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EERC EDGE

Our Edge Is Our People

Sept/Oct 2011

Photos by Derek Walters

One of TIME Magazine's *"America's Ten Best Senators," U.S. Senator Kent Conrad gives the keynote address at AQVIII.*

U.S. Senator Byron Dorgan (retired) pinpoints key energy opportunities for the United States.

Assistant Administrator Gina McCarthy of EPA discusses critical environmental issues and upcoming regulations.

Chuck McConnell, Chief Operating Officer of the Office of Fossil Energy, provided DOE's perspective on the current state of U.S. fossil energy.

20 countries represented at AIR QUALITY VIII

A record number of countries were represented at the International Air Quality VIII Conference, which took place October 24–27, 2011, at the Crystal Gateway Marriott in Arlington, Virginia. The biannual Air Quality Conference is the nation's premier conference on air quality.

This year's conference drew more than 425 attendees from 20 countries around the world, including four Canadian provinces, 40 states, and the District of Columbia.

"We have an ever-increasing global demand for energy, and we are on the verge of major changes to environmental regulations in this country. The world is paying attention to the need for economically viable and environmentally superior technologies to address the air emission challenges within the energy sector," said Gerald Groenewold, Director of the Energy & Environmental Research Center (EERC). "The cross section of attendees from around the world made Air Quality VIII the perfect venue to discuss air quality as a global issue."

Media coverage for the event also increased significantly.

"We were extremely pleased to have a 20% increase in media coverage for this event," said Derek Walters, EERC Marketing, Communications, and Outreach Manager. "We were covered in such media as the *Boston Globe*, CBS Los Angeles, and the *Oil & Gas Journal*."

Deb Haley, Associate Director for Marketing, Outreach, and Administrative Resources, said Air Quality VIII featured the following keynote presenters: U.S. Senator Kent Conrad (D-ND); U.S. Senator Byron Dorgan (retired); Gina McCarthy, Assistant Administrator, Office of Air and Radiation, U.S. Environmental Protection Agency (EPA); Charles "Chuck" McConnell, Chief Operating Officer, Office of Fossil Energy, U.S. Department of Energy (DOE), and Nominee for Assistant Secretary of Fossil Energy; and Anthony Cugini, Director of DOE's National Energy Technology Laboratory (NETL).

Air Quality VIII was organized and sponsored by the EERC and cosponsored by DOE NETL and the Electric Power Research Institute, along with Signature Sponsor SOLVAir Solutions (part of Solvay Chemicals), Collaborating Sponsor Albemarle Corporation, and Exclusive Media Sponsor *Pollution Engineering* magazine. Air Quality IX is scheduled for October 21–23, 2013.

–Sandy Van Eck

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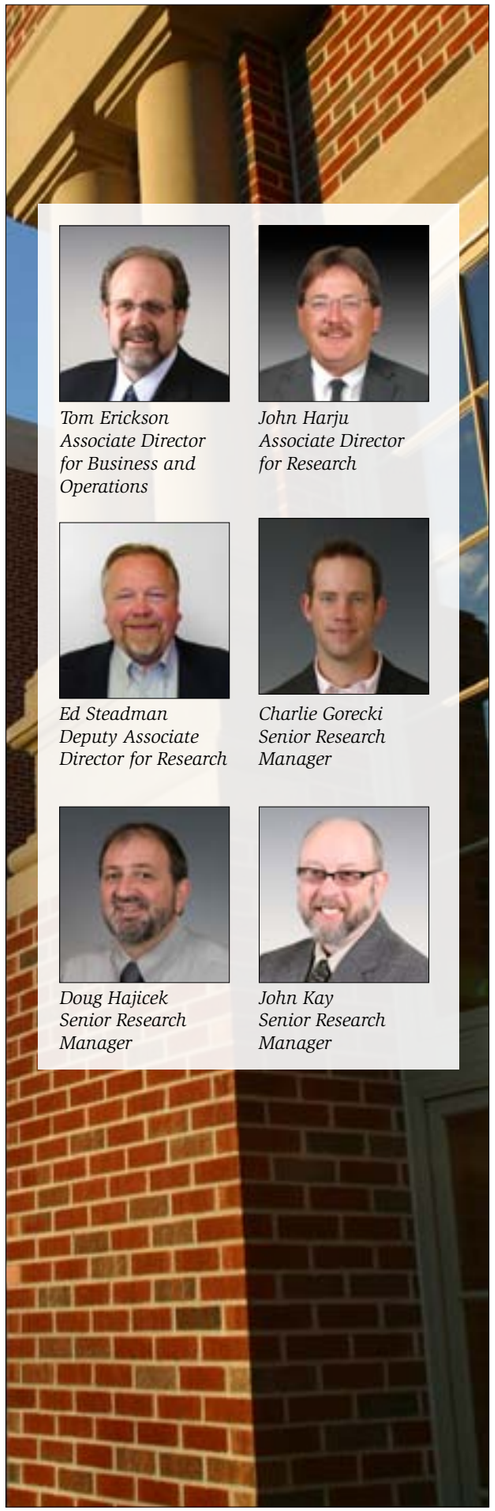


