



NEWSLETTER

Midwest Cogeneration Association, Inc.

November/December, 2004

Vol. 19, No. 4

2004 ANNUAL CONFERENCE



Bob Koszyk, Manager of Interconnection Services, Exelon Energy Delivery



Marty Melchi, Robert Finley, & George Sweeney – The fuels session group.



John Cuttica, UIC Resource Center; Thomas Smith, Equity Office Properties; and William O'Shea, O'Shea Environmental discuss the Cogeneration Market



The Honorable Kevin K. Wright, Commissioner and Chair of the Electric Policy Committee, Illinois Commerce Commission presented the keynote address



Philip R. O'Conner, Ph.D., Vice President, Constellation NewEnergy, Inc.



Wrap up Session with: Mark Hanson, Director of State Relations, Association of State Energy Research and Technology Transfer Institutions



Exhibitor's Area

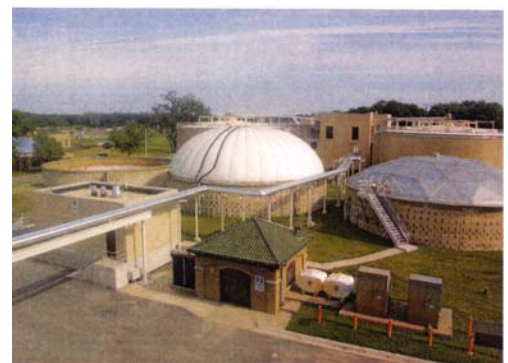


Refreshments and Barbecue Dinner

2004 COGEN AWARD WINNER

Congratulations to Ballard Engineering on being the recipient of the 2004 MCA Annual Cogen Award.

Ballard Engineering with the Rock River Water Reclamation District designed and built a dual fuel 2,475 KW Natural Gas / Digester Gas powered Combined Heat and Power facility. The system provides maximum flexibility to the facility by its capacity to operate the entire facility independent of the utility automatically if necessary, provide all process heating requirements thru heat recovery from water jacket and exhaust, and switch fuels on the fly based on digester gas availability. Typical operation is one of the three engines operating 24/7 on digester fuel, with the remaining two engines operating 9 am to 6 pm Monday thru Friday.



Bud Wolf (lft.) and Robert Conway (ctr.) present the 2004 Annual Cogen Award to David Martindale of Ballard Engineering.

FROM THE PRESIDENT

2004 Board of Directors

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For up-to-the-minute
information on the Midwest
Cogeneration Association visit
our website at:

www.cogeneration.org



MEETING RECAP

Paving the Way for a Renewable Energy Future

A joint meeting of the Midwest Cogeneration Association and AEE Chicago Chapter on January 22, 2004. Presented by Gary Nowakowski, Technology Team Leader, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Chicago Regional Office

Renewable energy has benefits to all including economic development, a cleaner environment, improved national security and less reliance on imported fuels. The breakdown of primary energy use in the U.S. is:

- Coal: 22%
- Natural Gas: 23%
- Petroleum: 39%
- Nuclear: 8%
- Renewable Energy: 8%

Conventional hydropower, geothermal and biomass make up the majority of the 7.37 Quads of renewable energy, however wind is rapidly growing.

WIND

As of the end of 2003, 6.37 GW of wind was installed nationwide. States with the greatest wind resources include North Dakota, Texas, Kansas, South Dakota, Montana and Nebraska. Minnesota and Iowa are ranked 9th and 10th respectively. Michigan, Illinois, Wisconsin and Missouri are ranked 14th, 16th, 18th, and 20th respectively. The cost to generate power from wind has fallen ten-fold since 1980 from 40 cents/kW-hr to between 4 and 6 cents/kW-hr. The falling cost of wind power means that wind is now nearing competitiveness with central station power (2.5 to 3.5 cents/kW-hr) in some areas of the country. Wind turbines have evolved from small, high speed units (75 kW) in the early 80's to larger and larger slow speed (10 to 20 revolutions per minute) designs. In 2000, the average size unit was 750 kW and today the typical unit size is 1.5 MW. The forecast is for wind turbines to

