the time. Shortly after the events in Japan, Germany announced their plans to shut down their nuclear reactors. We had a three week long debate in class over nuclear energy. At the end of the debate, the majority of German students came to the conclusion that Germany should not shut down its nuclear power plants. This was a demonstration of the importance of educating all people on all of the different options so people themselves can make informed decisions.

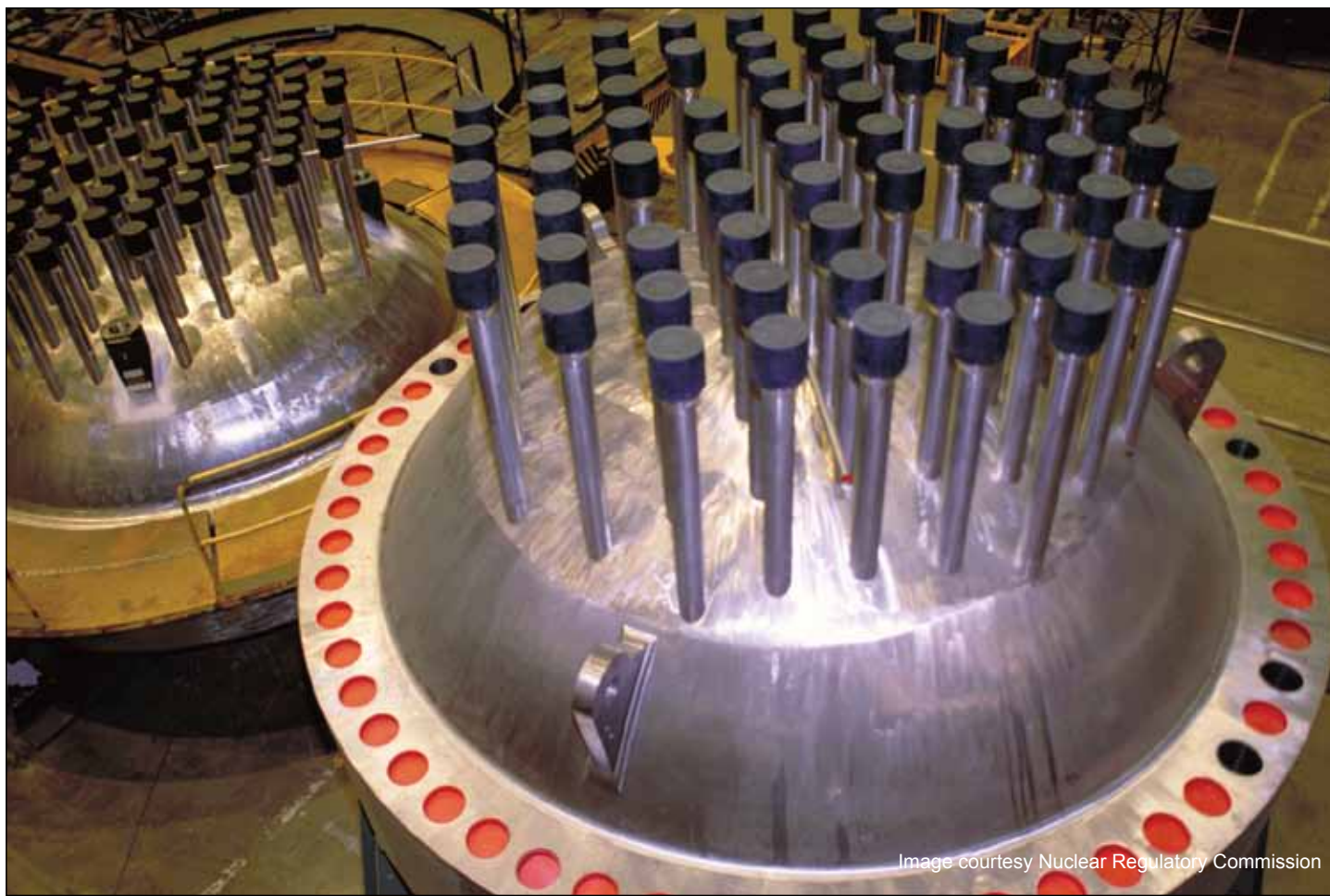


Image courtesy Nuclear Regulatory Commission

After he completes his degree, Greg Troyer will work full time evaluating and analyzing the materials used in a nuclear power plant.

