

SMART ENERGY

PACIFIC NORTHWEST CENTER OF EXCELLENCE
FOR CLEAN ENERGY

A Centralia College Partnership



Spring 2013

Building an Energy Workforce for the Pacific Northwest

Avista's smart grid projects are part of a changing landscape in the way energy is delivered. More and more utilities across the country are incorporating smart grid technologies into their systems. New "smart" technologies will present challenges and opportunities for the existing and future workforce. Electric utility occupations will change, and new jobs and skill sets will emerge.

To meet the growing demand for implementing smart grid technology, workforce training is critical. Avista is a partner in the smart grid project with the Pacific Northwest Center of Excellence for Clean Energy/"A Centralia College Partnership" (PNCECE) along with several utilities, organized labor, community colleges and universities in the region. The project, which is funded by the U.S. Department of Energy, creates training programs that will result in a smart grid enabled workforce.

As part of the workforce training project, Avista has:

- Upgraded the Jack Stewart Training Center with a substation and distribution circuits equipped with smart grid technology. This site will serve as a regional training center for the delivery of smart grid field training. The connected facilities will create an authentic training environment that will simulate real life work situations for field personnel.
- Updated Avista training programs for apprentices, journeymen and pre-line school students to incorporate smart grid technology.

"Our goal for the substation, and the transmission and distribution system that this substation feeds, was to have a facility for training our apprentices and journeyman on the proper procedures

and safety practices in real life situations," Avista Manager of Craft Training, Mike Hanson, said.

The additional equipment gives students the opportunity to have a real training experience with the ability to make a mistake without harming themselves or shutting down a grid.

"The smart grid tools and equipment installed at the Jack Stewart Training Center have continued to give us success in pre-apprentice and apprentice training, both internally and externally," Hanson added.

The goals of the smart grid workforce training project are to:

- Create and deliver curriculum, programs, and training for smart grid technologies and applications to utility workers in a five state region that includes Idaho, Montana, Oregon, Utah and Washington.
- Create an online smart grid training and information portal to share with utilities, businesses, and consumers

throughout these five states (cleanenergyexcellence.org).

- Share best practices on smart grid training using a regional approach.

The project specifically targets 12 supply and demand side occupations that will require workforce training to prepare the labor force for emerging smart grid technologies:

- Supply side: Instrument Control/ Relay Specialist (Generation and Load Dispatchers); Generation, Load and Substation Operators; Line Workers; Substation Wireman/Mechanics; and Ground Crews

Avista Corp. (NYSE: AVA) is an energy company involved in the production, transmission and distribution of energy as well as other energy-related businesses. Since 1889, Avista Utilities has provided reliable and safe energy services to customers in eastern Washington, northern Idaho and parts of southern and eastern Oregon.



Summer 2012 graduates of Avista's/SCC Lineworker School.



*"The Missouri Valley JATC program director said that the Avista/Spokane Community College Lineworker school is the best school in the nation."
~ Bruce Campbell, Missouri Valley Lineworker Apprentice and 2012 SCC graduate.*

Energy Technology: A Powerful Pathway

The line school began in 1993 as a unique partnership between Avista Utilities and Spokane Community College with the goal of introducing people to the demanding field of line work. Nearly 50 participants enroll in a four-month pre-apprenticeship program that prepares students to become line crew helpers that may progress into apprenticeships.

Students learn to set and climb poles, install crossarms, hardware, line, and transformers in varying weather conditions. They learn how to use trade tools and equipment through actual field experience. Classroom training covers safety, electrical theory, interviewing skills, and the importance of attitude and teamwork. The typical day starts with three to four hours of classroom work such as safety briefings/tailboards, electrical theory, math, and interviewing skills. The rest of the day is spent in the training yard gaining hands-on practical experience.

