



Bi-State Chapter Exchanger

Volume XXV, Issue 9

Serving the Hudson Valley and Western Connecticut

May 2012

Meeting Wednesday May 9, 2012

2 PDH Credits Approved

Upcoming Events

- **June 20th -**
Golf Outing

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Presentation: Super High Efficient Chillers

Adam Meddaugh, LEED AP, Chiller Products Consultant for McQuay International, will present Super High Efficient Chillers: How manufactures are improving chiller efficiency today. Technology advances, system components, refrigerant and efficient operating range will be discussed. 1 PDH credit. Topics include:

- Magnetic bearing w/c chillers
- Single screw a/c chillers, including rapid restart and refrigerant econ
- Examples of performance possible for both Mag and Screw chiller
- Best operating range

Tech Session: Air Management and Building Water Pressurization

Bob Barrett from Wallace Eannace will present on Air Management and Building Water Pressurization. This presentation differentiates between "air control" and "air elimination" systems, provides information on components required to make a close system work properly with a large focus on expansion tank selection and the role an expansion tank plays in proper hydronic water pressure control. Sizing of the PRV, relief valve, and expansion tank are explained, along with pressure requirements for other components. 1 PDH credit.

Place: Casa Rina, 886 Commerce Street, Thornwood, NY 10592

Program: 5:30 - 6:00 PM Attitude Adjustment Time
6:00 - 7:30 PM Buffet Dinner / Tech Session
7:30 - 8:30 PM Main Presentation

\$25 Members, \$30 Non-Members

Engineering students: complimentary admission

The general public is invited and encouraged to attend.

Directions to Casa Rina

From Saw Mill Parkway - North or South
Exit at Marble Avenue - Exit # 27
Make right - continue to second traffic light
Make right onto Commerce Street
Casa Rina is the second house on your left.
Parking is on your right.

Please make reservations by contacting:

Nicholas Salomone ashraebistate@gmail.com

President's Message

By Nicholas Salomone

On behalf of the entire Chapter, I would like to thank everyone for making it a great year! Our final chapter meeting for the 2011-2012 year will take place on May 9th at Casa Rina Restaurant, and it has all the makings for yet another interesting and informative evening. Bob Barrett from Wallace Eannace will be presenting on Air Management and Building Water Pressurization, and Adam Meddaugh from DaikinMcQuay will be presenting on Super High Efficient Chillers. June will feature our Golf Outing so stay tuned for more details!

Nicholas Salomone
Bi-State Chapter President

Historical Note — Bob Roston, Bi-State Historian 1920s Oil Burners Could Be Tricky

“Back in the “Roaring 20s” the oil burner was brand new and it literally added much to the roar of that 1920s decade in an audible way. The oil burners of that decade were tricky, capricious and temperamental, and given to such shenanigans as filling the house with oily soot and blowing the furnace door through the basement wall into the front yard of the neighbor next door. In those days the new industry had little if any past experience to go on, and most burners were designed by ‘cut and try’ methods. The result was that burners of that decade were crude and inadequately designed in comparison with today’s burner. The burners of that day were equipped with a drain pipe from the bottom of the combustion chamber that led to a trip bucket that in turn would stop the burner if the bucket filled with unburned oil. The only trouble was that it didn’t. Sometimes the bucket failed to work ... then the entire contents of the oil tank would drain on the basement floor.”

— *Comfort From a Tank of Oil*, 1960

Student Activities — Carmen B. Yellen, Chairman

We are approaching the end of another successful year as members of an influential and internationally recognized organization. ASHRAE’s success rests on our ability as professionals to continually improve the practices in our industry, developing standards and guidelines for socially responsible and sustainable practices in construction. As a society, we have achieved such recognition, being widely accepted and referenced in building codes, through research and education within our professional community. Our social responsibility also extends to the rising engineers, our future colleagues and leaders. This year we are proud to once again offer scholarships to two of our local engineering students pursuing careers in the HVAC field. We invite our members to join us in congratulating them as they receive their awards at the Bi-State Golf Outing this June 20th, 2012.

