ASHRAE Region III

"REGIONAIRE"

Volume 4, Issue 2 March 2008

From the DRC

Dan C. Pettway, Region III Director and Regional Chairman ('06-'09)

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When I took office as Region III's DRC, one of my major goals was increase the presence of Region III in our Society. I would like to recognize all the Chapter and Regional Officers for helping us to accomplish a major step in doing so. I am so very pleased to report and congratulate all of you that Region III attained Full Circle for Honor Roll donations by all officers to Research Promotion in all 12 chapters and the regional staff, accomplished it for the second year in a row, and was the only region in ASHRAE to do so this year. You should be very proud of your commitment, dedication, and demonstration of leadership! I would like to recognize Regional Vice Chair, Dan Wyrick, for his work in making this happen.

Another of my goals was to strengthen the quality of leadership in the chapters. Two of the tools to accomplish this are the President Elect Workshop and the Chapter's Regional Conference. In case you have not noticed in the Regionaire's Calendar, these dates have been set. The President Elect Workshop is to be held Saturday, April 19th and will be conducted again at the offices of Whitman, Requart, and Associates, LLP at 801 South Caroline Street in Baltimore, Maryland. There will also be the traditional social event for Friday evening before the workshop. The Regional Officers will also hold the Regional Planning Meeting on Friday, April 18th at the same location. The Chapter's Regional Conference is set for August 14th, 15th, and 16th and to be held in Harrisburg, Pennsylvania. The host chapter is the Central Pennsylvania Chapter with Gary Debes and Dan Wyrick serving as CRC Chairmen. I can tell you that they are ready to go with plans almost 100% complete and include some great social events. If any of you have any

We encourage you to distribute the Regionaire to your local chapter members, so that all may learn of our regional activities. suggestions for either of these upcoming events, now is the time to send them to me for consideration. I intend to keep to the same format for both events as last year except removing the failing air conditioning system part. Gary promises the Hilton will not fail us.

Three of ASHRAE's recent and best publications, the Advanced Energy Design Guides for K-12, Small Offices, and Small Retail have been released for free electronic download at the Society Website. They demand for these downloads has numbered beyond 26,079 in just 22 days and has gone so far as to crash the server that downloads them. Society felt that these tools should be released in order to provide a widespread distribution and meet Society's goal to provide a Sustainable World. These are publications created by your fellow volunteers in ASHRAE.

In closing I would like to congratulate a few members of Region III recognized at the New York City Meeting. I would like to acknowledge a long time supporter of Region III for earning the E. K. Campbell Award which honors outstanding achievement by Engineering Educators. The recipient of this year's E. K. Campbell Award is our own Dave Meredith. Dave is an Associate Professor of Engineering at the Fayette Campus of Penn State and has been a very active member of Region III and ASHRAE. I would also like to recognize and congratulate Lindell Davidson of Hampton Roads Chapter, PE; Dr. Piotr Domanski of National Capital Chapter; and Dr. T. Agami Reddy of Philadelphia Chapter for their attaining the Membership Grade of Fellow ASHRAE for their contributions to the Arts and Sciences of Environmental Technologies. I would also like to congratulate ASHRAE past Director at Large, Tom Watson, for his nomination for the Office of Vice President ASHRAE.

Yours in ASHRAE, Dan.

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Membership Promotion

Roger Jones, Region III Vice Chairman Membership Promotion ('06 - '07) (703) 793-4474; roger.jones2@honeywell.com

Members (Get 'em in, Keep 'em in, Advance 'em)

The holiday season is over and a few of us are clinging to our New Year's Resolutions. By now your chapter operations are in full swing and (Punxsutawney Phil notwithstanding) thoughts of warm weather and springtime are creeping in. *Now is not the time to get complacent!*

Now, a review of our goals, some PAOE results, our Top Gun challenge and a reminder for CRC.

Goal 1: Growth (Get 'em in) >2%

We define net growth as gains (new members, reinstates, and student transfers) less losses (deaths, non-payment, and resignations). Compared to total membership, we can track the percent changes.

As a region we are growing at 1.5%. While positive, this is still below our goal. 9 chapters are showing positive growth with 4 (**Richmond** 2%, **National Capital** 2.6%, **Johnstown** 3.1%, and **Lehigh Valley** 8.3% - wow!) exceeding our goal.

