Volume 22 – Issue 4

EERC EDGE

Our Edge Is Our People

July/August 2011

Biomass '11 presenters: (left to right, front row) Ben Oster, Carl Wolf, S. Kent Hoekman, Bruce Folkedahl, Martin Olazar, Allen Aradi; (second row) David Ripplinger, Luca Zullo, Nancy Hodur, Adam Wirt, Governor Jack Dalrymple, EERC Director Gerald Groenewold, Chris Zygarlicke, Erin Powell, Andrea Holl Pfennig; (third row) Adonis Neblett, Bob Cowan, John Hurley, Greg Jenner, Bruce Browers, David Rein, Lawrence Tsang, Margo Shaw; (back row) Brian Cooper, David Jones, Michael Polzin, Chad Wocken, and Carolyn Nyberg. Presenters not pictured: Ted Aulich, Ezra Bar-Ziv, Gary Breitenbeck, David Haberman, Ron Lamberty, Brian Mullen, Klaus Raffelt, and Corinne Valkenburg.

Biomass '11 attracts attendees from six countries

Governor Dalrymple delivered the keynote.

The Energy & Environmental Research Center's (EERC's) Biomass '11: Renewable Power, Fuels, and Chemicals Conference held in July presented a wide array of topics on biomass and the biomass industry, ranging from current trends and opportunities to real-world economics to sessions on biopower, biofuels, and biomass feedstocks.

EERC Director Gerald Groenewold opened the event with comments on important advancements in biomass at the EERC, such as renewable jet fuel. He mentioned that bioenergy technologies need to compete in U.S. markets. The type of world-class research and development being done at the EERC is helping biomass technologies find competitive niches. Video remarks were provided by the Honorable John Hoeven, U.S. Senator from North Dakota. The Honorable Jack Dalrymple, Governor of North Dakota, presented keynote remarks.

"All forms of energy are needed and essential to our country's energy security," said Governor Dalrymple. "We need to form partnerships and work together on renewable energies."

Governor Dalrymple's knowledge of biomass comes from a background in farming along with working on the development of EmPower ND, North Dakota's energy policy that encourages growth in all energy sectors and supports research and development of cleaner technologies.

Conference attendees included over 250 people representing 156 organizations from 28 states, the District of Columbia, and six countries.

–Trish McGuire

Inside

Side view of the mobile indirect liquefaction system (MILS) designed and built by EERC engineers and technicians for semitrailer deployment. The advanced automated control room is located on the right side behind the curtain.

Building a mobile biomass-to-methanol production system

This article is based on an article published in the April issue of Biomass Power and Thermal *magazine.*

The biomass industry knows all too well that transportation costs often stymie a project. Distributed or even portable energy and fuels production may be one method for diminishing the economic impacts of transportation costs in biomass utilization.

To test this idea, the University of North Dakota's (UND's) EERC is building a mobile system for converting cellulosic waste into liquid products. The work is being funded through the Xcel Energy Renewable Development Fund and the U.S. Department of Energy (DOE) through the EERC Centers for Renewable Energy and Biomass Utilization. The system is close to completion. Parametric testing will be performed with the system during the fall of 2011.

In the EERC program, the technology is being demonstrated by building and testing a 200-lb biomass/hour fixed-bed downdraft biomass gasifier, air-blown and with specialized gas cleaning to produce the syngas. The integrated system includes 3-meter-long packed-bed catalytic reactors for producing methanol. The methanol produced will then be tested by IdaTech LLC of Bend, Oregon, to determine if it is of sufficient purity to power a fuel cell used to produce heat and electric power.

A strong advantage of the EERC gasification system is that it can be used with green or wet wood. This reduces the need for drying the wood before gasification. In fact, the high moisture content creates a syngas with a significantly higher hydrogen content than if the moisture were not present. A high hydrogen content is especially useful when a liquid fuel such as methanol is made. By increasing the hydrogen content in the gas stream, higher conversion of biomass solids can be reached.

