

July 2015

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Official newsletter of
IEEE-Denver Section

Join us for the IEEE Power and Energy Society 2015 General Meeting
July 26-30, 2015

<http://www.pes-gm.org/2015/>
Sheraton Downtown Denver Hotel
1550 Court Pl, Denver, CO 80202

3000+ Power and Energy Professionals Heading to Denver

More than 3,000 professionals from around the world will visit Denver, Colorado, July 26-30, for the Institute of Electrical and Electronic Engineers (IEEE) Power and Energy Society (PES) 2015 General Meeting.

This annual meeting is one of the largest forums of energy engineers and academics. At the event, themed *Powering Up the Next Generation*, energy experts will present and discuss changes facing the energy industry in plenary and super sessions, including:

- Energy storage
- Intelligent systems
- Grid reliability and security
- Renewable energy technology and integration
- Grid modernization

You are invited to attend any part of the 2015 IEEE PES General Meeting opening session, super sessions and plenary presentations.

Registration

To register as a member of the media, contact Maureen Dalton at m.dalton@ieee.org.

Volunteers Needed

Your Denver area colleagues need your help! Some 100 volunteers are still needed to perform a wide range of roles, including welcoming, directing people, assisting with sessions, and coordinating meeting events. Volunteers will earn an hour of meeting attendance, excluding paid events such as tutorials, for every hour of completed volunteer time.

Volunteer shifts are in four-hour blocks. A gift card which can be used for your lunch will be provided when a volunteer works two shifts back to back. As an additional thank you, we will provide an RTD transit pass or a gift card to help with parking. All participants will receive a free T-shirt identifying them as official volunteers for the event.

Please visit the Volunteer Sign-Up page by following the link at <http://www.pes-gm.org/2015/>.

About IEEE Power & Energy Society

The IEEE Power & Energy Society (PES) is the leading provider of scientific and engineering information on electric power & energy for the betterment of society and a trusted resource dedicated to the technical, informational, networking and professional development needs of its members. With over 32,000 members around the globe representing every facet of the electric power and energy industry, PES is at the forefront of the rapidly changing technological advancements that impact everyone's future. **PES celebrated its 125th year of service in 2009.** Additional information on IEEE PES can be found at: <http://www.ieee-pes.org>.

IEEE GreenTech Returns to Denver in 2017

Denver will once again host the IEEE GREENTECH Conference, and we want you to be a part of the action! Set in beautiful Colorado at the foothills or our soaring mountains, the GREENTECH 2017 conference provides a unique opportunity for you to interact with business, government and technology leaders; network with friends, colleagues, customers and vendors; and visit a few of the 43 microbrew breweries in the area.



Colorado is the hub for clean and renewable energy industry, research and development. These include the National Renewable Energy Laboratory (NREL), the National Institute of Standards and Technology (NIST) the University of Colorado and the Colorado Clean Energy Cluster, along with Vestas Wind Turbines and hundreds of companies specializing in renewable energy.

The last time the Denver hosted the Greentech Conference, it brought together an international selection of scientists, researchers and practitioners from 19 countries to develop realistic solutions to the current energy crisis and carbon and greenhouse gas emissions. The conference featured 60 technical presentations, representing the cutting edge of clean energy research, development, and demonstration. This international conference convenes attendees from China, Taiwan, Japan, India, France, Germany, Italy, Canada and all over the United States; drawing from universities, industry, government and national laboratories.



The Denver GREENTECH conference will be held in April, 2017 with technical papers submission deadlines six months in advance to allow for a juried review and final selection. All presented papers will be eligible for publishing in IEEE Xplore. Stay tuned for upcoming details on the IEEE Denver Section website at www.IEEE-Denver.org.

-Jim Look

Dine and Learn

Come join your fellow IEEE members and local engineers for a fun-filled evening of appetizers, networking, and dinner, while we discover exciting new innovations in technology. Once a month one of your local Denver IEEE Societies will host the event and bring in a unique speaker related to their field to present. This provides you, our members, with a unique opportunity to **explore and learn about exciting new technologies being developed around you. Early on in the evening you'll also have ample opportunity to mingle with your fellow engineers and colleagues, delving into a broad range of technical expertise.**

Events are held the 2nd Tuesday of the month from 6:00 to 9:00 pm. We'll be providing plenty of delicious appetizers to accompany the networking hour, but dinner is on your own dime while we settle into the evening's presentation. If you're an IEEE student member, just let us know and your dinner is on us. Watch for our upcoming e-mails with details about each event and location. We've already hosted many of these successful events this year and are scheduled for the remainder of the year. We are actively looking for speakers for the 2015 series, so please contact us if you have an exciting topic to talk about. Browse the list and don't hesitate to contact us with any questions. We hope to see you there!

-Marc Kessler

- 8/11/2015 - Digital Mode Amateur Radio
- 9/8/2015 - Electrical Design for High-End Computers
- 10/13/2015 - Radiated Emission & Immunity of NASA Orion Mars Moon Capsule

IEEE Denver Section Hosts a 'Build Something Cool' Event for 6-12th Graders

Explaining what electrical engineering is to a teen can be a real challenge. They're already the most capable user of technology in their household so what else could there be?

