PACIFIC NORTHWEST CENTER OF EXCELLENCE

SMART ENERGY FOR CLEAN ENERGY

"A Centralia College Partnership"

January 2011

Smart Energy: Smart Workers

Center Addresses "Human Energy Crisis"

The "Energy Crisis" used to mean simply that we didn't have enough of it. Today's Energy Crisis is more complicated: it requires us to use both sustainable and traditional energy sources while transitioning from our current analog energy system to a digital system designed to maximize efficiency and reliability from a smarter energy system. This work will require workers that are innovative and creative in approaching problems and creating solutions.

Over the next decade there is a Human Energy Crisis looming in the energy and utility businesses:

Changing Workforce: 40% retiring in next 5 years
Evolving Jobs: transforming into higher skilled positions
Information Technology: pervading the energy sector
Customer Focus: evolving from commodities to services
Fewer Qualified Applicants: shrinking pool of prospects

To meet these demands in a new energy future, a broad consortium including educators, utilities, manufacturers, organized labor and the United States Department of Energy is teaming to help the next generation of power system workers who will lead the transition to a smarter grid.

PNCECE builds on a decade's worth of skill building partnerships that have made the Pacific Northwest and the Washington Center of Excellence for Energy Technology at Centralia College a nationally recognized leader in workforce development.

"This is the latest evolution of partnerships that have revolutionized skill building and training in the energy industry over the last 5 years," said Troy Nutter of Puget Sound Energy, chair of the PNCECE Smart Grid Project Governance Board. "Now we're about to take it to the next level, with this expanded regional Center including Washington, Oregon, Idaho, Montana and Utah. It's not just about skills training, we see these innovations as major drivers for economic development across the region. It means business."

The Pacific Northwest Center has an ambitious mandate, including improving smart grid training delivery, creating a new regional clearing house for state-of-the-art innovations and ideas, introducing sophisticated hazard prevention and safety protocols, and sharing these best practices with its regional partners in business, education, and labor.

Cowlitz River Mossyrock Dam; "Tacoma Power invested nearly $60 million dollars over 5 years to refurbish and upgrade electrical generating equipment that extended the life of the facilities and achieved a 3% increase in power production," states Pat McCarty, Power Generation Manager and PNCECE Advisory Board Chair.

"We're setting out to improve the state of the art," commented Bob Guenther of IBEW Local 77, a long-time Center of Excellence partner, "and it's none too soon. If we're really going to succeed in developing a smarter energy system we're going to need more highly skilled workers to manage it."

PNCECE SMART GRID PROJECT GOALS

1. Identify Smart Grid training needs across select supply and demand-side energy occupations.
2. Establish energy training satellites in Washington, Oregon, Idaho, Montana and Utah to regionalize training and skill building.
3. Improve internal job progression in utilities that serve the Pacific Northwest.
4. Create a centralized training and recruiting portal.

"We have an entire new generation of prospective employees who care about clean energy and sustainability," echoed PSE's Nutter, "but we've got to connect them with skills, career paths and job opportunities to make their dreams a reality."

PNCECE is headquartered at Washington's Centralia College under the leadership of Barbara Hins-Turner, Executive Director.

Welcome!

We're delighted to celebrate our expansion to the Pacific Northwest Center of Excellence for Clean Energy (**PNCECE**) with this inaugural edition of our Newsletter: **Smart Energy**.

Since the **U.S. Department of Energy** announced our successful application for a regional smart grid training grant this Spring, PNCECE has been a whirlwind of organization, team building and planning which is already producing results.

The **Smart Grid Project Governance Board** has been formed and includes leaders in education, organized labor, our regional power authority and the utility industry.

Our **Educational Taskforce** is already at work — the folks who'll really be "getting their hands dirty" inventing a new career path planning process and curriculum for our next generation energy workers. We're especially pleased to be focused on the career path and planning needs of our veterans and returning servicemen and women.

We owe enormous thanks to the people who believed in the Center of Excellence and pushed for its expansion to include our partner states **Oregon, Idaho, Montana and Utah**: first and foremost our two U.S. Senators, Maria Cantwell and Patty Murray, who have been long time friends of the Center and gained additional support from eleven legislators in our 5 state region. Also a special thank you to our Governor Chris Gregoire who helped rally gubernatorial support from our partner states. In fact in the corner of my office hangs a framed letter signed by the four Northwest Governors who endorsed PNCECE — a pretty spectacular example of regional cooperation.

Finally we owe a sincere thank you to the visionary leadership of the Northwest Energy Efficiency Taskforce — NEET — who boosted the Center as a regional focal point for energy education and innovation.