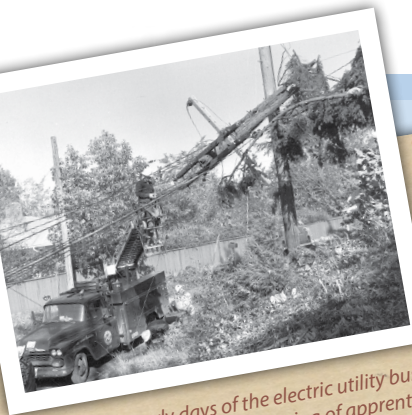
Participants are expected to be in class every weekday – just as they would be present at a job site. Tardiness and absenteeism are not tolerated. Approximately 35 students graduate from the program (up to 70 per year). Once graduated and hired by a utility, students may enter a three-year paid apprenticeship program

that will lead them to journeyman status.

Eighty percent of the graduates are successful at finding jobs. Avista/SCC graduates have been placed in Canada, Colorado, Texas, Utah, Oregon, Idaho and Washington.



Avista Lead Line instructor Bill Magers gives a safety overview of working within an energized substation.



The Early Days (around the 1890s)

In the early days of the electric utility business, the selection of, and for that matter, the training of apprentices, was a pretty forthright and to-the-point procedure. When a company wanted to start an apprentice lineman, for instance, the general foreman or line superintendent walked out into the men's crummy, or onto the truck dock, before the whistle blew on any given morning. He would look around with a practiced eye, spot some young "grunt" or "truck skinner," one who probably wore a size 20 shirt and a size 3-1/2 hat, and who the general foreman also knew could drink about a half-pint of moonshine whiskey without taking a breath, and this guy the general foreman would tell he was now the new "jerker" and he "should ought to" get his "hooks" and "scare" strap and prepare to "hit the sticks" tomorrow. The training that went on after that was just as "to the point." The new "jerker" was probably standing near the top of a 60-foot pole by the next morning, scared stiff, but up there. This seemed to be the "trial" period procedure in those days – if the new "jerker" didn't burn the pole, or "freeze" on and have to be brought down by some old timer, he eventually made a pretty good fair line hand. Sounds pretty rough cut, cruel and chance taking doesn't it? Well, it was...

Author Unknown

Today... Apprenticeship

In apprenticeship training, you learn while you're employed. In addition, on-the-job training is supplemented by formal classes each year. The training period, or apprenticeship, varies in length from three to four years according to the complexity of the selected occupation.

Apprentices are paid by their employer. Starting wages for an electric utility apprentice range from \$17-\$22 per hour. They receive pay increases at regular intervals if their skills have increased and their training has been completed satisfactorily. Those who successfully complete their apprenticeship training reach journeyman status and are fully qualified to pursue their craft.

Training: Classroom and On-the-Job

Classroom training requires six to 48 hours each week, depending on the trade. These classes may take place during days, evenings, or weekends.

On-the-job training involves working with and learning from experienced journey workers. During this training period, apprentices are paid. Near the end of the training, an apprentice is performing as a skilled worker and is earning close to the journeyman wage of approximately \$35 per hour.

Electrical Pre-Engineering Student: A Schweitzer Meritorious Scholar

John Hofman is one of 20 PES scholars.

John Hofman, an electrical engineering student at WSU/Vancouver and a student member of the Institute of Electrical and Electronics Engineers – Power and Energy Society (IEEE-PES), has been instrumental in coordinating a clean energy working lab that will provide electricity for Centralia College's Kiser Natural Outdoor Learning Lab (KNOLL). The lab also serves as an educational tool for energy technology students and city officials alike.

Hofman graduated with honors and an Associate of Applied Science in Electrical Engineering degree from Centralia College. As the KNOLL energy project manager, he researched and acquired all of the material and labor needed to complete the lab.

"This project has been waiting for someone with driving enthusiasm to take it and go," Barbara Hins-Turner, executive director of PNCECE said. "John engaged generous contributors to bring this clean energy production project to campus."