continue to increase in size based on improved economies leading to lower generating costs. As an example, GE Wind Energy has installed a 3.6 MW wind turbine demonstration unit in Spain. Wind power is directly related to the swept area of the turbine blades and the cube of the wind velocity. Therefore, the goal has been to design systems with larger turbine diameters located on taller towers where the wind velocity is the greatest. Hub heights today can be in the 200 to 250 feet range. General Electric (formerly Enron Wind) is the only domestic producer of turbines. Vestas recently purchased another Danish Company, NEG Micon, to become the largest wind turbine company in the world and a significant player in the U.S. The current focus of U.S. DOE's wind program is on low wind speed turbine development and small wind turbine development. The development of low wind speed turbines will require the design and production of longer, thinner, stronger blades and use of improved composite materials. It will also require the use of taller towers through innovative "telescoping" designs and hybrid concrete/steel towers. The U.S. DOE funds the National Renewable Energy Laboratory's (NREL) National Wind Technology Center located in Colorado. Wind Powering America is the outreach segment of the U.S. DOE's Wind program. Goals include providing 5% of the nation's electricity by 2020 as well as rural economic development. Improved wind mapping has been a key ingredient to identifying areas for utility-scale wind developers to begin their prospecting work. The

mapping software is far more precise today than it was 10 years ago, thus allowing wind developers to identify the top wind resource areas. Wind farm developers such as FPL will then erect anemometers to monitor wind resources for a year before making a decision to invest millions of dollars in a wind farm at a specific site. The installation cost of utility-scale wind turbines is in the \$800,000 to \$1,000,000 per MW range. States with the greatest installed wind capacity in rank order are California, Texas, Minnesota, Iowa, Washington and Oregon. While North Dakota is known as the Saudia Arabia of wind, they do not have a means of transmitting the power to more populated markets.

BIOMASS:

Biomass is a very diverse area covering wood/wood waste, landfill gas, biogas, ethanol fuel from starch and , biodiesel fuel from soybeans, products from agricultural crops, etc. Ethanol production is the perfect example of how a biomass renewable fuel source can provide economic, environmental and energy security benefits. 80% of all ethanol produced is from the "corn belt" region. Seven percent of all corn grown is used to produce ethanol, but ethanol only represents 1% of transportation fuel (mainly as a gasoline oxygenate), hence there is tremendous opportunity for ethanol. Ethanol production is a value-added process which takes a commodity (corn) and produces

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MEETING RECAP

Paving the Way for a Renewable Energy Future (con't.)

multiple, higher value products (ethanol and distillers dried grain, a feedstock for animals). Numerous economic studies have been done to prove the positive economic impact of an ethanol production facility on the local economy. The results include increased capital spending, the purchase of goods and services, the creation of new jobs, increased household income, increased tax revenue and a boost to local corn pricing. Another popular biomass resource is the harnessing of methane from manure through anaerobic digestion. Besides the value of the biogas, other benefits include odor control, reduced disposal costs, ammonia (fertilizer) as a byproduct and a reduction in methane released into the atmosphere. Operations with more than 450 dairy cows are able to benefit from economies of scale with installation costs around \$400 to \$500 per cow. The focus of U.S. DOE's Biomass program includes biorefineries, ethanol production from agricultural residues (as opposed to corn starch), and biomass gasification. The biomass outreach effort in the Midwest, Regional Biomass Energy Program, is managed by the Council of Great Lakes Governors. The biorefinery concept involves the input of biomass feedstocks (dedicated crops, agricultural residues, production byproducts) to a biorefinery which converts the biomass through a variety of processes (fermentation, gasification, combustion, co-firing) to produce multiple, high value-added products such as fuels, electricity, heat, food stuffs and chemicals. There are more than 600 products listed by the National Corn Growers Association produced from corn. DuPont is in the early stages of developing corn plastics (funded by

U.S. DOE) from stocks, stems, and leaves. Corn plastics are currently being produced by Cargill Dow, a joint venture between Dow Chemical and Cargill. These plastics are being used to produce plastic plates, foam, dinnerware, and clothing.