The advantage of the mobile platform is that, by making a liquid fuel, the site at which the waste is found and processed can be decoupled from the site where the liquid fuel is utilized. In this project, the biomass resource targeted is legacy piles of wood waste found at sawmills throughout Minnesota. These are piles, often produced years ago, that still contain a significant energy content but that have degraded to the point at which they cannot easily be used as commercial products such as garden mulch. Rather than incinerating them, the EERC technology would turn the waste piles into a revenue stream through the production and sale of carbon-neutral methanol.

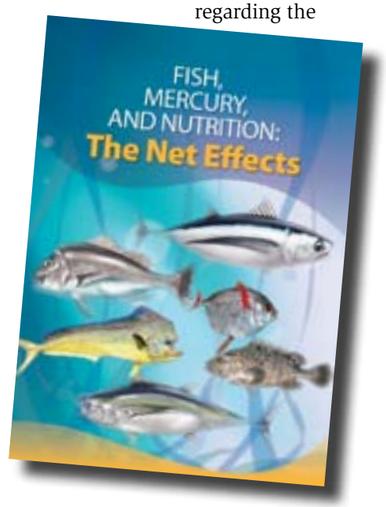
The EERC gasification technology is new and unique and is being integrated with commercially available technologies for gas compression and conversion. The fixed-bed biomass gasifier is the lowest-capital-cost system for indirectly producing methanol. The mobile platform is highly automated to minimize labor requirements. The technology is available for licensing through the EERC Foundation.

–John Hurley

Fish: Friend or foe? Find out as the latest EERC–Prairie Public documentary premieres September 8

Fish contain nutrients critical to brain and nervous system development in children and to heart health in adults, and over a billion people consume seafood as a central part of their diets. However, fish can also contain mercury, raising concerns for unborn and young children who are the most vulnerable to mercury toxicity. So, are fish good or bad when it comes to health and development?

Fish, Mercury, and Nutrition: The Net Effects, an original half-hour coproduction of the EERC and Prairie Public Broadcasting (PPB), explores the benefits and perceived risks of ocean fish consumption. The show traces the health concerns stemming from rare cases of mercury poisoning, subsequent population studies of seafood consumption and childhood development, government guidelines about fish in the diet, and research by the EERC and other institutions regarding the relationship of mercury and selenium. The documentary team included Laura Raymond, Charlene Crocker, Dan Daly, and Sheila Hanson from the EERC and Bob Dambach, Dave Geck, Barbara Gravel, Ben Stommes, and Frode Tilden from Prairie Public. Funding was provided by the National Oceanic and Atmospheric Administration Marine Fisheries Pacific Island Regional Office and the members of Prairie Public.



Fish, Mercury, and Nutrition: The Net Effects is scheduled to premiere on Prairie Public Television (PPT) (Channel 13 in Grand Forks) at 8:00 p.m. CDT on September 8, 2011. The EERC will also launch a companion Web site simultaneously (www.undeerc.org/Fish).

Hydraulic fracturing specialist shares expertise

Michael Vincent conducted an educational workshop on hydraulic fracture design in the Bakken Formation at the EERC in July. Participants included staff members from the North Dakota Industrial Commission Department of Mineral Resources Oil and Gas Division and 35 EERC researchers working on PCOR Partnership and Oil and Gas Group activities. Vincent is a Petroleum Engineer with Insight Petroleum Consulting of Golden, Colorado.

Hydrogen documentary a YouTube hit

Since its premiere on PPT in January 2011, the hourlong documentary *Hydrogen: Nature's Fuel* has continued to be hugely popular on YouTube. From January 15 to August 15, it received nearly 19,000 views, which is the equivalent of roughly 2700 views a month or 100 views a day. The rate was relatively steady over the entire period of time and is on par with PPB's popular *Prairie Home Companion* pieces.