U.S. Greenhouse Gas Emissions Headed Up Again

After dropping for two years during the recession, emissions of the gases blamed for global warming rose in 2010 as the economy heated up, the Environmental Protection Agency reports. Output of carbon dioxide and other heat-trapping gasses were up 3.2 percent from 2009 as the nation climbed slowly out of the deepest economic downturn since the Great Depression, the E.P.A. said.

“The increase from 2009 to 2010 was primarily due to an increase in economic output resulting in an increase in energy consumption across all sectors, and much warmer summer conditions resulting in an increase in electricity demand for air conditioning that was generated primarily by combusting coal and natural gas,” the agency reported in its [annual inventory](#) of greenhouse gases.

The report, produced for domestic policymakers and for the [United Nations Framework Convention on Climate Change](#), covers emissions of the six main greenhouse gases: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride.

Research Promotion Contribution Form

PLEASE COMPLETE THE INFORMATION BELOW AND RETURN WITH YOUR CONTRIBUTION TO:

Terry Connor
Johnson Controls
8 Skyline Drive
Hawthorne, NY 10532

Phone: 914-593-5223 Fax: 914-593-5201

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Credit Card #_____Expiration Date_____

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Donors are recognized for their contributions as follows:

Honor Roll contributors are listed in the October ASRHAE Journal and receive the commemorative coin recognizing Giants in HVAC&R invention or innovation.

Individual Honor Roll beginning at \$100

Corporate Honor Roll beginning at \$150

Investors with contributions of \$250 or more receive a wall plaque that can display six commemorative coins.

Contributions in any amount are gratefully received and 100% of the contribution goes directly to research. All contributions are tax deductible.

Coalition of World Energy Ministers Commit to Improvements in Energy Efficiency

Leaders from the 23-government Clean Energy Ministerial (CEM) and the UN Secretary-General's Sustainable Energy for All initiative (SE4All) outlined specific commitments by participating countries and private sector leaders which will promote improved energy efficiency, renewable energy technologies, and increased energy access around the world. The commitments build on two years of work by the Clean Energy Ministerial and support the goal of sustainable energy for all by 2030, the primary objective of the Secretary-General's initiative. Both the CEM and the Sustainable Energy for All initiative seek to improve energy efficiency, increase the share of renewable energy in the global energy mix, and ensure access to energy. Specific commitments by participating CEM governments in each category are detailed below.

Improving Energy Efficiency

Sixteen governments participating in the Super-efficient Equipment and Appliance Deployment (SEAD) initiative recommitted to working together and with the private sector to accelerate global progress on improving the energy efficiency of equipment and appliances. This effort could save consumers more than \$1 trillion over the next two decades. The Efficient Product Promotion Collaborative is a new public-private partnership that will help better utilize the billions of dollars spent globally on appliance efficiency programs each year, including a new program targeting super-efficient fans in India. A SEAD-facilitated technical exchange also led to India becoming the first country in the world to adopt comprehensive standards for performance, safety, and quality of light-emitting diodes (LEDs) in February 2012. These standards will help keep poorly performing products from spoiling this critical global market for highly efficient lighting.

Earlier this year, SEAD launched the first Global Efficiency Medal competition to recognize and promote the most efficient products, starting with a voluntary flat-panel televisions competition. Televisions account for six to eight percent of global residential electricity consumption. Manufacturers representing a significant portion of the global market have expressed interest in competing, with winners announced this fall. SEAD participating governments also announced the expansion of the competition with the next two award categories, which include motors and computer monitors. SEAD partners, led by India, in collaboration with the \$20 million UN Environment Program's enlighten initiative, launched a new effort providing technical cooperation to accelerate adoption of efficient lighting. Shifting to more efficient lighting technologies, such as compact fluorescent lamps and solid state lighting, has the potential to reduce global electricity consumption by approximately 2.5 percent.

