



American Society of Heating, Refrigerating & Air Conditioning Engineers, Inc.

The Hot Air Recorder

The Houston Chapter

Golden Gavel '72-'73 James Beach
'12-'13 Alan Neely

Jack Thompson Award '10-'11 Keith Reihl
'12-'13 Alan Neely

President's Message



Wow, time continues to move faster and faster. I always say that work and children accelerate your life somehow. Last week I celebrated my last day in the 30's (Ok I turned 40!). As I looked back on my 30's, I realized just how precious that time was.

Holiday season is upon us and I hope everyone had the same food hangover I did for Thanksgiving. Black Friday, Cyber Monday, etc. it appears the retailers have taken over the true meaning of Thanksgiving. I've been told over and over again that the best way to show love in your family is by giving them our "T-I-M-E". From all of us on the ASHRAE board, we sincerely hope you got to spend quality time with your family.

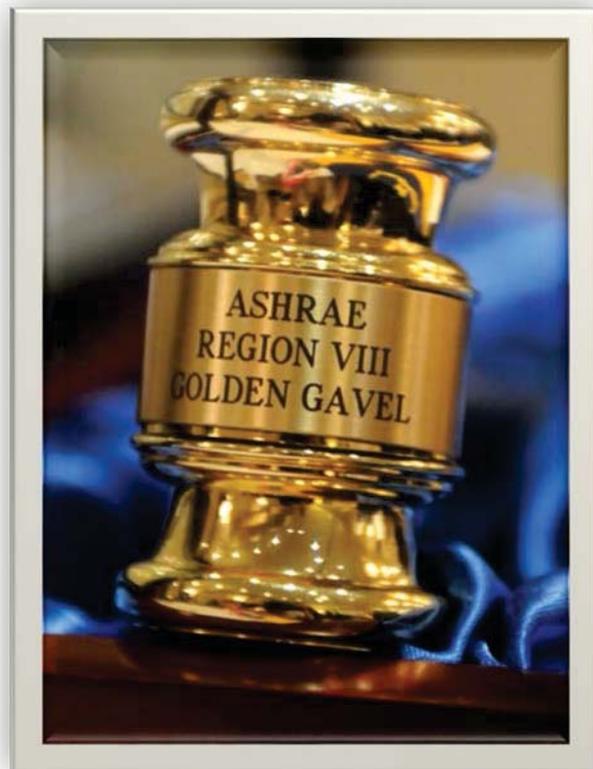
Well, we have an interesting spring semester on tap for 2014. For those of us that joined us at donor recognition night to end 2013, thank you very much. Our past president's night will kick off at 6 p.m. January 15th and we are sure to have a great turnout. Our speaker from UH will be sure to raise some eyebrows. Don't forget about the ASHRAE/AHRI show in New York City the following week (January 20-23rd). Get on your ski jacket and come join us at the EXPO. The ASHRAE Houston crowd always finds time for a soft adult beverage or two.

The first four meetings of our year were very well attended and we definitely appreciate all the effort the board and the committees put into the ASHRAE chapter. Please join us this spring as we have even more great technical/industry topics that are entertaining and enlightening. As I have said before, the Houston chapter is considered to be one of the most successful chapters in the world.

Have a wonderful holiday season and look forward to seeing everyone at past president's night. Be on the lookout for table and event sponsorship opportunities.

Sincerely

Mike Donovan / 2013-2014 President



This Month's Meeting

ASHRAE January Meeting
Wednesday, January 15th, 2013
6:00 PM - 9:00 PM
HESS Building
5430 Westheimer Road
Houston, TX 77056
<http://www.hessclub.com/>

Past Presidents Night
EVENING MEETING

TOPIC: Global Warming – Distinguishing The Truth From The Lies

Costs:

Members: \$50

Non-members: \$50

Consulting Engineers Express Members: \$50

Regular Express Members: Free



Biography Of Larry Bell

Larry Bell is a Professor and Endowed Professor at the University of Houston where he directs the Sasakawa International Center for Space Architecture and heads the Graduate Program in Space Architecture. Larry is also a twice-weekly Op/Ed contributor to Forbes.com, and a regular Op/Ed contributor to Newsmax.com. His book "Climate of Corruption: Politics and Power Behind the Global Warming Hoax" is available on Amazon and Kindle.