Hydrogen: Nature's Fuel tells the story of hydrogen through a series of intriguing interviews from those working on cutting-edge hydrogen technologies and explains every step of the process, including how hydrogen is created, how it is transported and dispensed, and how it is used in fuel cell vehicles and other end uses. The documentary was a production of PPB in collaboration with the EERC's National Center for Hydrogen Technology® (NCHT®). Funding for the program was provided by DOE's National Energy Technology Laboratory, the NCHT, and the members of Prairie Public. The production is a key part of the NCHT's mission in education and outreach.

Photo provided by Bob Dambach.

Filming the Sharma family: Poonam Girdhar acts as a "grip" and the Sharma sons watch as their mother, Lata, is filmed.

Behind the scenes: The making of a documentary

In the spring of 2009, EERC Research Manager Dan Daly accompanied the PPB film crew to the northern Great Plains, northeastern India, and Cameroon to film "a day in the energy life" of typical families living in three different economies. Here is the rapidly emerging economy, Part 3 of his experience behind the scenes creating the PCOR Partnership documentary "Global Energy and Carbon: Tracking Our Footprint," *which premiered on Prairie Public and is available at www.undeerc.org/PCOR.*

"We're over here!"

Bob Dambach, Prairie Public's Director of Television and Executive Producer for the documentary, stood in the middle of an assortment of camera cases and personal luggage fresh out of baggage claim. Videographers Dave Geck and Barb Gravel were kneeling, checking equipment, and Intern Poonam Girdhar, our "in-country expert" for the India trip, was talking to our Delhi "outfitter"—the man with drivers, vehicles, and knowledge of the city. Moments later, we were making our way through the controlled chaos of the midnight Delhi rush hour to the Metropolitan Hotel.

As I downed my last cup of breakfast coffee some 30 hours later, my body was saying "Dan, say good night to Conan O'Brien and hit the hay." But it was a sunny morning halfway around the world from North Dakota, so I double-checked my pack for the essentials—water, sunscreen, and camera— and joined the others in the Toyota van. The hours since our arrival had been spent catching up on sleep, getting on track with the time change, and getting an introduction to the area. Our routine for the next 3 days was to leave the hustle and bustle of Bangla Sahib Road each morning for residential tree-shaded streets and beige three- and four-story stucco apartment blocks where balconies held air-conditioning units, drying clothes, and potted plants. There we would film the everyday routines and energy use of our two families, both friends of Poonam's mom.

There were four in the Sharma household: Lata and her husband, Atul, both doctors, and their teenage sons, Sharad and Varun. The Handa household comprised five: Shobha Handa; her mother-in-law; her son Anuj and his wife, Preeti; and another son. First we captured the Sharma family's morning routine, Dr. Lata Sharma at her office, and then the Handa family at dinner. No matter what we asked of them, our families remained gracious and cooperative. On the third day, we unloaded our gear and followed Poonam up the stairs to the Handa family's third-floor apartment.

"Go ahead. Eat just as you would if we weren't here," said Bob.

Oh, yeah, I thought, as Poonam repeated the message in Hindi. It's just a normal morning—two cameras, a sound boom, and five people from 7200 miles away standing around your dining room table. The room was filled with the morning sun, the small stove and fridge were visible through the archway to the kitchen, and the aromas of the morning meal mingled with the warm air from the open window, and I found myself thinking of childhood visits to my grandmother's in New Mexico.

Next, Preeti and Anuj put on their "going-to-work" expressions and walked down the apartment corridor past the camera held by a kneeling Dave Geck, who kept the camera rolling as they got into their car, fastened their seatbelts, pulled out of their parking spot, stopped, and then did it all over again until Bob was satisfied. Dave filmed Shobha Handa as she emerged from the small temple in the apartment building's courtyard and hailed a green CNG minicab (a three-wheeled vehicle that runs on compressed natural gas) at the street. She smiled and waved at us as the taxi pulled away.