Increasing the Share of Renewable Energy in the Global Energy Mix

The United Kingdom announced the establishment of up to £60 million in new funding to support the demonstration of carbon capture and storage technologies in developing countries. Denmark, Germany, and Spain released a global renewable resource atlas that maps the potential for solar and wind energy across the world. This includes plans to assess the cost-effectiveness of those resources in different countries, based on energy prices, project finance costs, and available incentives.

Ensuring Universal Energy Access

Italy and the U.S. announced the launch of Lighting India, which will bring modern lighting services to two million people by the end of 2015. This builds on the success of the Lighting Africa program, which has already accelerated market-driven delivery of quality off-grid lighting devices to 2.5 million people in Africa. Both of these programs are affiliated with the Global Lighting and Energy Access Partnership (Global LEAP) announced to promote market-based delivery of low-cost, quality-assured solutions to consumers who currently lack modern energy options. Other Global LEAP partners include the World Bank, the International Finance Corporation, the UN Foundation, the Energy and Resources Institute (TERI), the African Development Bank, the Global Environment Facility, the UN Development Program, and Japan's Ministry of Economy, Trade & Industry. More than 100 private sector and civil society organizations have expressed support for its principles.

Additional Cross-cutting Initiatives

Several CEM participants are also involved in cross-cutting initiatives, including 11 countries that agreed to bolster the Clean Energy Solutions Center. Launched a year ago at the second CEM, the Solutions Center is a \$15 million Internet-based technical assistance project jointly led by Australia and the United States in partnership with UN-Energy. The Solutions Center's 10,000 users from 150 countries have access to a 1,300 clean energy policy resources, including policy and deployment data, online trainings and webinars, and policy assistance consultations.

The ClimateWorks Foundation and its network commit to in-kind support for no-cost technical advice for up to \$1 million over three years through the Clean Energy Solutions Center. Senior government officials from more than 20 countries have already requested specific policy consultations. The Solutions Center, in partnership with Bloomberg New Energy Finance, is also launching a quarterly policy and market briefing as part of its web portal, www.cleanenergysolutions.org. The Government of India also announced its intention to create a detailed database of national and sub-national clean energy policies and incentives, with support from the United States during the design phase.

The United States also announced a national Women in Clean Energy program in partnership with the Massachusetts Institute of Technology (MIT), as part of its commitment to the Clean Energy Education & Empowerment Initiative (C3E). The program's three components include more than 20 senior professional women in clean energy serving as "C3E Ambassadors," an awards program to recognize individuals who have advanced women's leadership and their accomplishments in clean energy, and a symposium at the Massachusetts Institute of Technology this September.

In addition to the CEM announcements, the Sustainable Energy for All initiative released its Action Agenda. The agenda provides a practical roadmap for how the multi-stakeholder initiative can encourage collaborative action by governments, the private sector, and civil society to achieve sustainable energy for all by 2030. The agenda was developed by Sustainable Energy for All's High-Level Group, which includes distinguished leaders from government, the private sector and civil society, as well as three CEM ministers including: Steven Chu, U.S. Secretary of Energy; Edison Lobão, Brazilian Minister of Mines and Energy; and Farooq Abdullah, Minister of New and Renewable Energy of India.

Officers and Governors 2011—2012

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Why Be Involved in a Local Chapter?

- Learn about the latest technologies presented in the program sessions
- Attain continuing education credits
- Meet industry associates and discuss local concerns
- Network amongst designers, installers, vendors, educators, in your local area to help improve business for all
- Share experiences with others
- Enjoy a social hour
- Carry out ASHRAE's mission on a local level

To advance the arts and sciences of heating, ventilating, air conditioning and refrigerating to serve humanity and promote a sustainable world.