To answer this question, the Denver Section of IEEE teamed up with BlueStamp Engineering and Metropolitan State University to give students a glimpse at what is behind the touchscreen. The drop-in event, held on Pi Day



(3.14.15) from 10am - 4pm, gave away electronic kits to the ~70 students who signed up and offered lab space with tools and experienced engineers to help guide them to a successful project. The guides were area engineers who generously volunteered their time to inspire the next generation. Parents were also encouraged to attend with their child to help and/or learn about electronics themselves.

The kits were selected to offer a real experience that taught about soldering, LEDs, resistors, capacitors, and a few integrated circuits while being easy and fun enough for the uninitiated to complete in a few hours. The

goal was to get kids to stop just using electronics and start building them. To help motivate them, each student **was invited to pick one of 10 kits that piqued their interest. The most popular were Adafruit's Minty Boost, Sparkfun's Simon Says game, and Mitch Altman's TV-B-Gone** in addition to an array of flashing LED projects.

Watching student after student light up when their project worked for **the first time was simply exhilarating, often coupled with 'whoops' and exclamations of 'it really works!'** Everyone in the room couldn't be more proud, and the positive energy motivated the students that had to fix the occasional LED polarity, poor solder joint, or incorrectly oriented IC problem.

The event further celebrated pi day by serving pizza and pie which gave the kids a chance to informally talk with their engineering guides about their technical interests and careers. Some particularly motivated students spent time at a table setup by an IEEE member to showcase various electronic equipment and experiments that would be too complicated to build in a few hours.

The energetic event was a huge success with kids building projects, discovering their own abilities, and talking about engineering. It was a true testament to the value of letting kids explore reality beyond what is available on a half-watched YouTube clip. Who knows - the event could have sparked what will be a life-long love of electronics for some of these youngsters!



-Dave Young

Why Engineers Should Spend Time in the Field

Scientists differ from engineers in that they work to develop an understanding of fundamental principles and concepts. Through the scientific method, their research is riddled with failures in order to attain success. Without scientists' advancements in medicine and technology, progress in the commercial domain would stagnate.

Now let us consider the traditional role of an engineer. Engineers are responsible for designing answers to problems by integrating one or more known technologies into a cohesive solution. While necessary for scientists, failure for an engineer can lead to negative human and economic impact.

Although in the 21st century the line between engineers and scientists is becoming fuzzier, engineers have always acted as a liaison between science and industry. Therefore in order to be successful, engineers must have a firm grasp of the construction and maintenance methods utilized by contractors and technicians.

The knowledge of these methods is not something that can be read in a book, modeled in a computer program or distilled from a drawing; it requires direct, hands-on experience in the field. To illustrate this point, consider the following questions:

1. Even though the NEC lists the ampacity for 2000kcmil cable, should your engineer specify this cable in his or her design? **What will the electrical contractor's impression of your engineer be?**
2. Off the top of his or her head, can your engineer communicate the size differences between a 50kVA, 50MVA, and 500MVA transformer? How about the transportation or installation methods for each?

In order to cultivate a holistic understanding of the profession, a key component of an engineer's professional development, especially in the early years, should include a deliberate focus on field engineering. The nature, duration, and approach to this field work will vary by organization, but the objective is the same...**the engineer must be engaged in the construction or maintenance process and be responsible for solving issues as they arise.**

In an organization with different departments, some of which spend time in the field while others do not, an onboarding process involving rotations through the departments can provide the necessary field exposure. In smaller companies travel is typically shared among colleagues, making field exposure fairly simple to gain. However your company approaches field engineering experience, the value derived from that time will be significantly increased by having knowledgeable mentors leading the less experienced field engineers.

Spending time in the field benefits an engineer in many ways. First, the engineer is exposed firsthand to the magnitude, timeframe, and manpower required to complete a project. Second, the engineer will spend time with the contractor, and we all know contractors are not shy when it comes to admonishing engineers. Many contractors have the view that engineers do not understand the difference between lines in AutoCAD and the real world: oftentimes they are right. Contractor feedback is free advice to be used on the next project, and often sticks more prominently in the mind than reading from a book.

Third, the contractor will approach the engineer multiple times throughout the project with unforeseen obstacles during construction. The engineer must develop a solution in a limited timeframe and with limited resources. These exercises in problem solving will sharpen the engineer and help him or her appreciate the ultimate goal, rather than the discrete steps indicated on the drawings; Machiavelli would be so proud.

Lastly, the perspective gained from field exposure will increase the engineer's understanding and efficiency on future design projects. Engineers who are confident in both design and field work often outpace their peers in terms of value added to the organization and personal career advancement.

I urge readers of this article to consider the importance of field engineering experience, and how it can benefit both the employee and the organization. We owe it to our employees, clients and contractors!