Tom Erickson
Associate Director for Business and Operations

John Harju
Associate Director for Research

Ed Steadman
Deputy Associate Director for Research

Charlie Gorecki
Senior Research Manager

Doug Hajicek
Senior Research Manager

John Kay
Senior Research Manager

EERC restructures to maximize strengths and global reach

The EERC recently restructured its organization to maximize the strengths of its employees and better serve clients around the globe. The two Associate Director for Research positions previously held by Tom Erickson and John Harju were combined into one position overseeing all EERC research programs. That position is now held by Harju, while Erickson assumed the duties and responsibilities of the Associate Director for Business and Operations following John Hendrikson's retirement.

"We were able to capitalize on the strengths and skill sets of Tom Erickson and John Harju. Tom brings many years of experience and leadership on the research side of the EERC to the business and operations side," said EERC Director Gerry Groenewold, "and consolidating the oversight for all research programs under John Harju allows the EERC to enhance the integration of research activities and maximize overall efficiency. It has long been my objective to have all research activities under one associate director for those reasons. In light of our programs receiving a tremendous amount of global media coverage, it is obvious the EERC has what the world needs."

To assist in this integration and to manage the programmatic growth, a new position was created for a Deputy Associate Director for Research overseeing the EERC's Oil and Gas and PCOR Partnership teams. Ed Steadman, previously a Senior Research Advisor and Program Manager for the Plains CO_2 Reduction (PCOR) Partnership Program, was tapped to fill the spot. The three Deputy Associate Directors for Research (Steadman, Chris Zygarlicke, and Mike Holmes) report to Harju.

Other key positions created during this reorganization include three new Senior Research Manager positions filled by Charlie Gorecki, Doug Hajicek, and John Kay. Gorecki took over the Program Manager responsibilities for the PCOR Partnership Program. Hajicek now oversees his own group of engineers and reports directly to Zygarlicke. Kay also manages his own group of engineers and reports directly to Holmes. Many of the over 320 employees at the EERC were affected by the reorganization, as people moved into groups with like areas of expertise and groups were integrated to provide multidisciplinary teams to redouble the EERC's focus on its clients' needs.

"The intent and effect of this reorganization has enhanced and streamlined our areas of expertise," said Groenewold. "The EERC needs to stay agile in adapting and increasing its expertise to meet the ever-evolving energy needs of the world. The EERC has clients in 51 countries; we need to remain responsive to them and lead the way as energy needs and regulations change throughout the world."

–Sandy Van Eck

EERC researchers and CCP team members (left to right): John Kay; Julio Rincon, ConocoPhillips; Mark Crombie, BP Alternative Energy; Josh Stanislowski; George Parks, FuelScience LLC; Jonathan Forsyth, BP Alternative Energy International Limited; Cliff Lowe, Chevron Energy Technology Company; Jason Laumb; Gustavo Torres Moure, CENPES, Petrobras Research Center; Ivano Miracca, Saipem S.p.A.; Steve Schlasner; Mark Bohm, Suncor Energy Services Inc.; Charlie Gorecki; Raja Jadhav, Chevron Energy Technology Company; Brandon Pavlish; Dan Burt, Suncor Energy Services Inc.; Mahesh Iyer, Shell International Exploration & Production Inc.; and Mike Holmes.