ASHRAE Region I Roster 2011-12 Executive Committee

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Commerical Heating, AC Retrofits Could Create Significant Energy Savings

Four control technologies could create significant reductions in electricity consumption, natural gas use and carbon dioxide emissions in commercial buildings, according to a recent study by Pacific Northwest National Laboratory (PNNL). PNNL suggests retrofitting packaged air-conditioners and heat pumps with air-side economizers, supply fan speed controls, demand-controlled ventilation and cooling capacity controls. The study added that cost savings attained from the technologies could be as much as 38%. The report is available at: http://www.pnnl.gov/main/publications/external/technical_reports/PNNL-20955.pdf

ASHRAE, NIST to Host Conference on Refrigerants

ASHRAE and the National Institute of Science and Technology (NIST) will jointly host a conference focusing on technological advancements and regulatory activities related to refrigerants this fall. The ASHRAE/NIST 2012 Refrigerants Conference: “Moving toward Sustainability” is intended to address the impact of refrigerants on climate change, with a focus on refrigerants with low global warming potential (GWP) applied in high-efficiency systems. This includes new generations of unsaturated fluorochemicals and “natural” refrigerants. The conference will be held October 29 – 30 at NIST in Gaithersburg, Maryland.

Join ASHRAE at its 2012 Annual Conference June 23–27, 2012/San Antonio, Texas



Special Rates for First-time Attendees



Join ASHRAE in San Antonio! Take advantage of the opportunity to discuss and examine the latest topics in the building industry, such as high performing buildings and integrated design, through the technical program; participate in technical tours; attend ASHRAE Learning Institute courses; and earn professional credits.

Technical Program – From integrated energy systems to indoor environmental applications, the Technical Program features seven tracks addressing topics and principles important in the HVAC&R industry today. The technical program also features a new mini-conference format on Integrated Building Controls. Earn PDHs, AIA LUs and LEED AP credits.

Virtual Conference – If you can't make it to San Antonio, take advantage of the knowledge shared in the technical program with the on-demand Virtual Conference recordings of all the presentations.

ASHRAE Learning Institute – ASHRAE Learning Institute provides high-quality courses presented by industry-recognized subject matter experts. Select from two all-day seminars and six half-day courses to stay current on HVAC&R trends.

First time attendee registration fee—
 a special rate of \$320 if you register by June 1;
 \$480 during onsite registration that begins June 11.

Notice to business card advertisers:

We are currently accepting business card advertisements for this year's newsletters. The cost of a business card ad is \$125.00. The newsletter is published monthly, September through June (ten issues). That means for \$125.00 (\$12.50 an issue), your business card ad will circulate to approximately 300 recipients a month or an advertising cost of approximately 4 cents/recipient.

If you are interested in placing an ad, please forward a business card and check (payable to ASHRAE Bi-State) to:

ASHRAE Bi-State Chapter
 DL Flow Tech
 2421 Route 52
 Hopewell Junction, NY 12533




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Employment Opportunities

Employment ads may be submitted for inclusion in **The Exchanger** as follows:

1. \$100.000 from companies placing ad for one (1) month.
2. \$150.00 from companies placing ad for two (2) months.
3. No charge for members looking for employment.



ASHRAE, founded in 1894, is a building technology society with more than 50,000 members worldwide. The Society and its members focus on building systems, energy efficiency, indoor air quality and sustainability within the industry. Through research, standards writing, publishing and continuing education, ASHRAE shapes tomorrow’s built environment today.

ASHRAE will be the global leader, the foremost source of technical and educational information, and the primary provider of opportunity for professional growth in the arts and sciences of heating, ventilating, air conditioning and refrigerating.

Upcoming Meetings

Month	Date	Promotion	Main Presentation	Tech Session
May	5/9/2012	Student Activities	Super High Efficient Chillers	Air Management and
June	6/20/2012	Student Scholarships	Golf Outing	

Through a Glass, Clearly

One of the most instantly recognizable features of glass is the way it reflects light. But a new way of creating surface textures on glass, developed by researchers at MIT, virtually eliminates reflections, producing glass that is almost unrecognizable because of its absence of glare — and whose surface causes water droplets to bounce right off, like tiny rubber balls.