We look forward to your feedback, comments and ideas as we launch this new endeavor. Thanks for your interest in **Smart Energy**, in the regional Center of Excellence, and tomorrow's workforce!

Barbara Hins-Turner, Executive Director

Courtesy of Puget Sound Energy

Partner Profile

PNCECE and Incremental Systems (IncSys) have signed a cooperative agreement in response to their recent awards under U.S. Department of Energy's workforce training programs. The PNCECE and IncSys awards, with a combined value of more than $20 million, will help prepare the next generation of workers in the utility and electrical manufacturing industries for Smart Grid-related jobs.

The projects will conduct workforce training programs for new hires – including displaced workers and military veterans – and retraining programs for electric utility workers and electrical equipment manufacturers to enhance their knowledge of Smart Grid technologies and implementation. These projects will help ensure utilities and manufacturers have the necessary trained workforce to support ongoing Smart Grid deployment projects, including Smart Grid investment grants and demonstration projects.

"I am truly impressed and delighted at the breadth and depth of the team that Barbara Hins Turner has built in gaining this prestigious award for the Pacific Northwest Center of Excellence for Clean Energy. Each time our colleagues meet and interact we learn from each other and inspire each other to take on new challenges and increase the scope of what we can accomplish together" states Dr. Robin Podmore, President, IncSys.

IncSys provides solutions for power system operators. These solutions include training simulators, training curricula and real-time computer decision making tools. The PowerSimulator has been built through a joint effort between IncSys, PowerData and EPRI and is currently used by more than 50% of NERC certified system operators to obtain NERC mandated training in Emergency Operations and Continuing Education Hours.

"I am very excited about partnering with Incremental Systems! They have developed an amazing tool to bring real world Grid simulation into classrooms across the five state region," commented Barbara Hins-Turner, Executive Director.

Barbara Hins-Turner and Robin Podmore at contract signing.

PNCECE Smart Grid Project Education Taskforce Convenes

Creating the 21st Century Workforce

Dr. Alan Hardcastle seems remarkably composed for someone charged with so much heavy lifting. A Senior Researcher with Washington State University Extension Energy Program, Dr. Hardcastle is a critical member of the PNCECE Education Taskforce charged with identifying the career pathways that will be essential to the work of the new regional Center of Excellence.

"This is a continuation of work we've been doing for over five years in the energy industry," commented Hardcastle. "The heart of our work is a commitment to talking to real people doing real jobs. We are using this data to generate accurate, actionable job descriptions and career paths that will be useful to educators, labor organizations, and businesses."

The Education Taskforce, which is chaired by Sue Walsh of Bonneville Power Administration, reflects the real-world emphasis and coalition-building which enabled PNCECE to capture one of twelve multi-million dollar DOE grants awarded for next generation energy research and education.

"We're fortunate to have such great representation in this Center of Excellence," comments BPA's Walsh. "Besides business and labor, we've got a powerhouse national laboratory, PNNL, and a broad group of universities and community colleges across five states."

"The 21st Century workforce will be a mobile and flexible workforce," according to PNCECE Executive Director Barbara Hins-Turner, "That's the purpose of the Career Lattice. We need to anticipate the way people will move around in their organizations, respond to new technologies and trends, and stay current with their education and credentials."

"Alan and his team are essential to our team's success," she concludes. "The foundation of this project is rigorous research and demonstrated outcomes. The Career Lattice will underlay the entire project."

Educators will use the Lattice to identify career structures, training gaps and program improvements. Industry will use it to clarify their existing career paths for new and incumbent workers and to design internal training. Workers, students, and veterans will use the Lattice to help navigate career options, identify training programs, and develop new skills.

The Education Taskforce held its inaugural meeting at Puget Sound Energy's spectacular Wild Horse Wind Farm pictured below in October, and followed up in December with a meeting at PGE in Portland.

In its successful grant application to the U.S. Department of Energy, the PNCECE listed ten job descriptions/occupations as primary targets for enhanced training and career path orientation to prepare workers for the advent of The Smart Grid.