YOU ARE ALREADY WORKING FOR AREVA, HOW HAS THAT EXPERIENCE BEEN?

After my freshman and sophomore years I did summer internships. After that I have been working year round for AREVA part time, while going to school as well. I would highly recommend a part time school/part time work approach. From a professional development standpoint, I learn just as much or more from being at work as I do at school. This benefits me because I can ask informed questions in the classroom to help cement something I see at work. It is also beneficial to UVA because I'm in the classroom making the professor think about how what they are teaching is being applied in real life.

KNOWING WHAT YOU KNOW NOW ABOUT COLLEGE AND WHAT YOUR GOALS ARE, WHAT ADVICE DO YOU HAVE FOR MIDDLE SCHOOL AND HIGH SCHOOL STUDENTS?

The most important thing is to learn a good work ethic - easier said than done! Even in middle school and high school you need to recognize that you're learning more than just a foundation of math, reading, and writing. You're developing your work ethic, and whether that work ethic is good or bad, what you are doing now is shaping your work ethic for the future. If you're sitting in algebra and thinking that it doesn't apply to you, you're still learning a work ethic and critical thinking skills. It might not look exciting at the time, but it is important for later. A good work ethic and integrity are going to make you valuable in any field that you go into.

Also, get work experience. It doesn't matter what you do, I started out in construction. When I first started college my dad said, "Greg, you're paying for your own school, get out and earn it." Even if I wasn't paying for it though, he would have made me get out and work. It's valuable experience for anyone to work with a boss, learn the value of physical work, so just get out there and apply.

ANY OTHER THOUGHTS OR ADVICE YOU WOULD LIKE TO SHARE?

The nuclear energy industry is going to continue to need people in its workforce. I must be about the youngest guy here, many people I work with are close to retirement age. Even if new plants end up not coming online, life extension for our operating fleet is happening now, and who knows, maybe there will be another round of extensions down the road too. With the potential for new plants, the workforce will need to increase even more.

For more information about the partnership between CVCC and AREVA visit,
<http://www.cvcc.vccs.edu/workforce/NSF/Students.asp>.

For more information about AREVA visit www.areva.com

Q&A

NEED GETS TO KNOW INDUSTRY PROFESSIONALS

STEPHEN SMITH

Steve Smith is a Local 58 Journeyman electrician at Stephenson Electric in Port Huron, MI.



TELL US ABOUT WHAT YOU DO.

At Stephenson we primarily do commercial/industrial electrical work. Everyday is something different. It can include digging trenches, running electrical equipment in the ground, running pipe/conduit 30-40' in the air, putting in or changing light fixtures, wiring different motors in factories, it really varies.

WHAT IS THE PROCESS TO BECOME AN ELECTRICIAN?

The apprenticeship program is five years. You go to school one day a week every other week and you're also working with a company throughout your apprenticeship. Once you finish your apprenticeship and pass the tests you are a certified electrician called a journeyman. After you have been a journeyman for two years you can take the next test to become a master electrician. After that you can get your contractor license.

WHAT DOES IT MEAN TO BE A CERTIFIED ELECTRICIAN?

If there's not a lot of work in my area, I can travel to where there is more work and sign up for jobs with different local unions. For example, if work was slow here I could go to Nashville and sign a book with their local union and receive a number. When a job became available they would call my number and I could go to work.

WHAT IS THE BEST PART OF YOUR JOB?