The new “multifunctional” glass, based on surface nanotextures that produce an array of conical features, is self-cleaning and resists fogging and glare, the researchers say. Ultimately, they hope it can be made using an inexpensive manufacturing process that could be applied to optical devices, the screens of smartphones and televisions, solar panels, car windshields and even windows in buildings.

The technology is [described in a paper](#) published in the journal *ACS Nano*, co-authored by mechanical engineering graduate students Kyoo-Chul Park and Hyungryul Choi, former postdoc Chih-Hao Chang SM '04, PhD '08 (now at North Carolina State University), chemical engineering professor Robert Cohen, and mechanical engineering professors Gareth McKinley and George Barbastathis.

Photovoltaic panels, Park explains, can lose as much as 40 percent of their efficiency within six months as dust and dirt accumulate on their surfaces. But a solar panel protected by the new self-cleaning glass, he says, would have much less of a problem. In addition, the panel would be more efficient because more light would be transmitted through its surface, instead of being reflected away — especially when the sun’s rays are inclined at a sharp angle to the panel. At such times, such as early mornings and late afternoons, conventional glass might reflect away more than 50 percent of the light, whereas an anti-reflection surface would reduce the reflection to a negligible level.

While some earlier work has treated solar panels with hydrophobic coatings, the new multifunctional surfaces created by the MIT team are even more effective at repelling water, keeping the panels clean longer, the researchers say. In addition, existing hydrophobic coatings do not prevent reflective losses, giving the new system yet another advantage.

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Fossil Ridge High School provides a comfortable learning environment for 1,800 students in Fort Collins, Colo.

Energizing Education

By **Craig Watts, P.E.**, Member ASHRAE

Growing population and increased secondary educational needs prompted Poudre School District to build Fossil Ridge High School, a new 290,000 ft² high school to serve southeast Fort Collins, Colo. The district wanted the secondary educational facility to provide the community of Fort Collins with a different type of educational space and meet the district's sustainable building goals.

The result was an educational space designed for 1,800 students grouped into three different learning communities of 600. This approach offers close interaction between students and administration. Students gain a sense of belonging to a smaller group while benefiting from the strength of the entire high school population.

By creating a well-designed, cost-effective high school, the school district demonstrates to the local taxpayers that their tax dollars have been used in a way that is worthy of their continued support. As recent studies indicate that optimizing the learning environment for comfort improves students' test scores,

the new school showcases the district's forward thinking approach to the learning environment. Students enjoy and benefit from the new school's environment, and families can be confident that the school district went to great lengths to provide the best learning environment.

Innovative and Simple Design

The design approach for educational buildings can be extraordinary. The requirement to bring in outside air for optimal ventilation rates for students and faculty is in direct conflict with the goal of an energy-efficient building. Outside air requirements

About the Author

Craig Watts, P.E., is principal/vice president of MKK Consulting Engineers in Greenwood Village, Colo. Watts won a first place 2008 ASHRAE Technology Award.



At the time of certification, Fossil Ridge was only the third high school in the United States to achieve LEED-NC Silver.

for this type of building need to change as fast as students change between classrooms. The mechanical engineering firm, MKK Consulting Engineers, implemented two simple but effective ideas: bring in outside air only when required, and use energy recovery systems to minimize the energy required to condition outside air.

Bringing in outside air only when needed. Dedicated air units provide outside air that is ducted to each fan coil unit serving a classroom. Using occupancy sensors in the classroom and sensors in operable windows, fan coil operation is regulated. When the classroom is unoccupied or a window is opened, a signal is sent to the fan coil to turn off. As these dampers close down, a pressure sensor in the outside air duct sends a signal to tell the variable frequency drive (VFD) on the air handler to ramp down. The system can change the outside air quantities supplied and closely track actual requirements in the occupied spaces.