I challenge each Membership Promotion Chairman to personally secure at least 5 new chapter members by June 30th. I also encourage each chapter to focus energy in getting Young Engineers (YEA) to join and get actively involved in ASHRAE. This provides the future talent for the long-term success of the chapter. **Nick Romeo** in **Central Penn** is doing some great things with YEA and I'll pass along some of his good works in the next Memberandum.

Goal 2: Cancellations (Keep 'em in) <10%

Steps taken by Society to reduce delinquencies are really taking off. Now the emphasis is on cancellations. I am happy to report that *all chapters* are below 10% cancellation rate with a Regional rate of 4.0 %! Terrific news – keep up the good work!

Goal 3: Advancement (Advance 'em) >3%

Here we have work to do. Our chapter and regional advancement numbers are far below goal. For instance: any associate member who has a P.E. is almost automatically eligible for full Member grade.

In a review of a book on Volunteer Management, the reviewer noted a very close link between **Retention and Recognition**. Retention was linked to **Motivation** and a key aspect of Motivation was recognition of their peers.

In my next Memberandum, I'll spend some time on how to identify members who are eligible for advancement and how to streamline the advancement process.

PAOE

Most chapters are dutifully reporting PAOE points online. If you're having any difficulty, please let me know and we'll walk through it together. As of January, we have a Regional MP count of 4420 points (1100 from YEA alone) which is far above last year! 9 chapters are above minimum and 2 – **Rich Goins (Baltimore)** and **Bob Finkboner** (**Philadelphia**) are already above Par!

Top Gun

As of this writing, we have 3 chapters (**Baltimore**, **Philadelphia**, and **Richmond**) who have met (and reported) all mandatory requirements (CRC, MBO, Delinquency Campaign, Online reporting, MP night) for Top Gun. 4 chapters are close. Chairs: check your numbers and keep reporting.

Finally, **CRC** is in Harrisburg, **PA** August 14-16 Have you made plans to attend yet? Is it on your calendar?

A healthy sustainable Chapter requires new members, and the only way to obtain new members is to spread the word about the tremendous benefits ASHRAE has to offer. In addition, it is vitally important to retain current members through delinquency campaigns and public recognition.

Remember: <u>Prior Planning Prevents Poor Performance</u>. So plan for the future of your Chapters, and promote ASHRAE Membership. - Roger

Roger �

Region III Chapters Regional Conference (CRC) Schedule

2008 Central Pennsylvania Chapter August 14-16

2009 National Capital Chapter August 13-15

Have you made your Annual Contribution to ASHRAE Research Promotion?

Chapter Technology Transfer

Nancy J Mitchell-Veeck, Region III Vice Chairman Chapter Technology Transfer (07-2010) (757)-558-3330; njmitchell@trane.com

ASHRAE Winter Meeting/Expo

I was fortunate enough to go to the Big Apple to attend the ASHRAE Winter Meeting/Expo. I hope most of you took advantage of the opportunity to enjoy both the technical programs, symposiums forums and seminars. (Hopefully you took time to take in the sites in this great city as well).

Distinguished Lecturers

CONGRATULATIONS REGION III. Thanks to all of you that took advantage of this wonderful program.

My personal goal was to use all eight (8) allocated DL's and we as a Region did it. I was proud to report this at our Chapter Technology Transfer Committee meeting in New York.

ASHRAE Satellite Broadcast-April 16, 2008, 1:00-4:00 P.M. EDT

Integrated Building Design: Bringing the Pieces Together to Unleash the Power of Teamwork.

This broadcast explains what you and other members of the building team must do to advance high-performance buildings with improved design, construction and operations processes.

Kent Peterson, ASHRAE's 2007-2008 president, will introduce the broadcast program.

Our speaker line up is as follows:

Walter Grondzik, Architectural Engineer and Professor in the Department of Architecture, Ball State University, Muncie, Indiana

Charles Gulludge III, PE, MAI, CSI, ASHRAE Distinguished Lecturer, Senior Mechanical Engineer, AC Corporation, Greensboro, North Carolina

Drury B Crawley, Technology Development Manager, US Department of Energy, Washington, DC

Keep your chapter Website updated. It is your members up to the minute link with what is going on in your local chapter.