CCP joins PCO_2C Program

The CO_2 Capture Project (CCP) team recently joined the EERC's Partnership for CO_2 Capture (PCO_2C). The CCP team is a partnership of seven major energy companies—BP, Chevron, ConocoPhillips, Eni, Petrobras, Shell, and Suncor Energy—whose mission is to advance the technologies that will underpin the deployment of industrial-scale CO_2 capture and storage.

On September 7, 2011, the CCP team toured the EERC and was introduced to its programs and capabilities. The team was briefed on the PCO_2C Program's Phase II efforts and joined the discussion of technology options for Phase II test campaigns.

Photo by Wes Peck

PCOR Partnership annual meeting/workshop held

Photo by Wes Peck

The PCOR Partnership annual meeting was held September 13–14, 2011, in Denver, Colorado. The meeting attracted 83 attendees representing 42 organizations from 12 states, the District of Columbia, and four Canadian provinces (photo above). The annual meeting provided an overview of carbon management topics, including carbon capture and storage (CCS), enhanced oil recovery, regulatory updates, and media relations and outreach strategies, and provided summaries of the PCOR Partnership's completed and ongoing activities.

A half-day introductory workshop entitled "Foundations of CCS Geology" was held on September 12. Designed for everyone involved in or associated with CCS projects, the workshop provided an explanation of key geological concepts, rock specimens, and activities such as a walking tour of the I-70 outcrop to inspect the various exposed strata (left).

Designer Nikhil Patel observes the clean flaring of syngas during his successful first test of the semitrailer-mounted gasification unit (featured in the July/August 2011 issue of the EERC Edge*) built by EERC engineers and technicians. This gasification unit converts forestry wood waste into a clean-burning syngas.*

Technology development operators: Key factor in EERC success

It seems like magic when someone can take an engineering drawing and build something out of it, but that's exactly what routinely happens at the EERC. Machinists, carpenters, electricians, welders, plumbers, and engineers work together to turn lines on a piece of paper into a three-dimensional piece of equipment or system in support of a research project or client's desires.

"We build, operate, and maintain research equipment anywhere from bench scale all the way up to an eight-story unit combustor," said Kelly Fox, Research Specialist.

The team leaders who make this happen include John Richter, Research Associate, who makes the blueprints and orders the materials; Butch Riske, Technology Development Operations Supervisor, who assigns staff to work on the project; Al Lilke, Technology Development Mechanic Supervisor, who manages the machine shop; and Dennis Kyle, Manager, Instrument Shop.

"We work with the engineers to supply them with the right type of skills to get the work done," said Riske.

"We have every engineering discipline we need here," said Al Lilke. "We also have 11 welding machines at the EERC."

The EERC's in-house machine shop is packed full of equipment such as drill presses, lathes, a milling machine, shear, and a variety of welding machines, and its 54,000 square feet of demonstration area is filled with equipment that was designed, built, or assembled for research projects. With such a display of in-house expertise, EERC project managers can feel confident that they will have the equipment or system that is needed for their project and/or clients.

"It usually starts with people like Nikhil Patel, Research Scientist, with a proposal or an idea," said John Richter. "I take that and turn it into a design, an actual physical component, and do what the process design needs to make it work."

The overall process begins in the proposal stage identifying a project that will require a formal design process. These are projects that involve "high-pressure" operation or where significant structural modifications or new structural construction are required. When funding is obtained, a designer or, for larger projects, a design team is formed to work with the design engineering group. Before final drawings have been completed, Doug Hajicek, Senior Design Engineer, checks over the overall design to ensure the appropriate calculations have been completed to meet the appropriate pressure and piping codes to ensure that the project can be completed in-house and safely operated upon completion. Prior to final design, the necessary input is obtained working with drafting and fabrication personnel to ensure the components can be fabricated in an efficient and timely manner.

Corey Fox assembles an in-house-fabricated hybrid water condenser for a DOE-funded project studying ways to minimize water use in coal-fired power plants.