The lab features a state-of-the-art wind turbine called The Energy Ball V200. It measures 6-1/2 feet in diameter and will produce up to 2,500w of energy in ideal conditions. The turbine will produce power at wind speeds more than 6.7 mph and will work alongside six 175w solar panels.

John is also the first community college student in the country to be recognized as a Schweitzer Meritorious Scholar and has received two IEEE-PES scholarship awards totaling more than \$5,000.

"John was selected for his exceptional academic performance and interest in the field of power engineering," Dainel C. Toland, IEEE-PES Scholarship Plus Program Director, stated. "Only 20 PES Scholars have been recognized in this manner."

"An IEEE-PES student membership provides access to an amazing group of engineers who coach and mentor students," Hins-Turner added. These memberships, which are usually awarded to students enrolled in 4-year colleges, are beginning to open up for community and technical college students as well.

IEEE-PES provides the world's largest forum for sharing the latest in technological developments in the electric power industry, for developing standards that guide the development and construction of equipment and systems, and for educating members of the industry and the general public. Outreach into community and technical colleges needs to increase. To learn more about IEEE-PES, visit <http://ieeepes.org> or contact Barbara Hins-Turner, who is the national community college liaison.

John Hofman and Energy Technology student Travis Kinney assemble the first pieces of the Energy Ball wind turbine.



The Energy Ball wind turbine produces energy for Centralia College.

Walla Walla Community College serves veterans



*"Wind Technicians work in small teams and have to be willing to trust each other..."
~Richard Slusser, a former Navy NCO and graduate of Walla Walla Community College.*

Richard Slusser, a former Navy NCO, decided wind energy technology was the best career pathway to use the variety of skills he already had. What he required was training – which he found at Walla Walla Community College (WWCC). At WWCC, the Wind Energy Program is growing and continues to attract former service members looking to start over in an emerging field.

"Wind Technicians work in small teams, and have to be willing to trust each other with their lives, and that's even before any maintenance or repairs happen," Slusser said summarizing his own reasons for being here.

Because green power is a growing

field, it is more normal to have a unique skillset that isn't found in more conventional industrial jobs. That unique skill set requires a new type of student technician. Wind power is clean, environmentally friendly and expanding into new geographic areas. This field is less tied to conventional career paths, so men and women leaving the military are a great fit based on their strong work ethic, good physical fitness, high initiative, attention to technical detail, and commitment to team member safety.

"The field has quite a lot of work for vets willing to learn new technical capabilities and work hard," James Bradshaw, WWCC

Wind Energy Program Director, said. Students learn electrical wiring, mechanical drive systems, crane rigging, climb safety, business science, electronics, SCADA and programmable logic circuits, hydraulics and pneumatics, computer science, and a variety of additional mechanical subjects.

Wind power is becoming a significant contribution to the national power grid, but schools teaching men and women to become wind turbine technicians are relatively rare. Based on the unusual collection of skills required by new techs, community colleges provide two-year associate degrees.

Centralia College Energy student chosen from large pool of applicants

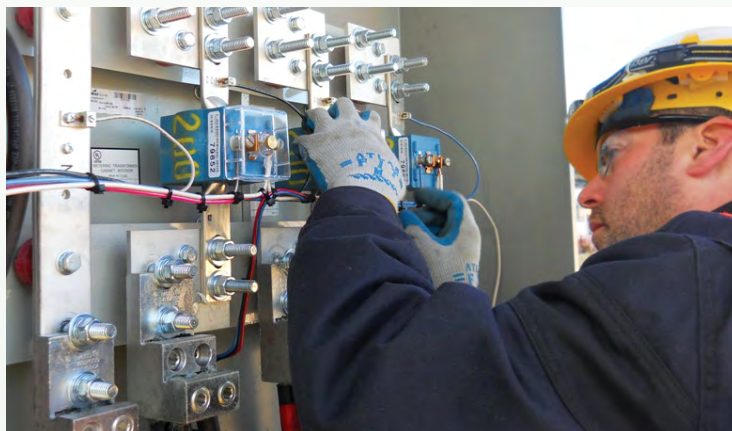
Arlen Everist, Meter Electrician Apprentice at Seattle City Light, was hired from a pool of 430 applicants in February 2012. He understood that mastering math and electrical theory were vital in securing a job within the industry.