SOLAR:

Solar energy often gets a bad rap because of the high capital cost (\$/kW) and the high cost to produce electricity. However, like wind, the cost to generate power from the sun has decreased exponentially from \$1.00/kW-hr in 1980 to between 20 and 30 cents/kW-hr today. The long term goal of U.S. DOE's Solar program is to generate power for 6 cents/kW-hr by 2020 and reduce the cost to generate hot water from 8 cents/kW-hr to 4 cents/kW-hr by 2005. The Solar program focuses on fundamental research, materials and devices, technology development and solar water and space heating. Thin film or amorphous photovoltaic products use less semiconductor material and can be produced at a lower cost than the more well known crystalline Silicon products. Today, crystalline silicon products make up 90+% of the market for photovoltaics and have a higher sunlight to electricity conversion efficiency (10 to 12% vs. 8 to 10% for thin films). Photovoltaics are cost effectively utilized today in off-grid applications. A few examples of these applications include portable highway signs, emergency traffic signals and off-grid lighting. One novel thin film product is manufactured in Michigan by United Solar Ovonic under the brand name, Unisolar. It is a roofing shingle which doubles as a means of producing electricity. Many of BP's gasoline stations have canopies which are coated in a thin

film photovoltaic which produces 40 to 50 kW. The glass spandrels at 4 Times Square in New York City are coated with a thin film semiconductor material and produce electricity. The Million Solar Roof Initiative is the outreach part of the Solar program. Midwest partners include the State of Iowa, Wisconsin and Minnesota, City of Chicago, Great Lakes Renewable Energy Association (Michigan), Foundation for Environmental Education (Ohio). The Midwest partners have pledged the installation of 25,000 systems and have surpassed 1 MW of installed capacity this year.

RENEWABLE ENERGY DRIVERS:

Drivers for renewable energy include the declining cost to generate electricity from renewables, state and local economic development, an expanding number of green power offerings by utilities, increased energy security based on less reliance of imported fuels and the dispersed nature of renewable energy installations, fuel price uncertainty of traditional fossil fuels, federal and state policies and continued advances in research and development. There are many federal and state policies which have contributed to growing the renewable energy market. Included in the mix are

- Renewable portfolio standards (RPS) are now offered by 12 states. This a state requirement for utilities to include a percentage of renewable power in their mix of electricity sold to customers.

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INDUSTRY NEWS

Paving the Way for a Renewable Energy Future (con't.)

- System Benefit Charges represent a surcharge on consumer energy purchases to support an energy program within a state. The funds are used to support low cost financing, technology demonstrations, etc.
- Production Tax Credits (PTCs) – the single most visible PTC is the federal Wind PTC. In this case, a production tax credit of 1.8 cents/kW-hr was offered to wind farm developers. The 1.8 cents/kW-hr applies to every kW-hr produced over a ten year period. The wind PTC expired at the end of 2003 and is included in the Energy Bill which has not been passed.
- Property tax exemptions
- Sales Tax Exemptions
- Equipment Rebates

The U.S. DOE has been a consistent funding source of renewable energy research and development over more than two decades and several Administrations. Such long term investments have been needed to achieve long term results. All of these efforts including those of private industry, state and local government and academia are starting to pay dividends which benefit the economy, environment and energy security of our country.

AEP Plans to Build 'Clean-Coal' Plant

American Electric Power said Tuesday it plans to build at least one "clean-coal" plant by 2010 in response to environmentalist and shareholder demands to release pollution-reduction plans.

The plant, which would convert coal into a gas and pass it through pollutant-removal equipment before it is burned, was recommended by a board of directors subcommittee that was formed as part of an agreement with shareholders.

The subcommittee's report evaluates the impact of proposed federal rules for reducing emissions and recommends ways for AEP to control emissions at its coal-fired power plants.