"Additionally, I review structural requirements to ensure that there will be adequate strength for stands or new installations," said Hajicek. "And in the case of when structural steel is to be installed or modified, whether we need a review by an outside structural engineer."

Once all "build" considerations have been addressed and the design has been approved for safety, the team begins building from what is called a working design, marking it with any necessary changes that come up along the way.

"We all work together until the work gets done," said Lilke.

This team effort was clearly evident on the Patel gasifier trailer project. Fox started welding large-body sections to the flanges on the end of the gasifier. Scott Schulz and Tim Abel, Technology Development Operators, started working on skids to support the modular units on the trailer. Kory Eidsness, Technology Development Operator, and Steve Evanson, Technology Development Mechanic, built a secondary stand or skid to house the water tank, did all of the welding and water testing, and put the water skid on the trailer. Lilke and Todd Deibert and Wayne Blegen, Technology Development Operators, along with University of North Dakota student Matt Koczur, built the methanol reactor, which was Research Engineer Tony Snyder's design. Deibert and Blegen were the primary operators who diligently worked toward getting the system operational. Greg Dvorak, Research Engineer, did the electrical instrumentation to ensure it all worked. And when it is ready, Gene Balek, Technology Development Operator, will prepare the fuel for the project.

"After the item is built, with all of the changes on the blueprint, an as-built set of drawings is prepared," said Lilke. "That can be used in the future if changes are desired."

Depending on whether the project has been completed or another test/run has been scheduled, Riske's team will either disassemble the equipment or clean it up to get it ready for the next test/run or project.

With a multitude of talent and years of experience working in their trades and learning others, it is clear that much of the success experienced at the EERC is a direct result of those individuals who build, fabricate, operate, and maintain research equipment

–Trish McGuire

Todd Deibert constructs the flare for the biomass gasification system.

Photo by Bob Dambach

Frode Tilden (left) watches as Dave Geck focuses the camera on cocoa beans drying in the sun on a tarp in the village of Ikata. A valuable cash crop, the beans are gathered up each night and brought into the house for safekeeping, then laid out to continue drying the next day. Drying the cocoa beans by this traditional method can take up to 2 weeks.

Behind the scenes: The making of a documentary, Cameroon

In May and June of 2009, EERC Research Manager Dan Daly accompanied the Prairie Public Broadcasting film crew to the northern Great Plains, northeastern India, and the African country of Cameroon to film "a day in the energy life" of typical families. Here in the developing economy of Cameroon is Part 4 of Dan's experience behind the scenes creating the PCOR Partnership documentary "Global Energy and Carbon: Tracking Our Footprint," which premiered on Prairie Public Television and is available at www.undeerc.org/PCOR.

"There they are."

Alex Azenkeng, EERC Research Scientist and our guide for Cameroon, was pointing at a couple of cars parked in front of the Douala International Airport. After 20+ hours in transit from Minneapolis, the vehicles were a welcome sight. In addition to Alex and me, our group included Prairie Public executive producer Bob Dambach and two "shooters," Dave Geck and Frode Tilden. We met the rest of our team: Dixon (driver of the Toyota land cruiser), Bill (driver of the Toyota sedan), and Nicodemus, our in-country guide ("I'm Nico," Alex's younger brother said with a smile). Soon we left Douala behind and entered the verdant countryside for the 2-hour ride west toward the Atlantic Ocean and our hotel in the town of Buea.

"What the…is that a rooster?"

The ensuing chorus of "cock-a-doodle-doos" soon had me out of bed and heading for my north-facing window. Below me were the white concrete buildings, shimmering tin roofs, and tropical greens of the city of Buea. In the distance, the dawn sun outlined the lower flanks of 14,000-foot Mount Cameroon, an active volcano with its summit shrouded in clouds. "Well," I thought as I drank in the scene, "it's pretty tough to mistake this place for North Dakota!"