"The hiring process for Seattle City Light's apprenticeship programs is extremely competitive and requires some prior technical education," Karen DeVenaro, Apprenticeship Manager, said. "The program at Centralia College does a wonderful job preparing students for the demanding and exciting skilled-trades careers in the utility industry."

During winter and spring quarters of 2012, Arlen worked full time, took online classes, and enrolled in night school twice a week to meet his apprenticeship program requirements. Thanks to good time management skills he was able to graduate on time with honors.

"Arlen was tenaciously driven by his studies and his work," Centralia College Energy Technology instructor, John Steidel, said, "and he was deeply interested in learning about the energy industry."

At Centralia College, Arlen learned electrical theory, parts of the electrical distribution system, technical math, and workplace safety.



"There are great benefits of being involved with a union – high wages, clear workplace policies and a high focus on safety" ~ Arlen Everist, Seattle City Light Meter Electrician Apprentice and 2012 Centralia College graduate.

"I use all of these things on a daily basis," he said. "I also learned time management and good study habits."

His instructors also prepped him with job interviewing skills.

"The interview process was exactly what the summer class with Rulon prepared me for," Arlen added. "Having the practice in class and knowing what kinds of things I may be asked made me a lot more confident and prepared to me give good, detailed, and precise answers, as well as ask good questions."

As for his job at Seattle City Light, "I love being able learn new things and solve problems," Arlen said. "Metering technology is always advancing so there is always more to learn. I also love working in various locations throughout the city, seeing new things and meeting new people."

Becoming an apprentice (three-year position) meant joining the union. Arlen is a member of IBEW Local 77.

"Being a union member means having excellent benefits," he continued. "It comes with high wages, clear workplace policies, and a high focus on safety."

Centralia College: Energizing CTC programs across the state

The Associate of Applied Science in Energy Technology/Power Operations program prepares students to compete for entry-level positions such as power plant operator, substation operator, technician, and other high voltage pre-apprentice and apprenticeship positions within the energy industry.

Coursework includes traditional sources of power generation, transmission, renewable energy, energy efficiency and smart grid technology which are transmitted via interactive television from Centralia College to virtual classrooms at Grays Harbor, Peninsula, Wenatchee Valley and Spokane Community/Institute for Extended Learning colleges.



Construction Center of Excellence Director Shana Peschek and PNCECE Executive Director Barbara Hins-Turner

Energy and Construction Best Practices Summit

Please join us for our annual Energy and Construction Best Practices Summit – where industry, education, organized labor and economic develop experts present the latest trends. Our signature crab feed and scholarship auction provides funding for college students throughout the state. Over the years, we've raised more than \$40,000 which has supported students in need (auction items are always welcome and appreciated).

Visit our website, <http://cleanenergyexcellence.org/summit> for more information.

Wenatchee Valley College (WVC), located in the heart of the Columbia River Hydro Operations system, has a one-year energy pre-apprenticeship program that includes ITV classes from Centralia College.

"Douglas PUD is in the midst of retrofitting 10 generator stations. They have hired two Energy Tech graduates from 2007. One, Tyler Evans, a journeyman operator and the other, Craig Timmermans, is a recent hire. Both know the dam very well and are beaming because of their current employment. They make \$26/hour as apprentices and about \$40/hour at journey level." ~ Riva Morgan, WVC's director of Workforce Education Pathways



Director's Corner



Mike Hanson, Avista Manager of Craft Training Manager, describes the smart grid training substation and distribution facility at Avista's Jack Stewart Training Center. Barbara Hins-Turner is pictured with PNCECE's Education Task Force.