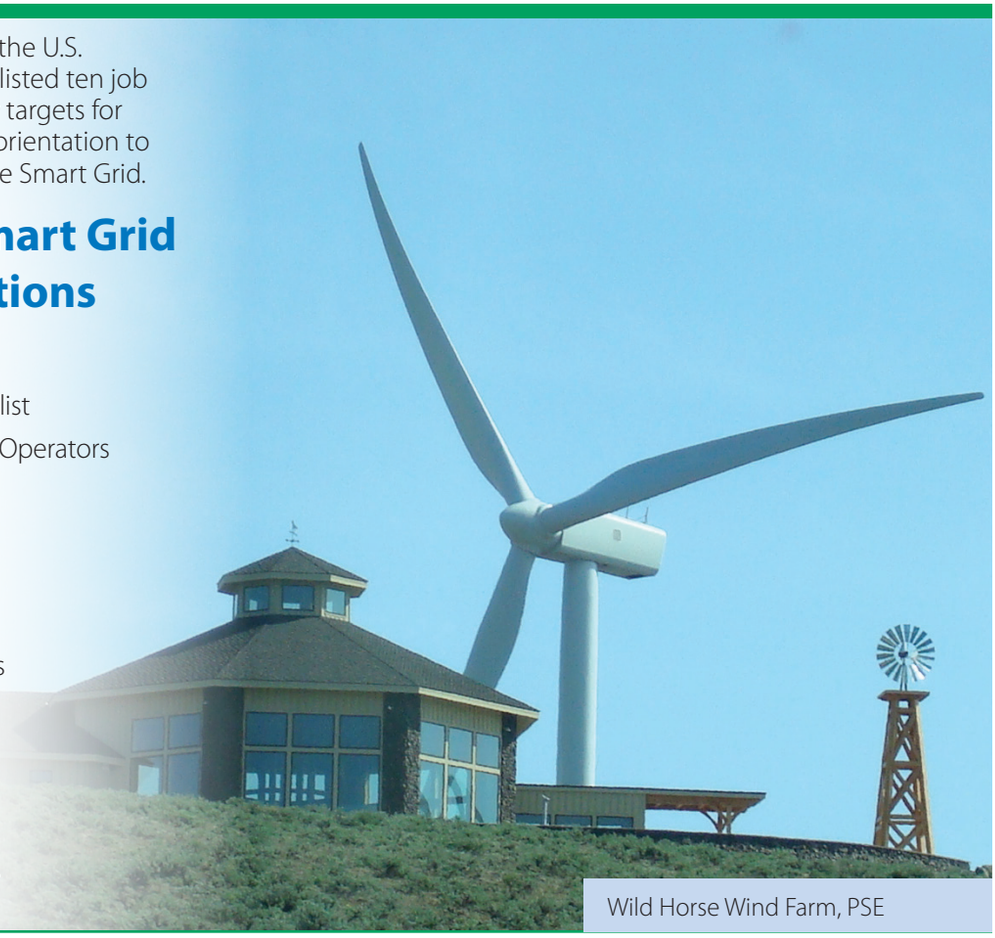
Targeted Energy Smart Grid Project Occupations

Supply Side Occupations

- Instrument Control / Relay Specialist
- Generation, Load and Substation Operators
- Line Worker
- Substation Wireman / Mechanics
- Ground Crew

Demand Side Occupations

- Customer Service Representatives
- Meter Technicians
- Energy Advisors
- Energy Conservation Program Administrators
- Resource Conservation Managers



Wild Horse Wind Farm, PSE

Centralia College

Bellwether for NW Energy Leader

When it comes to training the new generation energy industry workforce, it seems all roads lead to western Washington. Centralia College has established unprecedented leadership that influences statewide, regional, national and even international development of curriculum, career pathways and skills standards in the energy business through its Center of Excellence.

Last month Centralia College received recognition as a national finalist for the prestigious Bellwether Award in the Workforce Development category. Bellwether finalists have demonstrated outstanding community college leadership in developing the next-generation workforce. Centralia College will be among ten finalists competing for top honors in late January against nine other nationally recognized programs at the Futures Assembly convening at the University of Florida, sponsors of the program.

Centralia College helped pioneer the concept of Centers of Excellence, thanks to the tireless efforts of President Jim Walton. "In 2005 we jumped into energy workforce development and were among the first in the state to partner with business and labor to do it," comments Walton.

Joining Dr. Walton in representing Centralia College and PNCECE will be Troy Nutter, PSE, Alan Hardcastle, WSU Extension Energy Program, Don Guillot, IBEW Local 77, Barbara Hins-Turner, Executive Director, Jamie Krause, Project Manager. Good luck Centralia College and PNCECE!

Students "Energized"

From left to right, and top to bottom. Phi Theta Kappa Honor Society Energy Efficiency Student Project team, Renewable Energy solar class taught by Rulon Crawford, Energy Technology students inspecting new electric truck.

Smarter Grid Innovations 2011

Signature Event Set

The PNCECE's signature event is scheduled for June 23rd and 24th at the Regional Education and Training Center (RECT), Satsop campus. For the 6th consecutive year industry, labor, education, workforce and economic development leaders will gather to exchange best practices, premier new industry innovations, discuss training and education needs and munch on fresh Dungeness crab.