Larry makes frequent guest radio interview appearances on a wide variety of topics addressed in his articles. He and his professional aerospace work have been featured in leading magazines and media news networks throughout the world, including the History Channel (Modern Marvels Series), the Discovery Channel-Canada (Daily Planet Series), NASA Select, PBS, ABC TV: Australia, the BBC TV World Business Report, the National TV Network of Italy, the Swedish Educational Network, the NEC TV Broadcast Network-Japan, Radio Moscow, and the National Geographic TV-UK.

Larry has received prestigious honors from international space organizations. Among those are the Space Pioneer Award from the Kyushu Sanyu University in Japan, and two of the highest honors awarded by the Federation of Astronautics and Cosmonautics of the Former Soviet Union - the Yuri Gagarin Diploma and the Konstantin Tsiolkovsky Gold Medal - for his contributions to international space development. His name was placed on the Russian Rocket that launched the first crew to the International Space Station.

Meeting Minutes

ASHRAE

Technology for a Better Environment

REGION VIII HOUSTON CHAPTER MEETING MINUTES

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

ASHRAE Vision: 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.

In Attendance (Meeting Held at HESS Club , Houston Texas 11/20/13)

Mike Donovan / President / HTS Texas
Michael Langton P.E / Vice President / HTS Texas
Kimberly Thompson P.E./ Treasurer / HTS Texas
Bill Chalmers P.E. / Secretary / Johnson Controls
Alan Neely / Past President 2012-2013 / Pittsburgh Corning Insulation
Kenneth Shifflett P.E. / Student Activities / Distribaire, Inc.
Brian Dunne P.E. / Sustainability / TD Engineers
Kurt McCulloch / Membership / The Hunton Group

Time Called to Order 10:10 am / Time Called to End 11:03 am

Mike Donovan / President:

- Reviewed today's meeting logistics
 - Requested names of golf tournament sponsors needing recognition
 - Table top is Daiken
- Sending a letter in the newsletter encouraging people to pay local dues.
- Encouraged people to review their PAOE points. Goal is for everyone to meet the minimum requirements.
- Expressed concern about research contributions throughout the fall, growing the ASHRAE Houston endowment and how the money is contributed to Society. Companies who contribute must be credited for Society recognition. Tasked Michael to organize the contributions.

Elliot Millican P.E. / President-Elect:

- Elliot was unable to attend, but he sent the following message:
Here's the CTTC (Chapter Technology Transfer Chair) Update, as I will not make it to this week's meeting:
 - Past President's Night is on January 15 – I am booking a UH professor named Larry Bell. He is in the College of Architecture and has written a book called "Climate of Corruption: Politics and Power behind the Global Warming Hoax." I figured this could be a hit, and Global Warming was one of the potential topics mentioned in our July planning session for PPN. I am in the process of collecting his picture and bio. Once received I will post to website.
 - Feb 19 Lunch Meeting – Dr. Ray James from Texas A&M to give our Ethics Presentation, based on case studies from the two Space Shuttle losses.
 - March – Student night at St. Arnolds. I still need to plan this with Kenneth.

- April Meeting – Considering a Panel discussion on Commissioning. Given the huge success of our panel discussions earlier this year, I think another in the spring is a no-brainer. Give me your thoughts on these potential panelists and please make other suggestions. This is a breakfast meeting.
 - Gaylon Richardson (to offer contractor's perspective).
 - Jim Thornton (to offer commissioning agent's perspective).
 - An Owner's Rep? Tim Peglow or Charles Rightmer were recommended
 - An Engineer?
 - Mike recommended Sonny Vidovic
- May Meeting – Three topics that came up in our July planning session are ASHRAE170 (Ventilation of Healthcare Facilities), NFPA, and SMACNA. Which of these should I pursue? The board focused on ASHRAE170 Kenneth is a recommended speaker. ASHRAE has a distinguished lecturer who can also speak to the topic.
- I still need to get with Mike Langton on the Code Seminar in April. Has a date been set at Centerpoint?

○

Michael Langton P.E. / Vice President:

- CenterPoint charges for the use of their conference center. Board approved the expenditure.
- Reviewed logistical issues associated with the golf tournament. Complimented Longwood for making the event a success. Invited people to email thoughts about ways of improving the event. Mike expressed concern about everyone paying. Michael is certain everyone paid.
- Mike wants assurance that Michael is hitting the goals for achieving PAOE points.

Kimberly Thompson P.E. / Treasurer:

- Received the bill for the golf tournament and the directory. The chapter has ample money to cover payables.