There is amazing work happening across the state and region to develop a skilled and talented energy industry pipeline. Within these pages, you will find a few student success stories – real students placed into real jobs. There are so many more examples. Each student has his/her own story to tell. They bring to life how the Pacific Northwest Center of Excellence for Clean Energy partnership is working as a hub to serve the energy industry's new hire needs.

We have been very diligent to “niche up” the training programs across the region to serve the various occupations

needed in the industry. Here you will find craft stories on a lineworker, meter electrician and wind technicians; energy efficiency and electrical engineering. Each of these occupations are critical to fulfilling the needs of our future energy industry.

We are very fortunate to have training programs that have been carefully designed to serve industry's high-skill high-wage jobs. These programs have strong industry advisory boards, world class lab facilities and most importantly faculty who have come from industry and bring experience to their classrooms and students every day.

The Avista lineworker program rivals none and has put Washington on the map for delivering quality pre-apprentice line training. I would like to extend a sincere thank you to Avista and staff – including Mike Hanson, Diane Quincy and the Jack Stewart Training Center team. PNCECE would not be what it is today without the commitment Avista brings to the partnership.

Please join us in congratulating these students and the others like them – they are our legacy.

Barbara Hins-Turner

Grays Harbor College Energy Student promotes energy efficiency



“Our community college system has helped me gain confidence, skills and knowledge to go out into the world to be a productive and effective driver in our community” ~ Sara Bowles, Lewis Economic Development Council Energy Program Intern and 2011 GHC graduate.

Sara and Jim Lowery, Lewis County Economic Development Council Energy Program Manager.

Sara Bowles was devastated when she was laid off from her position at Westport Shipyard, in Hoquiam, in 2009. She was one of 100 employees in the second wave of cuts due to the failing economy. She had a child to support and was uncertain of their future.

Through WorkSource and the Commissioner-Approved Training program (CAT), Sara received tuition help and chose to follow the career path of energy technology. She quickly enrolled at Grays Harbor College (GHC) and became one of the first students to experience the partnership between GHC and Centralia College's Energy Technology program (offered through Interactive Television - ITV).

Sara graduated at the top of her class with an Associate of Applied Science in Energy Technology in June of 2011. “Sara is a very positive and motivated student,” Grays Harbor College program support supervisor Nancy Estergard said.

She then applied to continue her education at The Evergreen State College (TESC), where she's enrolled in business economics, political science, land use and planning classes.

“I wanted every single credit I earned at GHC to be accepted,” she added. Sara is in TESC's upside-down degree program and will graduate this spring.

“Upside Down” students complete focused, skill-based work during their freshman and sophomore years at a community or technical college. They are able to transfer 25 academic credits from a pre-approved program (grades must be a C or higher to transfer). Then while they attend TESC, students enroll in a combination of focused coursework and broad liberal arts studies.

“The Center of Excellence for Clean Energy worked closely with TESC to build a direct transfer degree program in 2006,” explained Barbara Hins-Turner, PNCECE Executive

Director. “Sara is a great example of a student who took advantage of that pathway.”

The more she learned, the more she felt compelled to help her community. “To make a difference in the world, you need to start locally - and that's what I truly believe,” she said.

Sara is working towards being self-supporting. Not only is she a full-time mom and a full-time student, she holds two part-time jobs. One of which is being the Energy Program Intern at Lewis Economic Development Council. Sara applies for grants to encourage small businesses to become more energy efficient. By applying retrofits, companies will save dollars, save energy and save our resources.

She's passionate about saving resources. “Energy efficiency should be our next resource for electricity,” she added. “The more watts we save, the less demand we'll place on our existing generation resources.”