For the first 5 days, we filmed energy use by our two families. The Anumendems (Alex and Nico's family) live in the village of Ikata, an hour north of Buea on the southeastern flank of Mount Cameroon. The Amins live in Muyuka, a short distance east of the hotel and just beyond the University of Buea. With "day-in-the-life" footage in the can, we split up: Dixon drove Alex, Dave, and me inland to the capital city of Yaoundé to interview government officials. Bill drove Frode, Bob, and Nico south several hours to the coastal city of Kribi to get shots of the major oil pipeline and offshore refinery. After 9 days in Cameroon, we rendezvoused in Douala before flying out.

Our families were gracious and welcoming. In Ikata, we watched cocoa beans being dried over a wood fire. We filmed families as they kindled their cooking fires in the morning to prepare breakfast and food for the noon meal in the farm plots. Then Bob and Dave accompanied Alex's mom on the 2-mile walk to her farm plot and filmed as she and her friends harvested taro, plantain, and greens and replanted the crops for a later harvest (in the tropical climate, the growing season is continuous). We joined the children of the village, who teased each other as they walked 15 minutes to the nearby spring-fed stream to get water for the evening meal.

"If I could get a pickup, I could transport my workers…."

Morris Amin was walking to the main road in Muyuka to hitch a ride to his plantation. Dave filmed as he rode off. Then we followed. Soon Morris was demonstrating a typical day caring for the crops on the plantation and giving us the lowdown on the different growth stages of palms. Later, we returned to Morris's backyard to film as his workers filled a 55-gallon drum with water and palm nuts, heated the mixture over a wood fire, and extracted the oil from the hot seeds. The cooking oil produced would be sold through the local farmers' cooperative.

"C'mon, guys, let's honor their hospitality…."

Bob was getting us together to enjoy a noon meal with the Amins. The preparation and the cooking had involved friends and members of the family. The taro had been peeled, washed, and boiled. Meal preparation started early in the morning under the supervision of Mrs. Amin (and filmed by Dave). As we entered the concrete-block home, a feast lay before us. As I sampled the traditional fare of greens and taro, it reminded me of dumplings and steamed beet greens. The whole fried fish was crispy and flavorful. Later, in the shade of the porch, I felt a touch on my hair. Two 5-year-olds were checking out this red-haired alien. As soon as I looked at them, they melted away in a chorus of giggles, only to be back moments later for a second look.

"Do you have the strength to eat the food and drink the drink of Cameroon?"

Dave and I considered this question solemnly and then nodded yes. "Good, I'm glad to hear it!" said Alex's in-law, Andrew Atabong, with a big smile. We had traveled east since early morning, watching the land become more hilly and the plantations give way to tropical forest. At noon, we filmed the hydroelectric station at Edea that supplies energy for aluminum production and for most of the households and businesses in Cameroon and other countries in the Central and West African region. In the early afternoon, we arrived in Yaoundé. Now we found ourselves in a bodega on a crowded street being treated to lively music, refreshments, and barbecued pork and plantains wrapped in the local newspaper.

The next morning in the Yaoundé Hilton restaurant, it was imported bottled water, French haute cuisine, protocol, and business dress. The hotel might be in Cameroon, but inside the hotel wasn't the Cameroon we had seen at our families' homes or when we'd shared pork and plantains with Andrew the night before. We left Yaoundé at noon and drove back to the Atlantic coast, playing hide and seek with motorbikes, logging trucks, and even a festive wedding procession: the bridesmaids perched on the window ledges of the back doors, holding hands across the car roof and waving. As we entered Douala at dinnertime, I realized that this city of 3 million had no stop lights or any traffic control signs—the traffic just ebbed and flowed.

Photo by Dave Geck

Alex Azenkeng (right) shares a laugh between video takes with his brother Nico (second from left), his mother (fourth from left), and Bob Dambach (middle). As in much of Africa, the village of Ikata has no Internet access, and cell phone coverage is spotty. Alex gets messages to his family by calling a relative in a larger village 10 miles away. His family travels to that village to call him. The country has an adult literacy rate of 76%, yet less than 1% of Cameroon's population has Internet access.

All eight of us were settled around a long table in the center of the Café Mediterranée with the big-screen TV behind us when the room erupted with laughter and shouts of victory. Cameroon was going to the World Cup! I was so tired and hungry that I took three bites of Dave's chicken before realizing it wasn't the lamb I had ordered. In a few hours, we would board the midnight plane for Brussels. Alex would spend a few days with his family before returning. Nico planned to study in the United States, so we would meet again, but this would be the last time we would see Bill and Dixon. We wished each other well and headed to the airport.