Bill Chalmers P.E. / Secretary:

- Reviewed notes from board members who could not attend.

Kenneth Shifflett P.E. / Student Activities:

- Reminded Mike about getting TAMU students to join chapter.
- Mike wants to sell booth space at student night. The booths are for a career fair. Twelve booths would be ideal. Kenneth is preparing a flyer. Mike is asking Mike Vaughn from Vaughn construction to speak about the Kyle Field redevelopment.

Alan Neely / Past President:

- Alan is nominating Bruce Flaniken for ASHRAE fellow.

Brian Dunne P.E. / James Principe P.E. / Sustainability:

- Sending sustainability articles to John Walik

Kurt McCulloch / Membership:

- ASHRAE has 900 local Society members, 700 of whom are local members. Kurt reminds the non-chapter members to join. Student members are notorious for not paying chapter dues, even though it is very inexpensive.
- Submitted report to John Walik. Two new members this month. Kenneth asked if Kurt is receiving the same emails he gets. It seems they are getting different information. Kenneth and Kurt are reconciling this issue.

- Kimberly requested the exact number of Houston society and chapter members because she must submit \$3 per member to society. The payment was not made last year. Discussion ensued and it was decided that it must be paid.

Brennan Vierra / Cory Detten P.E. / YEA:

- Tyler Herring participated in the leadership weekend.

David Schurk / PAOE Administrator:

- David distributed the current PAOE summary sheets.

John Walik / BOG / Editor / Webmaster:

- John was unable to attend and sent the following report:
 - December 9th COB is the HAR Deadline.
 - The Dec 5th Donor recognition night announcement was added to the calendar and being emailed.

Last Month's Meeting



Mike Mabry (r) of Spirax Sarco standing with Mike Donovan (2013-2014 President). November's meeting was on the Do's and Don'ts of Steam Design and Major Markets for Steam in the Houston Market.

TableTop Sponsor

The ASHRAE Houston Chapter gratefully
acknowledges our November 2013
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Plumbing:

- Junior + Senior Plumbing Designer - Designers create plumbing system drawings using Revit and AutoCAD and is responsible for the design of portions of the systems under the direction of senior staff. High degree of Revit proficiency required.

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Texan's Involvement with Refrigeration Equipment

Texas engineers did much of the early experimental work in the development of commercial refrigeration in the United States, although it was from Europeans (notably Scots, English, and French) that their theories were obtained. The development of mass production of artificial ice was pioneered in Texas and Louisiana. The most interesting refrigeration history related to Texas dates from 1861 to 1885. When the natural ice supply from the North was cut off by the Civil War, men of ingenuity in Texas and Louisiana came forth with inventiveness in mechanical ice making and food preservation. During the war a Ferdinand Carré absorption machine, which had been patented in France in 1859 and in the United States in 1860, was shipped through the Union blockade into Mexico and eventually to Texas, where it was in operation in San Antonio and later in Austin and San Saba. The Carré machine used a mixture of ammonia and water as a refrigerant. Around 1865 Daniel Livingston Holden installed a Carré machine in San Antonio and made several improvements on it. He equipped the machine with steam coils and used distilled water to produce clear ice. By 1867 three companies were manufacturing artificial ice in San Antonio. At that time there were only five other ice plants in the entire United States. About 1866 or 1867 Holden acquired the Peter Henri Van der Weyde compression patent, which used petroleum ether and naphtha as refrigerants, and in 1869 Holden took out a patent on his own designs. That year he also partially supervised the installation of a sixty-ton-capacity Carré plant in New Orleans. He extended his activities across Texas and into Louisiana and the South.

After the Civil War the expanding Texas beef industry encouraged and financed the development of the mechanical cold process. Andrew Muhl of San Antonio, in partnership with a man named Paggi, built an ice-making machine there in 1867 before moving it to Waco in 1871. Development of mechanical refrigeration for the Texas meat industry began in the late 1860s in Dallas with Thaddeus S. C. Lowe's carbon dioxide machines, which had been used to inflate the balloons he had constructed for military purposes. Using dry ice made with carbon dioxide compressors, Lowe designed a refrigerated ship, the *William Tabor*, in 1868, in competition with Henry Peyton Howard of San Antonio, to carry chilled and frozen beef to New Orleans. Howard's steamship *Agnes* was fitted with a cold-storage room, twenty-five by fifty feet in size. Because the *William Tabor* drew too much water to dock in New Orleans harbor, Howard's ship was the first to ship beef successfully by refrigerated boat. Upon the shipment's arrival, Howard threw a banquet at the St. Charles Hotel in New Orleans in July 1869 and presented his transported beef to prominent diners. Because Lowe failed to accomplish his feat, he did not receive the proper credit for his attempt; however, the singular accomplishment of a refrigerator ship established the compressor process of refrigeration for ships delivering meat to New York and Europe. Carbon dioxide is nontoxic and nonflammable, and its use as a refrigerant was employed in marine service well into the twentieth century.