Smart Grid TRAIN the TRAINER

The regional project is being led by Jeff Hammarlund, adjunct associate professor at Portland State University Mark O. Hatfield School of Government, in collaboration with Dr. Kevin Schneider, Pacific Northwest National Laboratory, and Dr. Bob Topping, System Design Consultant.

"Each of our design team members has a deep background and practical knowledge of how Smart Grid modernization is being implemented at a national and regional level," Hammarlund stated.

The pilot training was held at Edmonds Community College and was attended by 23 community and technical college

PNCECE is pleased to announce our newly developed Smart Grid Train the Trainer Class. The training is designed to provide community college faculty, industry trainers and K-12 career and technical education instructors with cutting edge smart grid information to enhance their curriculum with the latest smart grid related technologies.

faculty, industry trainers and K-12 career and technical education teachers.

"The presenters struck the right balance of topics for a comprehensive introduction," Tom Barr, Edmonds Community College Energy Management Instructor, said. "The workshop included smart grid studies, the regulatory policies and emerging standards that will enable its development, the various costs, and benefits for all stakeholders."

Hammarlund noted, "The Northwest is committed to moving toward a clean energy economy and many of these instructors are on the front line of this

effort as they help prepare the region's next generation of energy leaders."

A smart grid educator's toolkit has been produced by Montana State University that features smart grid classroom teaching guides and materials. The toolkits will be presented to participants at the Educators Institute during this year's summit. The Educators Institute is sponsored by Edmonds Community College and is held in conjunction with the annual Energy and Construction Best Practices Summit. Visit <http://cleanenergyexcellence.org/summit/> for information.

Idaho State University's ESTEC Generates Success

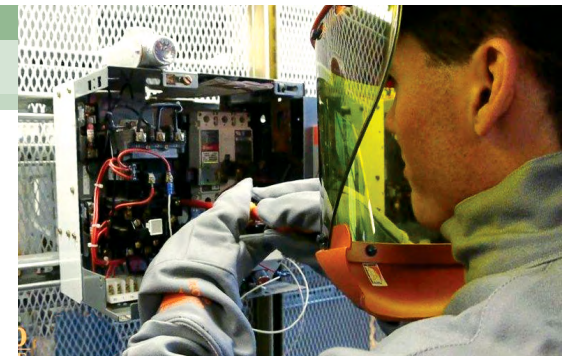
John Schwartz is a graduate of the Idaho State University, Energy Systems Technology and Education Center (ESTEC), Renewable Energy Technology certificate program. The 9-month program was funded through a grant from the U.S. Department of Labor under the Recovery Act - Green Capacity Building Grant - which allowed for state-of-the-art equipment to be installed in secondary and post-secondary classrooms throughout Idaho.

John came to ESTEC with a broad interest in energy. He wanted to know how energy was produced and used, and how to make it cleaner and more efficient. As a student, John excelled in all areas of study and constantly sought to dig deeper and develop a better understanding of components and how they worked as systems. At ESTEC, John was exposed to a wide variety of clean energy technologies, energy management

tools, smart grid concepts, energy resource management and conservation ideas.

"ESTEC gave me the knowledge to understand energy systems from a generation, transmission and distribution perspective," John said. "[I learned] how to best apply those resources to meet energy needs and how to effectively use technology to obtain solutions to energy problems."

Before graduating, John started his own company and worked as a consultant before joining his employer Utah-Yamas Controls. John has been able to turn his passion for integrated energy systems into his career. Utah-Yamas Controls provides leading edge control systems which utilize open system architecture to allow integration of building environmental, lighting and support systems. In his current position, John works with his customers to integrate building control



John Schwartz in the ESTEC lab

systems allowing customers to optimize the resources they already have and to make system modifications that have high impact on energy consumption and low capital cost thus maximizing the customer's return on investment. John looks forward to working with the growing resources available to him as energy management technologies continue to develop and to the challenges of developing better solutions to building management needs.

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Convening Communities for Success

Centralia College is an equal opportunity institution.