A highlight of the annual event is the flag raising ceremony, pictured at right. Last year's ceremony featured a flag carried through 50 missions in Iraq and donated to the Center, and its partners from IBEW Local 77, by the Veterans Conservation Corps.

"Our focus may be on jobs and skill building but the driving force is regional economic development," says Ryan Davis, Executive Director of the RETC and PNCECE Governance Board Member. "It's not going to do us any good to have a new set of technologies and innovations if our workforce isn't prepared to implement them. The Summit is a great forum that helps keep us ahead of the game. And it's great fun!"

Last year's event also raised over $6,800 in scholarships for worthy students. This year's theme is "Smarter Grid Innovations 2011." Save the date!

To register visit website www.centralia.edu/coe/summits.html

2010 Summit flag raising ceremony - IBEW Local 77 Apprentices.

Centers of Excellence:

A History of Skill-Building Innovation

It's all about relationships, say the key players in the Pacific Northwest Center of Excellence for Clean Energy. And many of those relationships go back over at least a decade, to pioneering work in skills standards performed by an innovative coalition of labor, business, and educators.

"You begin by establishing a relationship of trust between employers and employees, that allows them to share the details of each job, task by task, and how we measure success or failure," says Bob Guenther, of IBEW Local 77 and PNCECE Governance Board Member. "When building skill standards we sit down for two intense, no-holds-barred days and talk about real world jobs, success and failure, and continuous improvement."

"I'd trace this whole movement – which has won praise all over the country, to the day Dr. Walton hired Barbara Hins-Turner" adds Guenther. "President Jim Walton, knew we weren't going to get anywhere with curriculum for the real world unless we partnered with business and labor." Barbara Hins-Turner came from the energy industry and serves as Executive Director of the PNCECE.

In 2004, the Washington State Board for Community and Technical Colleges selected eleven Centers of Excellence to serve as economic development drivers in specified industries that are vital to the state's economy. By 2005, Centralia College had established the Center for Excellence for Power Generation and Distribution Technology, under Hins-Turner's direction. Over the last five years that partnership has trained and placed hundreds of individuals through the Center of Excellence statewide system and attracted financial support from both public and private sector partners.

In 2009, Washington became the first and only state to codify Centers of Excellence into state statute, recognizing their predominant role in building bridges to real-world jobs between business, labor and academia. Later that year, the Northwest Energy Efficiency Taskforce (NEET), an influential executive-level group representing regional utilities and their customers, selected the Washington State Center of Excellence for Energy Technology to spearhead coordination among training providers regionally and provided a powerful endorsement to its DOE grant application. "NEET was convened in early 2008 with a mission to maximize the region's energy efficiency achievement through greater regional collaboration, commitment, customer involvement, and pursuit of the most cost effective resource for rate payers." said NEET co-chair Cal Shirley, VP for Energy Efficiency at Puget Sound Energy. "The DOE grant award that created PNCECE is certainly a direct result of the groundbreaking work done at Centralia College and its Center of Excellence,"

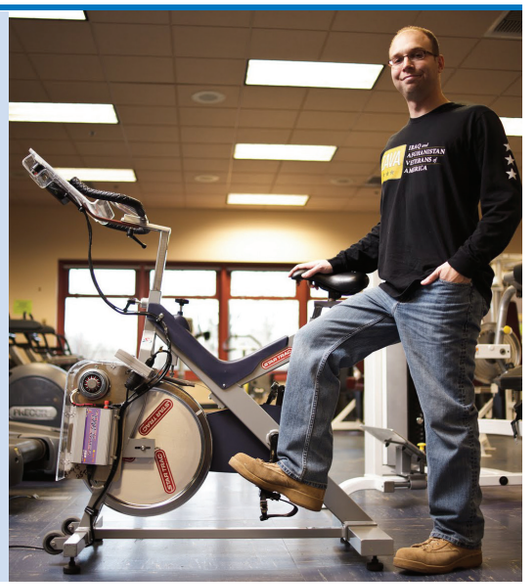
News and Notes

Smart Energy Around the Region

High Rankings. The Pacific Northwest continues to lead the nation in innovation and accelerated movement toward a clean energy future. This month the states of Oregon and Washington were ranked second, and fourth, respectively in the U.S. Clean Energy Leadership Index compiled by Clean Edge– the index ranking states on the basis of clean energy technology, policy, and capital deployment. In a related survey the Kaufmann Foundation released its 2010 State New Economy Index ranking Washington second in its movement toward a global, innovation-based economy.