-Clifton Oertli, MSEE, PE, MBA

Virginia Smith Converter Station Honored by IEEE Milestone Program

On May 21, 2015, [Western Area Power Administration](#), IEEE and [Siemens](#) celebrated the [IEEE Milestone](#) commemoration of the [Virginia Smith Converter Station](#). Two Denver area IEEE organizations championed the high-voltage direct-current (HVDC) converter station as an IEEE Milestone. Beginning in 2013, IEEE Life Fellow Member Duane Torgerson, Life Fellow Member Tom Weaver, Life Senior Member Gerhard Juette, and Life Senior Member Bob Wilson gathered support of the Denver Chapter of the Power and Energy Society/ Industrial Applications Society and the Denver Section Executive Committee in supporting the Milestone nomination.

The station, located in Sidney, Nebraska, provides an important interconnection between two of the nation’s three electrical grids, literally connecting east to west. Its electrical current conversion technology represents an important technological achievement in the field of electric power. The converter station is owned and operated by Western Area Power Administration.

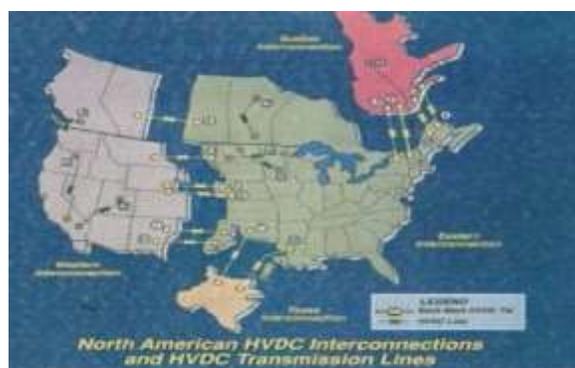
“This is a high honor,” said Western Administrator and CEO Mark Gabriel. “We are thrilled to be inducted into the IEEE Milestones family and become part of its proud tradition. The continued success of the [Virginia Smith Converter Station](#) is testament to the value of partnership in powering the energy frontier.”

Established in 1983, the IEEE Milestones in Electrical Engineering and Computing Program honors significant technological achievements for the betterment of humanity in one of the areas of the IEEE. These prestigious awards are proposed by IEEE Sections, managed by the [IEEE History Center](#) and funded through the [IEEE Foundation](#).



The station’s innovative control technologies act like giant shock absorbers between the eastern and western alternating current grids, allowing a reliable flow of energy between the two. Previous attempts to connect the grids without converter stations failed because frequencies on each side do not exactly match. The Virginia Smith station is capable of transferring energy in either an east-west or west-east direction by converting and inverting the AC grids to a common, controllable, high voltage direct current. Creating a reliable interconnection, the conversion process also makes it possible to maintain separation so that in times of disturbances, impacts in one grid do not adversely affect the other.

The 200 MW back-to-back HVDC Virginia Smith Converter Station (SCS) was commissioned in 1987 to provide energy interchanges between the eastern and western North American alternating current (AC) power grids. The SCS facility is capable of transferring 200 MW of power in either an east-to-west or west-to-east direction.



The east and west AC networks that connect to the SCS are comprised of large but dispersed generation and transmission systems that are operated asynchronously. These power and energy systems extend from the Pacific Ocean on the west to Atlantic Ocean on the east. Before back-to-back HVDC facilities were built, it was almost impossible to transfer power and energy between the eastern and western North American power grids (see Figure 1- 1986 Map of HVDC Interconnections).



The SCS is designed to be operated as an unattended facility with control via a microwave communication link from a dispatch center located approximately 150 miles away in Loveland, Colorado. The IEEE Milestones **plaque can be found permanently displayed in the lobby of Western’s Headquarters** office at 12155 W. Alameda Parkway in Lakewood, Colorado, where it is publicly accessible to all who wish to view it.

-Tim Weil & Bob Wilson

Get Involved!

Check out these links for more information and opportunities to become a volunteer with IEEE:

- Join the [IEEE Denver Section](#) ExCom 2015
- Join the committee board of [ComSoc Technical Society](#) or [Signal Processing Technical Society](#)
- Become a speaker at Cloud Over the Rockies Symposium or [Dine and Learn Event](#)
- Support your local teams and watch them compete at [Robotics Technical Society](#)
- General [IEEE.org](#) volunteering

Whether you are active in IEEE ExCom, are a chair of a technical society, or just a paying member, we thank you for being a part of something that we think is pretty great. If you want to get more involved, you know where to find us! And if you just want to enjoy the many hard (and not-so-hard) work of our volunteers by attending our events we would love that even more! Take advantage of the monthly volunteering efforts we have put together for you. Try something new, meet some new people, learn something new by listening to a distinguished lecturer. Oh, and thank you for being a reader of our newsletter! :-)

IEEE Denver Section

Mission Statement

Enrich the professional and personal lives of the Rocky Mountain Region members, developing them into valued contributors to society through quality programs, continuing education, career development and community service; in collaboration with IEEE, industry, government and academia.



The IEEE Denver Section is comprised of over 3600 engineers and technical professionals in the Denver - Boulder area.

<http://www.ieee-denver.org>