Paul Torcellini, Team Leader for Commercial buildings Research, National Renewal Energy Laboratory, Golden, Colorado

www.ashrae.org/ibdbroadcast

CTTC PAOE Summary

Minimum is 350 PAOE Points, PAR is 750 Points

<u>Chapter</u>	Points
Anthracite	0
Baltimore	485
Central PA	460
Delaware	0
Hampton Roads	250
Johnstown	685
Lehigh Valley	0
National Capital	355
Philadelphia	0
Pittsburgh	265
Richmond	325
Roanoke	200

Many of the chapters are tracking well and other's need to boost up their efforts. Please give me a call if there's anything I can help with and please contact me if you feel there may be some points you deserve but aren't included in these totals.

LET's MAKE A DATE: CRC – Harrisburg, PA

I know it's early, but it's never too early to mark your calendars. Please pencil in August 14th, 15th and the 16th of 2008 for CRC. The CTTC Workshop will be held on Saturday the 16th, and I'm counting on 100% attendance. I'm looking forward to meeting each of you.

Nancy *

CALENDAR OF EVENTS

PRESIDENT ELECT WORKSHOP

BALTIMORE, MARYLAND APRIL 19, 2008

ASHRAE SUMMER MEETING

SALT LAKE CITY, UTAH JUNE 21-25, 2008

REGION III CHAPTERS REGIONAL CONFERENCE (CRC)

HARRISBURG, PA AUGUST 14-16, 2008

Research Promotion

Daniel E. Wyrick, Region III Vice Chairman Research Promotion ('06 - '09) (717)747-5555; wyrickeplus@msn.com

Regional Summary as of 01/30/08

Region III has collected \$72,926 toward ASHRAE Research. Our 2007-08 annual goal is \$205,000.

Chapter Summary

Chapter Chair		YTD	Goal
Philadelphia	Steve Piccolo	\$2,665	\$25,000
Central Penn	Gary Debes	\$4,027	\$13,000
Johnstown	John Weiland	\$1,775	\$2,500
Pittsburgh	Kurt Scheer	\$2,503	\$7,500
Baltimore	Sherry Abbott-Adkins	\$\$2,417	\$24,000
Nat'l Capital	Stephanie Mages	\$48,961	\$53,100
Hampton Roads		\$1,140	\$7,400
Richmond	Bob Lacy	\$2,754	\$11,000
Lehigh Valley	Donovan Denlinger	\$900	\$4,000
Delaware	Bob Schunke	\$980	\$10,000
Roanoke	Andy Fuller	\$2,939	\$9,500
Anthracite	Frank Kilyanek	\$1,865	\$8,000

The year is half over – are you half way to your goal? Think about how you can get there through special fundraising events and calling campaigns. Remember to reach out to your entire membership.

Congratulations to those Chapters reaching **Full Circle** by the 12/15/07 deadline (that would be all twelve Chapters in Region III **for the second straight year**), so congratulations to everyone! We also reached Regional Full Circle, so congratulations to all the Regional Chairs as well:

News from the RP committee meetings in New York City:

Society continues directly mailing all donor recognition items to the recipients. Should there be any issues, please contact Patricia or Nicole and copy me on any emails. RP Chairs should still make the effort to recognize donors through table top displays and certificates handed out at the chapter meetings, and PAOE points are available and awarded for this function.

Goals for '08-'09 will remain the same, as the annual RP campaign goal remains unchanged, at \$2M. Ideally, Chapters should be at \$50/Member so individual Chapter goals could be modified to achieve this.

We were reminded a backlog of projects that have been approved but not yet funded, requiring another \$250,000 to do so. These are projects that YOU the membership (working as volunteers on Technical Committees) have determined are needed to support a Handbook, Guideline, Standard, Sustainable design, etc. for OUR industry. ASHRAE has diligently worked on redefining itself, so give to the Society that has, and will continue to, support and lead the way in designs in your industry.

Centralized Training will again be performed this year for Next year's campaign. Region III RP Chairs will be gathering in Chicago on September 13, 2008. Please check this date on your schedules. All '08-'09 Chapter RP Chairs will be required to attend this training. Contact me if this date is a conflict for anyone. For planning purposes, intend on flying into O'Hare on Friday evening; gathering for dinner; staying overnight; and returning home after 5PM Saturday.