Between 1871 and 1881 the first mechanically refrigerated abattoir in the United States was planned, established, and successfully operated in Fulton, Texas, for the purpose of chilling and curing beef for shipment to Liverpool, England, and other destinations. Daniel Livingston Holden, his brother Elbridge, and Elbridge Holden's father-in-law, George W. Fulton, took part in the development of this new process of beef packing and shipping. Thomas L. Rankin, of Dallas and Denison, held many patents in the area of refrigeration and had been involved in refrigeration work with Daniel Holden. From 1870 to 1877 Rankin worked on the development of refrigerator and abattoir service for rail shipping of refrigerated beef from Texas and the Great

Texan's Involvement with Refrigeration Equipment

Plains. In late 1873 the Texas and Atlantic Refrigeration Company of Denison made the first successful rail shipment of chilled beef across the country from Texas to New York. The development made by Rankin and his Texas associates spread rapidly to other beef-shipping centers of the nation.

The birthplace of ammonia-compression refrigeration in the United States is Jefferson, Texas, where David Boyle, in 1873, established his first ammonia-compression plant in a lean-to off a lumber mill. Improvements made during the winter of 1873–74 resulted in a high-grade production that attracted national attention. When his machine was destroyed by fire in 1874, Boyle left Texas and went to Illinois. He eventually made an arrangement with Richard T. Crane of Crane and Company of Chicago to manufacture his compression machines. The first two machines produced were bought by the Capitol Ice Company of Austin and by Richard King, who wanted to experiment with meat refrigeration on the King Ranch. In 1878 Charles J. Bell installed the first absorption ice machine at Sherman, Texas.

Another early worker in the development of ice-making machinery was Charles A. Zilker of San Antonio and Austin. After coming to Austin from Indiana in 1880, he worked in an ice plant that had been using a Carré machine brought from San Antonio. In 1882 King asked Zilker and his brother Andrew J. to go to Brownsville and operate a Boyle ammonia-compression machine at an ice plant that King had bought in 1876. Zilker returned to Austin in 1884, built his own plant, and continued improving and designing compressor-type ice-making machinery. In business with George W. Brackenridge, a San Antonio banker, Zilker established ice plants in Austin and San Antonio. After that he built plants in any city where he could find enough prosperous people and sufficient cooling water for compressors. In 1928 he sold his ice plants (which ranged from Texas eastward to Atlanta and northward to Pittsburgh) to the Samuel Insull interests, Chicago, for \$1 million.

In the latter part of the nineteenth century natural ice was shipped by rail from the North in refrigerated cars. Fruit and vegetable production in Texas greatly expanded after the turn of the century, and the refrigerator car was used effectively in transporting perishable foods to cities outside the state.

By 1900 there were 766 ice plants in the United States, and Texas, with 77, had more than any other state. In 1900 ice plants still generally used the aqua-ammonia cooling method. Innovations in these systems included more efficient high-speed engine drives for ammonia compressors and subsequently electric motor drives. During the twentieth century the move to liquid-vapor compression systems made for lower costs. Ammonia was still widely used in industrial refrigeration. Beginning in the 1920s there was a gradual decline in commercial ice houses and a greater use of home refrigerators, especially with the extension of rural electrification after World War II. In 1950 close to 90 percent of Texas families had some type of refrigeration. In the 1960s the growing use of automatic refrigerated vending machines, automatic ice vendors, and ice machines in restaurants was replacing many commercial ice plants. After World War II chlorofluorocarbons (CFCs), nontoxic and nonflammable, replaced many other coolants as the preferred means of cooling. CFC refrigerants were known under the trade name Freon.