"We'll have to say "good-bye" to that "good-bye" part in the editing room," Dave said with a smile as we climbed into the van that would follow Shobha Handa to work for the last of the "family" footage.

Photo provided by Bob Dambach.

A typical city street in Delhi: Motorized vehicles vie for space with bicycles and cycle rickshaws. Note the power pole in the background with the myriad of lines running to and from it.

Later in the week, we shot location footage (the busy highways, the Agra oil refinery, and rural life) in the countryside south of Delhi, where small collections of stucco homes dotted the flat landscape, each with a utility shed-shaped mound of dried cow manure patties for cooking fuel. Every few miles or so, tall brick chimneys trailed black smoke. We soon learned they were brick works. Near the chimney was an area of wet earth where the bricks were molded. One of the workers motioned for us to climb up on a shimmering brick structure at the base of the chimney. We soon felt the heat of the burning coal baking the bricks beneath our feet. Nearby, women in bright saris sorted yesterday's batch, loading the keepers into wagons and discarding the broken ones. When we had the footage we needed, Dave filmed the children of the workers, their laughter filling the air as they watched themselves on the camera's replay screen.

We continued location shooting in Delhi. The streets were full of activity: a man ironing clothes by the curb with a hot coal-filled iron, a vendor pulling a cart of vegetables, a bike rider pulling LPG (liquefied petroleum gas) cylinder refills for apartment cooktop units. We filmed the government buildings in New Delhi, the butcher shops of old Delhi (the chickens sold in the market were utterly fresh, I can assure you!), and the tangle of electric lines emblematic of new technology making its way into a long-established order. We saw a dozen motor bikes parked in a row with "Domino's Pizza" emblazoned on their gas tanks. We joined the constant stream of visitors paying homage at Gandhi's tomb. At the train station in the morning, we saw boxcar after boxcar disgorge men in white shirts and black pants bound for their jobs in the city. We saw makeshift tents made of shredded plastic laid against the fence of a modern shopping mall. Everywhere we looked we were bombarded with contrasts—the eye-opening and thought-provoking reality of this rapidly emerging economy.

"That's us," said Bob, at the end of the gate agent's boarding call.

We had each spent our last couple of days in India in different ways: finishing up location filming, visiting museums, shopping for gifts and souvenirs or, in my case, staying in my room eagerly popping high-powered emergency antibiotics in an effort to knock back the mother of all respiratory infections ("Who knows where you got it? That's why I gave you the pills!" said my doctor later in Grand Forks). We boarded the KLM jet around midnight. Ahead of me, seatback screens blinked on, one after another, and soon several identical Owen Wilsons were chasing several identical yellow labs. As the others lost themselves in *Marley and Me*, my mind wandered ahead. In just 10 short days, we would again be boarding a plane, this time headed for Africa….

Next time – "Mount Cameroon is an active volcano? And our family lives at its base?"

–Dan Daly

Photo provided by Barb Gravel.

Most of the crew piles into a CNG minicab in Delhi (left to right): driver, Bob Dambach, Dave Geck, Dan Daly, and Barb Gravel.

New employees

Jun Ge is a Research Engineer performing petroleum engineering analysis, including geomechanical reservoir modeling and simulation for enhanced oil and gas recovery and CO_2 storage, laboratory testing and design, and hydrocarbon and CO_2 storage resource analysis. His work includes designing geomechanical models for CO_2 storage risk assessment, engineering design and simulation for unconventional hydrocarbon resources, CO_2 enhanced oil recovery, and CO_2 storage operations. Ge's interests and expertise also include geomechanical modeling on wellbore stability, optimization of hydraulic fracturing operation, and the assessment of permeability enhancement after well stimulation.

"I am impressed with the friendly people at the EERC," said Ge. "I also love the quiet, safe, and beautiful town of Grand Forks."