Thanks for all your hard work and communication so far! We need to ramp it up now with calling campaigns, going after LYBUNTS and SYBUNTS through March. Last year, Region III finished at 87.2% of the \$175,000 goal. This year, the Region III goal has increased to \$205,000. We need to go after every contribution now! We'll then have the final push in May/June to bring it home and achieve our goals! Let's keep it up, stay focused and spend quality time for ASHRAE and put Region III over the top!

SHOW ME THE MONEY!!!!

Dan *

Society Ballot

Shortly you will be seeing this year's Society Ballot. There are some additional important issues for membership consideration other than the election of our officers for upcoming year. Five questions concerning ASHRAE's position on some important issues raised by a 1999 Membership Petition are being posed to the membership by the board in order to affect clear policies consistent with the views of the membership. I have asked the Chair of the Ad Hoc Committee appointed to "Develop Policy Forming Questions concerning IAQ", Society Vice President Dr. Andy Persily, to provide some pertinent information to assist the members of Region III in considering these policy questions.

Dan Pettway, Region III Director and Regional Chair

2008 Indoor Air Quality Questions to the ASHRAE Membership

Andy Persily, Society Vice President ('08 - '09) (301) 975-6418; andrew.persily@mail.ashrae.org

As part of this spring's membership ballot, in addition to the election of nominees to the Board of Directors, five questions are being sent to the ASHRAE membership for a vote. These questions arise out of the Society Bylaws (section 4.6) that allow the Board of Directors to refer any important question to the membership and then to use the outcome of that vote in guiding the subsequent actions of the board.

See IAQ, page 5

IAQ, from page 4

As many members of ASHRAE may know, a membership petition on ventilation and indoor air quality (IAQ) standards was approved by a vote of the membership in 1999. However, this petition led to many questions and some degree of confusion regarding its meaning and the intent of the members in approving it. Since that time, the Board of Directors and several ad hoc committees have attempted to clarify ASHRAE policy regarding IAQ and ventilation standards and the proper role of health in all our Society activities. These efforts resulted in several board-approved policies as noted below. In order to reduce some of the remaining confusion and to clarify the position of the membership, ASHRAE President Kent Peterson appointed an ad hoc committee in July 2007 with the following charge:

Develop Indoor Air Quality policy-forming questions that can be referred to the Society membership with the 2008 ballot. It is intended that the membership responses will help form ASHRAE's policy on the scope of our current and future indoor air quality and ventilation standards.

The questions being submitted to the membership are the result of this committee's efforts. Late last year the Board of Directors voted to submit these questions to the membership as well as to recommend a vote of yes on all five questions for the reasons noted in the ballot. It is hoped that the outcome of this membership ballot will help resolve much of the current confusion and allow us all to proceed with our important activities in standards, guidance and technology development for better indoor environments in a practical and responsible manner.

The five questions are as follows:

- 1) Should ASHRAE Standards and Guidelines contain health-based limits for pollutant concentrations only when those limits have previously been issued by nationally or internationally recognized health authorities, e.g. U.S. EPA, OSHA or the World Health Organization, and for which standardized measurement methods exist?
- 2) Should ASHRAE Standards and Guidelines be allowed to specify means and methods for limiting the concentrations of pollutants normally considered in the design of HVAC systems, even for pollutants that may not have maximum permissible concentration levels set by a recognized health authority or for which standard measurement methods don't exist?
- 3) Should ASHRAE Standards and Guidelines be precluded from requiring measurement of contaminant or other airborne concentrations or specifying concentration limits that cannot be measured using equipment and procedures in ASHRAE Standard 111, "Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning and Refrigeration Systems," or are not covered by other consensus Methods of Test or are not measurable using equipment that is common in building

- ventilation assessment?
- 4) Should ASHRAE Standards and Guidelines strive to provide health, comfort and/or occupant acceptability consistent with ASHRAE policy?
- 5) Should ASHRAE Standards and Guidelines be permitted to contain factors for use in design calculation, such as mixing efficiencies and air change effectiveness, as long as it is the consensus of the standards writing body that these factors are important to providing acceptable indoor air quality?

If you have any questions on this ballot, you can contact your Region III colleague, Andy Persily at andrew.persily@mail.ashrae.org or at 301 975-6418, who chaired this ad hoc committee.