"Did you say Cameroon?"

Suddenly, my 60-something shuttle driver seemed interested. "My neighbor is from Cameroon! What's that like?" As we made our way along I-494 in Minneapolis, I talked about tropical forests, household hospitality, and campfires for cooking. The next morning, as I sipped coffee on the plane to Grand Forks and carefully rationed the contents of my bag of airline minipretzels, I couldn't help thinking about a world where a guy from Cameroon could be the neighbor of a shuttle driver in Minneapolis and where a group of strangers from North Dakota would be welcomed as family by two households in Cameroon.

Say what you want—I think that world's got some possibilities.

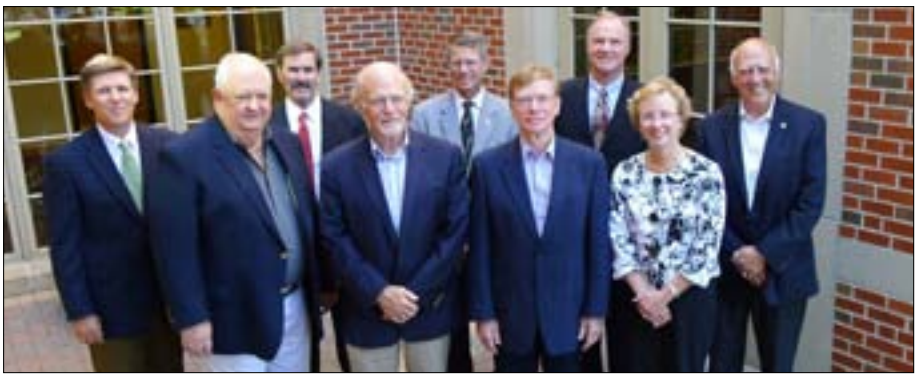
Next time – Six families, three continents, and a global perspective on energy and carbon in half an hour? Sure, no problem!

–Dan Daly

Photo by Bob Dambach

Morris Amin (left) demonstrates peeling a cassava tuber for Frode Tilden and Dave Geck. The cassava plant (bottom left) produces elongated tuberous roots (see the pile at their feet). Cassava leaves are eaten as a source of protein, while the root is the major source of carbohydrates in the tropical world.

The Fuels of the Future addition to the NCHT building is progressing rapidly, with the steel frame of the high-bay area nearly complete. Tom Erickson, Associate Director for Business and Operations, says the addition should be enclosed by early January and completed in the summer of 2012.



EERC Foundation Board meets

The EERC Foundation Board of Directors held its annual meeting at the EERC on September 8, 2011, to discuss a number of new and ongoing technology transfer and commercialization activities. Board members are (left to right) Ron Ness, President of the North Dakota Petroleum Council; Tom Bechtel, EERC Foundation Board President and Principal at TFB Consulting Services in New Bern, North Carolina, and former Director of the Morgantown Energy Technology Center; John Knapp, President of the Avex Group; Gerald Groenewold, Director of the EERC; John Snustad, Regional President of US Bank; John MacFarlane, Chairman of the Board and Retired Chief Executive Officer and President of Otter Tail Corporation of Fergus Falls, Minnesota; Robert Kelley, President of the University of North Dakota; Alice Brekke, Vice President of Finance and Operations of the University of North Dakota; and Bob Harris, Founder and Chairman of the Board of Harris Group, Inc. Not pictured is Carl Bauer, President of C.O. Bauer Consulting, Inc., and retired director of the National Energy Technology Laboratory, who attended the meeting through teleconference.

–Sandy Van Eck

Upcoming events

Save the Date!

The EERC holiday party will be held the evening of December 2, 2011, at the Alerus Center, Grand Forks, North Dakota.

EERC EDGE

The EERC Edge is published for employees of the Energy & Environmental Research Center at the University of North Dakota. Send comments and story suggestions to Sandy Van Eck, Editor, (701) 777-5023 or svaneck@undeerc.org.

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