Texan's Involvement with Refrigeration Equipment

Two of the most important Texas industries, fish and poultry processing plants, were highly dependent on refrigeration. By the late 1960s the state had thirty-six plants processing frozen fish and shrimp; in 1967 there were sixty-seven poultry-processing firms in the state. Texas industry also contributed greatly to the manufacture of refrigerants and refrigerating equipment. Among the products made in Texas were dry ice, industrial ice boxes, ice-making machinery, industrial ice-crushing machinery, household refrigerators, air-conditioning units, both commercial and domestic, and air-conditioner parts. Approximately 200 ice-manufacturing plants were still operating in Texas in 1967. Instead of supplying ice to homes, as in the past, these plants provided ice for leisure-time activities and for various commercial operations.

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The following, adapted from the *Chicago Manual of Style*, 15th edition, is the preferred citation for this article. Citation

Willis R. Woolrich and Charles T. Clark, "REFRIGERATION," *Handbook of Texas Online* accessed February 16, 2013. Published by the Texas State Historical Association.

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Saturday, Jan 18 – 8:00 a.m. to 3:00 p.m.

Healthcare Facilities: Best Practice Design & Applications

Saturday, Jan 18 – 8:00 a.m. to 3:00 p.m.

Significant Changes to Standard 90.1-2010 and IECC-2012 **NEW!**

Tuesday, Jan 21 – 9:00 a.m. to 4:00 p.m.

Energy Modeling Best Practices and Applications

Tuesday, Jan 21 – 9:00 a.m. to 4:00 p.m.

Effective Energy Management in New and Existing Buildings

Wednesday, Jan 22 – 9:00 a.m. to 4:00 p.m.

Operations and Maintenance of High-Performance Buildings

Thursday, Jan 23 – 8:00 a.m. to 3:00 p.m.

Complying with Standard 90.1-2013 **NEW!**

Thursday, Jan 23 – 8:00 a.m. to 3:00 p.m.

Introduction to Building Enclosure Commissioning **NEW!**

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Electric Rates, Rules and Regulations **NEW!**

Saturday, Jan 18 – 12:00 p.m. to 3:00 p.m.

Laboratory Design: The Basics and Beyond

Sunday, Jan 19 – 2:00 p.m. to 5:00 p.m.

Air-to-Air Energy Recovery Applications: Best Practices

Sunday, Jan 19 – 2:00 p.m. to 5:00 p.m.

Mathematical Optimization Techniques and their Applications: to HVAC&R Systems and Components

Sunday, Jan 19 – 2:00 p.m. to 5:00 p.m.

Combined Heat & Power: Design through Operations

Monday, Jan 20 – 8:30 a.m. to 11:30 a.m.

High-Performance Building Design: Applications and Future Trends

Monday, Jan 20 – 8:30 a.m. to 11:30 a.m.

IAQ Best Practices for Design, Construction and Commissioning **NEW!**

Monday, Jan 20 – 8:30 a.m. to 11:30 a.m.

Commissioning for High-Performance Buildings

Monday, Jan 20 – 2:45 p.m. to 5:45 p.m.

Designing High-Performance Healthcare Facilities **NEW!**

Monday, Jan 20 – 2:45 p.m. to 5:45 p.m.

Exceeding Standard 90.1-2013 to Meet LEED® Requirements **NEW!**

Monday, Jan 20 – 2:45 p.m. to 5:45 p.m.

Data Center Energy Efficiency

Tuesday, Jan 21 – 1:00 p.m. to 4:00 p.m.

Fundamentals and Applications of Standard 55 **NEW!**

Tuesday, Jan 21 – 1:00 p.m. to 4:00 p.m.

Design of Commercial Ground Source Heat Pumps **NEW!**

Tuesday, Jan 21 – 1:00 p.m. to 4:00 p.m.

Applications of Standard 62.1-2013: Multiple Spaces Equations and Spreadsheets **NEW!**

Wednesday, Jan 22 – 9:00 a.m. to 12:00 p.m.

Troubleshooting Humidity Control Problems

Wednesday, Jan 22 – 1:00 p.m. to 4:00 p.m.

HVAC Design Training

March 17 – 19, 2014 --- Level I - Essentials --- Atlanta, GA and Toronto, Canada

March 20 – 21, 2014 --- Level II - Applications --- Atlanta, GA

HVAC Design: Level I – Essentials - Registration is \$1,239, \$989 (ASHRAE Member)

Gain practical skills and knowledge in designing, installing and maintaining HVAC systems that can be put to immediate use. The training provides real-world examples of HVAC systems, including calculations of heating and cooling loads, ventilation and diffuser selection using the newly renovated ASHRAE Headquarters building as a living lab.