Ge earned master's degrees in Petroleum Engineering from Texas A&M University (TAMU), where his studies focused on reservoir geomechanics simulation and hydraulic fracturing, and in Geology from Peking University. Ge earned a B.S. in Geology from China University of Geosciences (Wuhan). As a Graduate Research Assistant in the Petroleum Engineering Department at TAMU for 4 years, Ge assisted with reservoir geomechanics design, programming, and presentation of research—a great foundation for his work in petroleum engineering analysis at the EERC.

Ge is originally from a small town in central China. His wife is pursuing her nursing degree at UND. The two like to read, hike, fish, play table tennis or Wii games, and go shopping. Ge is a voracious reader of newspapers, history, and novels.

Corey Lindeman is a Research Scientist in the Oil and Gas Group, where his work focuses on the determination of physical rock properties for use in the characterization of oil reservoirs and formations for geologic storage of CO_2. He currently performs experimental design, data analysis, and reporting on projects carried out in the Applied Geology Laboratory (AGL).

"I work on various projects in the AGL and really enjoy working on different projects and tasks on a daily basis," Lindeman said. "That keeps me motivated to learn new concepts and techniques for dealing with problems within the oil and gas industry."

Lindeman has a B.S. in Geological Engineering from UND, where his studies focused on groundwater systems and remediation and wetland restoration. When he previously worked at the EERC as a temporary employee, he became interested in oil production decline curves and how they relate to the long-term prediction of a well's potential. Through PCOR Partnership activities, Lindeman developed an interest in CO_2 enhanced oil recovery techniques and results. He plans to obtain a professional engineering license in petroleum engineering in the future.

A native of Thief River Falls, Minnesota, Lindeman grew up in Mooreton, North Dakota. He and his wife love to travel. She teaches 7th-grade math and just earned her master's degree in middle school education. Lindeman serves as goalie for the EERC intramural hockey team Cold Fusion. He likes fishing, bird hunting, and cooking for friends and family.

–Sandy Van Eck

Thompson graduates

Account Technician Uta Thompson received her Bachelor of Science degree in General Studies from UND on August 5. It was a journey that began in 1984 and, through life's interruptions, was delayed until 2009, when she decided to complete her degree. With the approval of her supervisor and the flexibility of a coworker, Thompson juggled work obligations and class schedules and finished her degree.

"I'm really grateful to the EERC and UND for this opportunity," said Thompson. "I am the first in my immediate family to graduate from a 4-year university."

–Trish McGuire

Holmes honored as distinguished alum

The Mayville State University Alumni Association honored Mike Holmes, EERC Deputy Associate Director for Research, at its annual Alumni Association Awards Dinner held June 24, 2011, where Holmes and two other alumni received the Distinguished Alumni Award. Holmes earned a Bachelor of Science degree with majors in chemistry and mathematics from Mayville State University in 1984 and a Master of Science degree in chemical engineering from UND in 1986. A standout college wrestler, Holmes is a member of Mayville State University's Athletic Hall of Fame.

–Sandy Van Eck

Transitions

Teresa Bonev has transitioned to the position of Assistant to the Director, where she facilitates all functions and endeavors related to the EERC Director and the Director's office. Bonev's experience provides a wealth of organizational and interpersonal skills for handling the responsibilities of this position, which include scheduling, communications, document production, and performing as the liaison between the Director and all internal and external entities. In this position, Bonev also assists the Associate and Deputy Associate Directors for Marketing, Outreach, and Administrative Resources with the planning, organization, and execution of EERC special events and coordinates all EERC involvement in charitable giving campaigns (United Way, Mortar Board, etc.). Bonev also continues as a direct supervisor for the administrative assistant group. She holds a B.S. degree in Business Administration (Management) from Oklahoma State University.

"I am excited to work in the Director's office and look forward to the new challenges this position offers. I am eager to work with new individuals and programs that will expand my involvement in and knowledge of the EERC," said Bonev.