<u>Current Policies approved by the ASHRAE Board of</u> Directors

1.201.005 Health Impacts of ASHRAE Standards ASHRAE standards shall consider health impacts where appropriate.

1.201.006 Health and Safety Impacts of ASHRAE Publications

Consistent with the ASHRAE' Certificate of Consolidation, Bylaws and Code of Ethics, ASHRAE activities and publications including but not limited to position documents, handbooks, special publications, standards and guidelines, technical and educational programs, and conferences shall consider health and safety impacts, where appropriate. While ASHRAE does not make findings as to the health and safety impacts of environmental exposures, ASHRAE activities and publications where appropriate shall consider and reference findings issued by cognizant organizations with the appropriate scope and expertise.

1.201.004 Policy and Definitions of ASHRAE Standards and Related Documents

- 9. **Indoor Air Quality or Ventilation Standards.** Any existing and all future ASHRAE indoor air quality or ventilation code-intended standards must meet the following requirements:
 - A. The standard shall specify concentration limits of only those specific contaminants for which a nationally or internationally recognized authority has established a maximum permissible concentration limit and for which standardized test procedures have been established. Nationally or internationally recognized authorities and procedures may be those developed by ANSI consensus procedures for private standards-setting organizations, those established by statute or duly adopted regulation issued by federal agencies.
 - B. The standard shall not contain requirements related to contaminants beyond those normally considered

See IAO Page 6

IAQ, from Page 5

- in the design of HVAC systems serving the relevant space type (for example filtration, dehumidification, intake location, and toilet exhausts are normally considered for office spaces).
- C. The standard shall not require the measurement of contaminant concentrations except those that can be measured using standardized test equipment and procedures in accordance with ASHRAE Standard 111 (or its successor) or other appropriate consensus Method of Test, or using equipment normally available in the HVAC&R industry to test-and-balance technicians.
- D. The standard shall not make any claims or guarantees that compliance will provide health, comfort or occupant acceptability, but shall strive for those objectives, consistent with ASHRAE policy.

Andy ❖

The Milton W. Garland/Jose Reig Student Challenge

Charlie Henck

Region III Treasurer ('07 - '09) (443) 224-1602; chenck@wrallp.com

PURPOSE AND IMPLEMENTATION

The purpose of the program is to establish an incentive to attract students and others of the younger generation into the field of HVAC&R engineering with emphasis on "refrigeration".

Chapters and student branches are challenged to create programs and activities that will:

- Attract grade and high school students to consider a career in engineering or engineering-related services.
- 2. Attract students into the field of HVAC&R with an emphasis on refrigeration.

On an annual basis, the chapters and student branches may submit proposals to the executive committee. The deadline for entries shall be December 31 of the applicable society year. The executive committee shall evaluate the proposals made and select the grant recipients by February 1 of the applicable society year. (we are very flexible on the dates.)

The proposals shall include the following information:

- 1. Description of the proposed activity.
- 2. Date of the proposed activity.
- 3. Impact of the proposed activity in attracting students into engineering, particularly HVAC&R with an emphasis on refrigeration.
- 4. Number of students involved.
- 5. Cost of the activity.

Examples of activities include but are not limited to, technical tours, sponsorship of students attendance at

ASHRAE events, technical paper competitions and student design projects.

While there is no specific format for the proposal, one-page summaries are preferred. Each proposal will be judged on the ability to attract students, the number of students involved, and the cost effectiveness of the program.

Charlie *

Student Activities

Paul E. Petrilli, Region III Vice Chairman Student Activities ('05 -'08) (814) 269-9355; petrilli@hflenz.com

Before we know it, golf balls will be filling the air (I know, many of you can do that all year without driving 3 hours)! – We are also reaching the home stretch in the PAOE race. Currently we have had 9 of 12 chapters reporting student activities PAOE points, and 5 chapters have achieved both "Minimum" (300 points) and "PAR" (500 points).

For those of you who have achieved PAR, congratulations! For the rest of you, I will be calling each of you by the middle of March to offer my assistance and helping you finish the year strong.

Chapter Visits

I will be visiting the Pittsburgh and Philadelphia Chapters this spring. The Philadelphia visit will be on April 10 for the Chapter's Scholarship Night. Scheduling for the Pittsburgh meeting is in the works.

New Student Branch

Congratulations to the Pittsburgh Chapter, and chair Dave Meredith on chartering a new ASHRAE student branch at Grove City College in Grove City, Pennsylvania. For those of you who have been involved with chartering a branch, a great deal of effort is involved. The Region salutes you in your efforts.