Using energy recovery systems. Approximately 40% of the total airflow required to condition a classroom is outside air. Once this air is brought into the space, it has to be exhausted from the building. The exhausted air is passed through an energy recovery wheel to preheat or precool the incoming outside air, reducing the energy needed to heat or cool the air.

Cooling and heating efficiently. The cooling system incorporates a standard 135-ton chiller coupled with a partial ice storage system. The system makes ice during off-peak hours when electrical rates are lower. The ice is stored in eight large insulated tanks. During the day when cooling loads increase, the cooling system uses the stored ice to provide additional cooling.

Additionally, high-efficiency condensing boilers (up to 97%) are used to generate 140°F heating water. The water is circulated to all of the air handlers and terminal heating units by base-mounted pumps with high-efficiency motors. A fully interactive direct digital controls (DDC) system operates all the equipment to maintain a quiet, comfortable learning environment.



Systems Working Together

Being a small community in itself, Fossil Ridge High School has several different types of mechanical systems: variable volume air-handling systems for the administration areas and constant volume air-handling systems for the media center, library, gymnasium and other large community areas. Four-pipe fan coil units with dedicated outside air units condition the classroom supply air. As previously mentioned, occupancy sensors and window sensors in the classrooms shut down fan coils when the room is not being used or when a window is opened.

The building has economizers, heat recovery units, split systems, condensing units, constant volume with reheat coils, chillers with ice storage, condensing boilers, full service kitchen with hoods and makeup air units, dust collection systems for wood shops, separate classroom residential kitchens, local exhaust systems placed throughout the building, gas and acid waste for science rooms and a greenhouse. These systems are not complex in a stand-alone application, but operating together in the same building with a full DDC package to achieve the school district's goals of sustainability, maintainability and energy efficiency creates an interesting design.

Nevertheless, the efficient building was designed for easy operations and maintenance. The operation and controls are simple, and the systems are unobtrusive. When people enter the building, they do not see or hear the systems, they only know that they are comfortable.

Schedule and Budget

The scheduled completion date for the school was June 2004. Due to a massive snowstorm in March 2003, three weeks were added to the schedule. The school opened in July 2004 and was ready for classes as scheduled in August 2004, meeting the district's goal.

The overall budget for the project was \$38.5 million. The final project budget, with a 5% contingency, was \$42.4 million. This included \$1 million for additional grading, parking lot and ground-work for the site, and \$1.5 million for tennis courts and ball fields that are shared with the City of Fort Collins Parks Department.

Exceeding Expectations

Fossil Ridge High School shows the engineering community that the use of proven technology, when applied in innovative ways, can produce extraordinary results. Fossil Ridge High School has exceeded Poudre School District's expectations. The school has won multiple awards, met the district's standards, saved money and provided an exceptional environment for students and faculty.

At the time of certification, the school was only the third high school in the United States to achieve the USGBC LEED® for New Construction (NC) Silver rating. The building is ENERGY STAR® rated and outperforms the ANSI/ASHRAE/IESNA Standard 90.1, Energy Standard for Buildings Except Low-Rise Residential Buildings, guidelines for energy savings by 60%.

The building to date, according to the construction manager, has been outstanding in terms of maintenance, cost savings, and operations.

Fossil Ridge's principal said the school's mechanical systems worked overtime during the 2005 summer school session. She thought the systems handled it well, considering that the daytime outside temperature reached into the 100s.



Eight large insulated tanks store ice made during off-peak hours when electrical rates are lower.

The school used approximately \$100,000 less in energy costs over the 2004–05 school year than its sister school, Fort Collins High School, of which only one-half of the school is air conditioned. Over the lifespan of the building (50 years), energy savings from the mechanical, plumbing, irrigation, and building lighting systems are projected to save more than \$6 million in operating costs for the district at current utility rates.

Fossil Ridge High School is a high performance building, exceeding the school district's sustainable guidelines, and a model energy performer. The design of the building and site is a clear statement of the district's commitment to environmentally responsible design.●

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