I'm always learning something. Every day I take in something new that can be used in a different part of my job later. I like figuring out the best way to make things work, and it's nice to go back and look at a project and say, "hey, I did that!"

WHAT IS THE MOST CHALLENGING PART OF YOUR JOB?

Because each project is different, sometimes you don't always know what you're doing and you have to ask a lot of questions. The other electricians have all been in my shoes though so they don't mind answering my questions. It can be labor intensive and digging can get old. Electrical work is also dangerous - you could get killed so you have to make sure you're being safe. It's important to learn as much as you can to keep yourself and your team safe.

WHAT TYPE OF PROJECT ARE YOU WORKING ON NOW?

Right now we're re-lighting all of the outside lights in the city of Port Huron, and I'm managing that process. The city is changing over to more efficient induction lighting. We do a lot of work switching to more efficient lighting, but this is the first time I've worked with induction lamps. It's neat that you can see your own work all over the city. (For information on induction lighting see page 11.)

WHAT IS THE PAY LIKE FOR AN ELECTRICIAN?

The pay changes a lot and it varies by where you live. Here in the Metro Detroit area, as an apprentice I started at \$13.50/hour, but I think it went up since then. There are steps in your apprenticeship called punches. There are six punches in all and with each punch you get a raise. The final punch/highest apprentice pay is \$20-25 hour. A full scale journeyman is paid around \$33.71/hour. But if you're a foreman running a team of more than three guys you get a raise, so it also depends how much responsibility you're taking.

WHAT DO YOU THINK THE FUTURE HOLDS FOR YOU?

Stephenson Electric is my family's business, so eventually I'll take over my dad's business. Before you can run your own business though you have to become a master electrician first, and I like working out in the field right now, so I've got some time.

WHAT ADVICE WOULD YOU GIVE TO SOMEONE INTERESTED IN BECOMING AN ELECTRICIAN?

There is often a waiting list to get into an apprenticeship program, so start the process as soon as you can. Go to your local union and turn in the necessary paperwork as soon as possible after graduation. It took me two years before I could start the program.

There aren't required classes you need to take in high school to start an apprenticeship, but the more construction type work and classes you can do in high school the better. If your high school offers a tech program with construction or electrical courses, take them. I went to college while waiting to get into the apprenticeship and I took an electrical wiring class there. There's a lot to learn, but during the apprenticeship you're only going to school one day every two weeks, so the more you learn before you start working the better it will be.



Image courtesy Flickr user Keith Macke, Creative Commons

Steve is currently working on installing induction lighting throughout the city of Port Huron, MI. Induction lights are often used on bridges, such as the Blue Water Bridges because they last a long time.

GOING VIRAL

BE OUR FRIEND ON FACEBOOK!

We're trying to grow our Facebook presence to better communicate about interesting NEED activities, information, and school projects. Be sure to like The NEED Project on Facebook to keep us in your social network! Have things to share? Please do!

COME BLOG WITH US...

Come blog with us—we're all doing it! Check out our blog at <http://blog.NEED.org> for fun and interesting posts with information, insight, and opportunities. Blogs from NEED's Executive Director, Curriculum Director, training team and great NEED teachers are all there. Have a NEED student with a good story to tell? Send your blog and a photo to info@NEED.org.

TEACHERS ASK AND WE ANSWER

For many years teachers and NEED club leaders have asked us to put the NEED Energy Chants and NEED Songs into audio and video formats for use in teaching students the words and motions. This year, Whitney Newman and Rachael Spencer (both previous recipients of the NEED Student Leader of the Year Award) decided to make it happen. You can view the videos on YouTube at <http://youtu.be/b5zChBjoVo8>.

LOOKING FOR SOME GREAT NEED TEACHERS TO USE THE ENERGY PRE/POST POLLS ONLINE!