HVAC Design: Level II – Applications - Registration is \$829, \$679 (ASHRAE Member)

In two days, gain an in-depth look into *Standards 55, 62.1, 90.1, and 189.1* and the *Advanced Energy Design Guides*. Training will focus on a range of topics including: HVAC equipment and systems; energy modeling; designing mechanical spaces; designing a chiller plant; and BAS controls.

Visit www.ashrae.org/hvacdesign to register

ASHRAE Certification Programs

Receive the recognition you deserve by earning an ASHRAE Certification at the 2014 ASHRAE Winter Conference and AHR Expo.

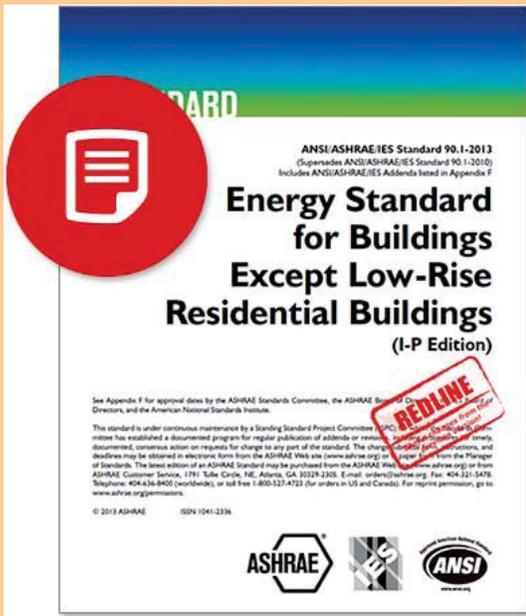
Take advantage of ASHRAE's special administration of the certification examinations on January 23, 2014. All exams will begin at 9:00 a.m. (candidates must report to the testing room at 8:30 a.m.). These exams are being offered in conjunction with the 2014 ASHRAE Winter Conference and AHR Expo in New York City. Refresh your knowledge in preparation of earning an ASHRAE certification with learning opportunities at the show and conference.



For more information, visit www.ashrae.org/NYCExams

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CATEE 2013

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Policy Updates | Practical Implementation Ideas | Statewide Peer Networking | New Resources

December 16-18, 2013

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The Clean Air Through Energy Efficiency (CATEE) Conference is a premiere educational conference and business exhibition connecting public and private decision makers and thought leaders. Join us for a collaboration focused on effective problem solving related to the energy and water intensity of the built environment and the reduction of related emissions.

CATEE draws a diverse audience of public and private organizations as well as individuals responsible for designing, constructing or operating buildings; regulating the built environment; and making policy decisions effecting budgets, programs or resources available for improving energy efficiency or implementing renewable energy applications.

Co-hosted by the Energy Systems Laboratory of the Texas A&M Engineering Experiment Station and the Texas Chapters of the U.S. Green Building Council.

December 16 | Pre-Conference Workshops

(Earn GBCI LEED-specific CEUs and AIA LUs)

- 8:00 – 12:00 LEED v4
- 1:00 – 5:00 Existing Building Operations & Maintenance
- 1:00 – 5:00 School Energy Management

December 17-18 | Plenaries, Concurrent Sessions, Building Tour and Awards Luncheon

Green building-related sessions focus on residential energy performance, green schools, commercial green building performance and modeling, and data-driven design tools. Additional sessions topics include Implementing PACE in Texas, Alternative Financing for Energy Efficiency, Advancing Energy Codes, Energy/Water Nexus, and many more!

(Most sessions will earn AIA LUs and GBCI CEUs, some LEED-specific -- As many as 15 GBCI and AIA credits expected)

Confirmed Plenary Speakers

- **The Honorable Bill Ritter**, former Governor of Colorado and Director of the Center for the New Energy Economy
- **Greg Aliff**, Vice Chairman and Senior Partner, Energy & Resources, Deloitte LLP
- **Dub Taylor**, Director, State Energy Conservation Office

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TEXAS CHAPTERS
Central Texas - Balcones
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Texas Gulf Coast

Membership

The American Society of Heating, Refrigerating and Air-Conditioning Engineers advances the arts and sciences of heating, ventilation, air conditioning and refrigeration to serve humanity and promote a sustainable world. Membership is open to any person associated with the field including indoor air quality, building design and operation, and environmental control for food processing and industry.