Company officials plan to spend \$3.5 billion by 2010 to comply with regulations already passed or in the process of implementation. Pending or potential emission standards could add \$1.5 billion from 2010 through 2020, AEP spokeswoman Melissa McHenry said.

Those cost estimates take into account only currently regulated emissions. Two pending bills seeking to regulate carbon dioxide could cost the company up to \$6.4 billion more, McHenry said.

The "clean-coal" plant could cost up to \$1.6 billion to design and build - about 20 percent more per kilowatt than a conventional coal-fired plant. No site has been chosen, said Michael Morris, AEP's chairman, president and chief executive.

The process that would be used at the Integrated Gasification Combine Cycle plant is more efficient and lowers emissions of carbon dioxide, nitrous oxide, sulfur dioxide and mercury, the company said.

AEP has about 5 million customers in 11 states: Arkansas, Indiana, Kentucky, Louisiana, Michigan, Ohio, Oklahoma, Tennessee, Texas, Virginia and West Virginia.

We Need Your Input!

This newsletter offers a forum to communicate with turnkey design build contractors, equipment suppliers, potential customers, regulators and utilities. We look forward to featuring your press releases, business news, com-ments and editorials. If you would like to submit comments, an editorial or be featured in an article, please address comments to: Midwest Cogeneration Assoc., P.O. Box 283, Western Springs, IL 60558 or an e-mail to: MCA@cogeneration.com.



Additionally, in an effort to control expenses, the MCA is now distributing information elec-tronically. If you are not currently receiving information from us via e-mail, please send us an e-mail (mca@cogeneration.org) and provide us with your current e-mail address. If you would like to receive the newsletter in electronic format only send us an e-mail with a subject line of "newsletter" and we will add you to the list of members receiving the newsletter via e-mail only.

INDUSTRY NEWS

MIAMI (OHIO) UNIVERSITY SELECTS WÄRTSILÄ FOR INTERMEDIATE PEAKING POWER

Miami University at Oxford in Ohio, USA, has selected Wärtsilä to supply an intermediate peaking power system to supply electricity to its students during peak and intermediate demand hours. Wärtsilä will supply two Wärtsilä 18V34SG generator sets for the project, each producing 5732 kW. Each generator is scheduled to operate up to 2500 hours annually. The project will increase the reserve capacity of the university's power system, reducing the possibility of power outages. The plant was designed by Cummins & Barnard, Inc., of Ann Arbor, Michigan, USA. Cummins & Barnard provides engineering and consulting services for power generation, project development and facilities engineering. "This project continues to underscore the validity of the dispersed generation model," said Frank Donnelly, vice president of Wärtsilä North America, Power Plants. "By providing robust and reliable intermediate peaking power to universities, as well as to municipalities and independent power producers, we enable them to increase the reliability of power distribution to their customers. In this specific case, their customers happen to be the students, faculty and administrators of Miami University." Miami University is a state-assisted university. Its Oxford campus has 15,000 undergraduates and 1,300 graduate students. Total enrolment including regional campuses in Hamilton, Ohio and Middletown, Ohio is more than 20,000. "We chose Wärtsilä because of their unique product line and reputation for delivering engineered equipment packages on time and on budget," said Doug Hammerle, Associate University Engineer. "We were impressed with their range of experience and ability to meet project goals."