Kari Schmidt has become the Assistant to Deputy Associate Director for Research Chris Zygarlicke. She will also continue as Administrative Assistant for four Senior Research Managers and associated staff, where her duties include scheduling, communications, document production, and other related activities. She holds a diploma in Executive Secretarial Studies from Aaker's Business College, Grand Forks.

"I really enjoy supporting such a large group—and it is such a great group to work with! I'm very fortunate. My days are filled with activity; it's so invigorating. My to-do list each day is longer, but there is a lot of satisfaction at the end of the day when I review it and can mark off all that I've accomplished," said Schmidt.

Heidi Vettleson has been promoted to a Project Management Specialist position in the Workflow Group. In this role, Heidi is supporting the EERC's Fossil Energy Cooperative Agreement (FECA) Program, currently comprising 35 active individual projects. Heidi assists FECA Manager Lucia Romuld in the preparation of proposals, the function and improvement of project management procedures, and updates and completion of project work plans, reporting documents, and budgets. In addition, Heidi manages the EERC's centralized resume system, including helping to determine system protocol, incorporating appropriate information, initiating and maintaining communication with researchers to make revisions, and ensuring appropriate reviews and approval of finalized resumes on a quarterly basis. Heidi continues as a team member in the Workflow Group as well.

"I feel fortunate to have this opportunity and am excited to learn and grow in this new position," said Vettleson.

–Sandy Van Eck

Quamme retires

Linda Quamme, who served as the Assistant to the EERC Director since she started at the EERC in 1989, retired August 31, 2011.

"Linda's presence and talents will be greatly missed. Throughout her 21 years as Gerry's Assistant, she has been extremely committed and dedicated to her position and the organization," said Deb Haley, Associate Director for Marketing, Outreach, and Administrative Resources. "Her attributes and can-do spirit have been appreciated on a daily basis. Congratulations, Linda! We sincerely thank you and wish you all the best in your future endeavors."

Quamme said her retirement will include lots of downtime at the new Quamme abode on Lake Bemidji and traveling to keep up with her children and grandchildren in Grand Forks, Wisconsin, and Alaska.

"I will just be enjoying the serenity at the lake," said Quamme, "and waiting for my husband to retire."

–Sandy Van Eck

Photo by Sandy Van Eck.

Linda Quamme (left) and Sue Bartley hand out treat bags at the EERC Picnic—one of the numerous events Quamme helped to facilitate over the years.

Summer events

Photo by Sandy Van Eck.

There was something for everyone, including lots of good food and good company, a magician (Jeffrey Salveson), a bunny (Olivia), and ice cream, at the EERC Annual Picnic held at Lincoln Park on August 16.

Photo by Sandy Van Eck.

Loreal Heebink's daughters show the tooth lost during the picnic.

Golfers beat the heat

The Annual EERC Golf Tournament, which took place on Thursday, June 30, at Valley Golf Course in East Grand Forks, was again a huge success. We had 12 teams of players participating in the scramble format tournament. Six teams played in the competitive division, which was won by the team "We Think We Are Good But Wait 'Til You See Our Score," which consisted of Steven Theisen, Keegan Hahn, Broc Bellmore, and Dan Hendrickson. They squeaked out the win, edging out two other teams by one stroke. Six teams also played in the recreational division, which was won by the team "The Putting Princesses," consisting of Becky Faulhaber, Brad Lucke, Chad Neppel, and Lynette Neppel. Overall, a lot of fun was had at the tournament in spite of the 96°F temperature, with an oppressive heat index of 107°F.

–Andy Palmiscno

Kari Schmidt and Heather Altepeter triumphed over 13 other teams of two in the Annual EERC Bean Bag Toss hosted by Administrative Resources on July 19 and 20. Runners up were June Novacek and Stephanie Weis.

Upcoming events

PCOR PARTNERSHIP ANNUAL MEETING AND WORKSHOP

September 12–14, 2011, Denver, CO

Air Quality VIII

October 24–27, 2011, Arlington, VA

EERC EDGE

The EERC Edge is published for employees and friends 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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