Pacific Northwest Smart Grid Demonstration Project. Department of Energy (DOE) has selected a Pacific Northwest team, including BPA, to conduct a regional smart grid demonstration project designed to expand upon existing electric infrastructure and test new smart grid technology with up to 60,000 customers in five states. The Pacific Northwest Smart Grid Demonstration Project was one of 16 smart grid demonstration awards totaling $435 million announced by the DOE. The PNCECE Partners Avista, PGE and Northwestern Energy are participating in the demonstration project. http://www.bpa.gov/energy/n/smart_grid/PN.cfm

Utah Smart Grid Hazard Analysis. In January of 2011, URS International and its partners in the education and labor communities are staging a three-day event on "Smart Grid Hazard Analysis." Included in the events will be special workshops and train-the-trainer sessions in Idaho. PNCECE's Bob Topping of Chemeteka Community College, will be teaching the class.



Dennis Skarr of Veterans Conservation Corps.

Photo courtesy of: Nacime Khemis

Vet Peddling for Power. North Seattle Community College (NSCC) is buzzing with a new source of power, the EcoBike, created by NSCC student, WDVA Veterans Conservation Corps and PNCECE partner Dennis Skarr. What looks like an ordinary exercise bike actually generates electricity, through a power inverter attached to the flywheel, enough to charge 20 cell phones. Dennis enrolled in the Sustainable and Conventional Energy and Control Technology Program at NSCC after returning from his second deployment in Afghanistan, and works as an advocate for other returning veterans: "Energy is a major national security issue that isn't really talked about," he says, and feels veterans make ideal candidates for jobs in the energy field.

The Smart Grid

What's behind the headlines?

"Smart Grid" has become a buzzword suggesting how a future energy system will allow us to make better use of our energy, maintain affordable costs, and empower a new generation of wiser and better informed consumers.

Our current electric grid is a largely electromechanical system that can be traced directly back to energy pioneers Thomas Edison and Nikola Tesla. It's a remarkable feat of engineering that has brought huge prosperity, but it's aging. Over 3,300 utilities in the United States alone are attached to the grid and are critically co-dependent: although the grid is essential to our economic well being it's antiquated, vulnerable to natural disaster and security breach, and economically inefficient.

The simple definition of a Smart Grid is one that uses modern technologies, principally IT or computer technologies, to be smarter in how we deliver electricity to consumers. At a more technical level, a Smarter Grid will:

- Create an improved power distribution network
- Offer two-way communications between producers and consumers
- Feature intelligent monitoring that tracks flow in the system
- Incorporate superconductive transmission for less power loss
- Integrate alternative energy sources such as wind and solar
- Be self-diagnosing and self-healing in case of outages

In the current analog one-way model, consumers are passive users of electricity. Power is generated at central plants which react to demand conditions. Reliability is the major focus. In the digital (Smart Grid) model, consumers are actively engaged with their local utility in managing their energy needs. Generation will be provided from multiple sources strategically distributed throughout the region. New forms of power generation will be smarter in integrating sustainable and renewable energy sources. Operators and technicians will achieve greater reliability rates by utilizing Smart Grid technology to anticipate demand and quickly — 6/10ths of a second — balance the load to meet consumer requirements. The main features of this new Smart Grid are a focus on improved reliability, price efficiency, reduced pollution, and enhanced safety and security.

PNCECE Smart Grid Project Governance Board

MEMBERS

Ryan Davis, **Regional Education and Training Center;** Karen De Venaro, **Seattle City Light;** Mark Fischer, **Veterans Conservation Corps;** Don Guillot, **Int'l Brotherhood of Electrical Workers Local 77;** Alan Hardcastle, **Washington State University Extension Energy Program;** Al Link **Washington State Labor Council;** Peter McKenny, **Gonzaga University;** Tom McLaughlin, **Center for Advanced Manufacturing Puget Sound;** Troy Nutter, **Chair, Puget Sound Energy;** Diane Quincy, **Avista;** Kevin Schneider, **Pacific Northwest National Laboratory;** Bob Topping, **Chemeketa Community College**

ALTERNATES

Ed Bowen , **Veterans Conservation Corps;** Bob Guenther , **Int'l Brotherhood of Electrical Workers Local 77;** Mike Hanson , **Avista;** Alice Lockridge , **Seattle City Light;** Jilliene McKinstry , **Gonzaga University;** Kairie Pierce , **Washington State Labor Council;** Sally Zeiger Hanson, **Washington State University Extension Energy Program**

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Centralia College complies with EEOC Guidelines