As part of a 2011-2012 evaluation, NEED seeks volunteers to commit to use the online polls with their students before and after using NEED materials in the classroom. Teachers should have students take the Pre-Poll at the appropriate grade level and return after students learn about energy to take the Post-Poll. Email info@NEED.org to volunteer! Participating classes will be entered to win a NEED Energy Kit (\$400 value) of their teacher's choice! Already used it? Email us and we'll register you to win too!



WHAT ARE INDUCTION LAMPS?

Induction lamps, also called electrodeless lamps, consist of a high-frequency power generator, a coupling device that generates a magnetic field (essentially an antenna), and a glass housing that contains the gases and phosphor coating—no electrodes required. The main advantages of induction lighting are the ability to produce a substantial amount of light in a relatively compact package and a long lamp life due to the elimination of the electrodes. The major drawback of induction lighting is high installed cost. In applications where maintenance costs are high, though, induction lighting systems can be cost-effective.

Existing induction-lamp products are aimed at two distinct market niches.

The higher-wattage versions available (55 to 165 W) offer very long life (up to 100,000 hours) and can be a good choice anywhere that relamping and maintenance are difficult or hazardous. These lamps have been used in all of the following locations:

- Escalator wells
- High-ceilinged spaces, including atriums (such as over open mall areas) and in warehouses and factories
- Parking garages
- Roadways, including bridges, tunnels, underpasses, and signs
- Exterior pedestrian lighting

Lower-wattage induction lamps (20 and 23 watts) are also available as direct replacements for medium-base



Many cities use induction lighting for pedestrian walkways. Image courtesy Flickr user Maxime Gendre, Creative Commons.

incandescent and compact fluorescent lamps. They offer light output of about 50 lumens per watt, a color rendering index of 82, and an expected life of 15,000 hours.

Source: Energy Star



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WHAT'S NEW AT NEED?

32ND ANNUAL NEED YOUTH AWARDS FOR ENERGY ACHIEVEMENT COMING SOON!

Don't forget! Schools should be working on their energy education outreach and documenting their work in a portfolio to submit to NEED by April 15, 2012 for review at the state and national level. Have you adopted classrooms, shared energy information with the local community, completed energy audits of your school, shared energy conservation tools with your family, created educational videos for the public? Yes?! Make sure to submit your project this year.

In early January NEED was fortunate to have former NEED students Lauren Beatty, Rachael Spencer, and Whitney Newman working at NEED headquarters during their break from college and graduate school. They updated the program for 2012 and have big plans for new events during the June 22-25 weekend in Washington. For more information or to watch the video about the Youth Awards Program for Energy Achievement visit www.NEED.org/Youth-Awards.

NEED YOUTH ENERGY LEADERSHIP SCHOLARSHIP

Are you graduating from high school this year or currently enrolled in a community college, college or university? NEED's \$1,500 Youth Energy Leadership Scholarship is given annually to students who are actively engaged in energy education. Applicants must be graduating seniors or first/second year students at the college level. Applications are being accepted now! Visit www.NEED.org/Youth-Awards to download the application.

THE NEED ENERGY CONFERENCE FOR EDUCATORS IS JULY 15-19, 2012

Join NEED for the 2012 National Energy Conference for Educators to be held in Arlington, Virginia. The conference is designed to provide participants with five days of energy education content and classroom tools. Hosted in Arlington, Virginia (Metropolitan Washington, D.C.) the conference promises to energize teachers and provide valuable professional development for all attendees. NEED seeks sponsors willing to provide scholarships for interested teachers. Registration to the conference is \$1,100. To apply, visit www.NEED.org/summertraining.

IN THIS ISSUE

Careers in STEM

Jobs in science, technology, engineering, and math are in high demand right now - STEM workers are a hot commodity! STEM jobs are abundant in the energy industry. From more traditional STEM jobs such as electricians and pile drivers, to engineering, and in developing renewable energy fields, there is something to fit almost anyone's interest. Read about those jobs and more in this issue of *Career Currents*.