FUELCELL ENERGY TO PROVIDE DIRECT FUELCELL POWER PLANT TO THE U. S. ARMY

FuelCell Energy, Inc. has entered into a Cooperative Research and Development Agreement (CRADA) with the U. S. Army Engineer Research and Development Center/ Construction Engineering Research Laboratory (ERDC-CERL) and will provide a 250-kilowatt Direct FuelCell(R) (DFC(R)) power plant to the Department of Defense (DoD) Fuel Cell Test and Evaluation Center (FCTec) for evaluation in a combined heat and power application. This distributed generation fuel cell system will supply electricity, and the byproduct heat will be coupled with an adsorption chiller. The power plant will be located in Johnstown, PA at the FCTec, operated by Concurrent Technologies Corporation (CTC). CTC will operate and maintain the DFC300A in a combined power and cooling application utilizing natural gas as the supply fuel for the system. CTC will monitor, trend, and report on the operating and maintenance parameters of the DFC power plant and heat recovery equipment, including all auxiliaries. CTC will leverage the FCTec resources for the performance characterization of electrical and thermal output of the system. This information will allow FuelCell Energy to expand the knowledge of the DFC power plant's electrical and thermal operating parameters, efficiency, and system capabilities. The electrical output will provide a portion of the power requirement for CTC's Environmental Technologies Facility. The available high-temperature heat from the DFC power plant will be used to support the input energy needs of an absorption chiller system. The absorption process utilizes thermal energy to create chilled water to support the air conditioning requirement in the facility. Future application of the system will be to analyze the

use of the available system heat output from the DFC power plant for tri-generation—the supply of electricity as well as chilled and hot water in a combined system.

"We are pleased to have the opportunity to work with the ERDC-CERL and CTC in this DFC power plant demonstration," said Herbert T. Nock, FuelCell Energy's Senior Vice President of Marketing and Sales. "We believe that the use of the heat output from the power plant for air conditioning and other uses adds further to the overall value equation presented by our DFC power plants, and we look forward to testing and evaluating the results at FCTec."

Under the 12-month program, FuelCell Energy will retain title to the unit and equally cost share the labor to operate and maintain the unit with ERDC-CERL. Through ERDC-CERL funding, FCTec will provide heat recovery equipment and mobilization costs as well as all material and utilities, including fuel and water, for the operation and maintenance of the power plant.

"The FCTec's mission is to significantly accelerate the development and commercialization of fuel cell power systems for military and commercial applications, and this new project between FuelCell Energy and FCTec will contribute to our ongoing Fuel Cell Demonstration Projects," said Dr. Michael Binder, U.S. Army ERDC-CERL Fuel Cell Project Manager.



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RETURN SERVICE REQUESTED



January 2005 - *MCA Bi-Monthly Meeting*
Location: TBA

January 19-20, 2005 - *2005 Natural Gas Outlook Conference*
Location: Hotel Derek,
Houston, TX
Sponsor: The McGraw-Hill Co./Platts
Contact: (713) 961-3000

January 25-27, 2005 - *5th Annual Microturbine Applications Workshop*
Location: Minto Place Suites Hotel,
Ottawa, Ontario, Canada
Sponsor: U.S. Dept. of Energy's
Distributed Energy Program and
Natural Resources of Canada
Contact: www.microturbineapplicationsworkshop.ca

February 24, 2005 - *Afternoon of Energy*
Location: Willowbrook Holiday Inn,
Willowbrook, IL
Sponsor: Chicago Charter Chapter AEE
Contact: Ray Protich (630) 396-0608

February 24-25, 2005 - *Energy Auditing*
Location: Las Vegas, NV
Sponsor: AEE
Contact: www.aeecenter.org

March 1-3, 2005 - *POWER-GEN Renewable Energy*
Location: Las Vegas Hilton
Las Vegas, NV
Sponsor: Power-Gen
Contact: www.power-gengreen.com

March 7-11, 2005 - *Comprehensive 5-Day Training Program for Business Energy Professionals*
Location: Las Vegas, NV
Sponsor: AEE
Contact: www.aeecenter.org

March 10-11, 2005 - *Energy Auditing 101*
Location: Boston, MA
Sponsor: AEE
Contact: www.aeecenter.org

March 15-16, 2005 - *Meeting Power Supply Needs in Ontario Conference*
Location: Metropolitan Hotel,
Toronto, Ontario, Canada
Sponsor: The McGraw-Hill Co./Platts
Contact: (781) 860-6103

March 17-18, 2005 - *Energy Policy Insights 2005 Conference*
Location: Washington, DC
Sponsor: The McGraw-Hill Co./Platts
Contact: www.platts.com

March 22, 2005 - *Creating a Strategic Energy Plan*
Location: Atlantic City, New Jersey
Sponsor: AEE
Contact: www.aeecenter.org

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