Paul 🌣

From the ARC

Kevin W. Fallin, ARC Region III Assistant Regional Chair ('07 -'09) (703) 267-9537; kwfallin@ekfox.com

Participation Leads to Personal Development (Printed in ASHRAE Insights December 2007)

The HVAC&R Industries top employers demand continuous improvement in the skill sets of their employees. While

technical skills are highly important, business acumen and leadership skills are essential to distinguish a professional in today's competitive marketplace and advance personal goals. ASHRAE has long provided its members with the opportunity to serve the HVAC&R Industry and improve the built environment, while building their skills and capabilities.

When serving as an ASHRAE volunteer at the local or Society level and participating in the many activities available, you are gaining valuable leadership skills including: teamwork, public speaking, report preparation, consensus building, effective communication, organizational skills, emotional intelligence, and problem solving skills.

In addition to increasing your business acumen and soft skills, you will have the opportunity to build your technical skills through the many seminars, forums, and continuing education courses offered at the winter and annual meetings.

ASHRAE participation also allows you to focus on areas of personal interest, whether serving on grassroots committees, technical committees, or standard project committees in such areas as HVAC&R design, systems applications, sustainability, energy efficiency, commissioning, and operation and maintenance are but a few of the many areas of interest available.

While helping to improve the world in which we live, you are also establishing long lasting friendships, and expanding your network of knowledgeable professionals.

The social interactions are part of what makes participation in ASHRAE so fulfilling. Your network provides a valuable resource to discuss business issues, and provide the answers to technical questions. With a few phone calls to your network of fellow ASHRAE volunteers, you have the answers you need, and a satisfied client.

Your ability to harness what you have learned while serving as an ASHRAE volunteer will distinguish you from your colleagues, and expand your network of professional contacts and friends. Why be viewed as one of many, when you can be one of few. Make the most of your career, and become a leader in the HVAC&R Industry, through active participation in ASHRAE.

Kevin �

Regional Historian

Carl Courtney Regional Historian 2007-2008 (717) 737-9901; Courtneyjr@aol.com

"We have to, as a nation, exercise foresight...and if we do not exercise that foresight, dark will be the future!" ... President Theodore Roosevelt (May, 1908)

Almost 100 years ago, Theodore Roosevelt hosted the <u>first</u> Governors' Conservation Conference at the White House. It is hard to believe today that his words could be so prophetic. All matters covered in this article are based on the biographical book "Theodore Rex" by Edmund Morris. The notable thing about this conference was that it was unprecedented. No such meeting had ever taken place in any nation on the face of the earth. Some 360 people were invited, including 45 state and territorial executives, the Cabinet, the Supreme Court, members of Congress and representatives of 68 professional societies. One seat was even assigned to the woman president of the General Federation of Woman's Clubs.

They came at the President's request for a 3-day meeting to discuss the conservation and wise use of the natural resources of the United States, including our energy policy. The attendees' duty was to formulate a national philosophy of conservation. This was to include not only National parks, waterways and forests, but also our mineral resources and farmlands. This meeting resulted in the creation of a National Conservation Commission, chaired by none other than Gifford Pinchot (later to become the Governor of PA). Thus, the Grand Canvon was made into a National Park and protected from the mining interests for future generations to appreciate. This was only the beginning. We added 13 new national forests and 20 new federal irrigation projects. The list of projects became extensive. More importantly, "Conservation" became a part of the American consciousness. It was a start, but you ask, what has this to do with ASHRAE?

Those of us who attended the 2007 Region III CRC heard Terry Townsend speak passionately about this very subject – sustainability. It was clear from his talk that ASHRAE is serious about energy conservation. The increased burning of fossil fuels, including the new biofuels, only adds to the carbon dioxide burden that our atmosphere must absorb. Therefore, it is obvious that the conservation of energy becomes one of the partial solutions to the problem. Energy saved is energy earned. We, as ASHRAE members, have been schooled in the methods and techniques of saving energy in our new and existing buildings. We owe it to future generations to exercise our skills to the utmost to achieve the goals that were set forth so long ago and reinterpreted more recently.

We must encourage our clients to invest in measures that lead to the efficient use of our resources. We must use our ingenuity as engineers to help alleviate the onrushing energy crisis. In 2108, will the day be dark or light? It could depend on the small decisions we make today.

Carl 🌣