Membership in ASHRAE allows access to information about state-of-the-art HVAC&R technology and provides many opportunities to participate in the development of that technology. Participation is available locally, through chapters, and through membership on Society committees, such as standards projects committees, which are responsible for the development of standards, and technical committees which advise the Society on research needs, emerging technologies, and technical matters.

To join renew or update your membership go to <https://www.ashrae.org/> and look for the Membership Tab on the top right side of the page.

New ASHRAE Houston Members for the November HAR Issue:

Submitted by Kurt McCulloch – Membership Chairman

Name	Company Or School	Member Or Student
Holly Green	Hunton Services	M
Samantha Rusek		S

Student Activities

ASHRAE Student Activities Update 12/04/2013

Submitted by Kenneth Shifflett, P.E. / Student Activities Chair

March 19th, 2014 is student night at St. Arnold's Brewery. This year we will be having a career fair as part of the activities as well. Details are still in the works.

The primary goal of ASHRAE student activities this year is to further promote ASHRAE and STEM to K-12, if you have any interest in participating or know of contacts to set up presentations, please let me know.

Engineering Week is February 17-21 and another area to focus efforts to speak to K-12 during that time as well.

The Texas A&M Chapter is doing well and we look forward to another great year supporting them also.

As in years past my ongoing efforts will be to grow student interest in ASHRAE within the local colleges (University of Houston, Rice, LoneStar college, ect..) and increase chapter participation of K-12 activities and involvement in Engineers Week. If anyone has contact information for potential interest or involvement, please email me at kshifflett@distribaire.com.

ANSI/ASHRAE/USGBC/IES Standard 189.1-2011: Standard for the Design of High Performance, Green Buildings Except Low-Rise Residential Buildings – Site Sustainability

Submitted By Keagen Cothorn and Brian Dunne

Getting back to our earlier intention of summarizing the major categories within ANSI/ASHRAE/USGBC/IES Standard 189.1-2011 “Standard for the Design of High-Performance Green Buildings” (or just 189.1 to save ink) this month we are going to talk about Section 5: Site Sustainability. As previously noted the requirements of this section are meant to address environmental impacts associated with selection and development of a building site. Things like undeveloped vs. previously developed sites, light pollution, heat island effect, storm water run-off, etc. The location of a building and decision made during site development play an important role in how sustainable it can be.

An energy efficient and environmentally responsible building starts at the bottom: the site. Site sustainability provides a compliance path that reduces the environmental impact caused by a building, focusing on issues pertaining to the building site. Buildings will often disrupt the local habitat, increase erosive effects, and increase the urban heat island effect. Site sustainability moves to reduce the environmental impact a building will have on the environment by choosing a building site that is conducive to reducing impact, mitigating the heat island effect, reducing lighting pollution, eliminating invasive plant species, ensuring that the building has immediate pedestrian access to a public way or transit stop, and by either maintaining local vegetation or by managing rainfall through infiltration, reuse, or evapotranspiration (ET).

Mandatory Provisions are those that apply to any project looking to comply with 189.1. They include:

Section 5.3.1 “Site Selection”; focuses on picking a building site that will help minimize development of previously undeveloped land. Buildings may be built inside an existing building envelope, on greyfield sites, or on brownfield sites and may also be built on greenfield sites that meet certain requirements. A building may be built on a greenfield site if it is within ½ mile of: residential land with 10 units per acre density, 10 or more

basic services with pedestrian access between the building and the services, or an existing or funded commuter train or light rail. The building may also be built if it is within ¼ mile of adequate transit service. If the building is to be built on agricultural, forest, or park land it may be built as long as the building's purpose is related to the land's use. In addition to those requirements, there are a few sites expressly prohibited by 189.1. No development is allowed in undeveloped land under 5 feet above the elevation of the 100 year flood except in cases of "AO" designated zones. In these zones, development will be allowed along with proper engineered flood-proofing. Additionally, no development is allowed within 150 feet of any fish and wildlife habitat conservation area or within 100 feet of any wetlands unless the development involves enhancing the habitat of the area it is in close proximity to. A low-impact trail is allowed to be within 15 feet of a wildlife habitat area.

Section 5.3.2 "Mitigation of Heat Island Effect" includes various strategies and materials implemented to increase reflection and decrease absorption of the sun's radiation into the building and its various hardscapes. Hardscapes must be provided with at least 50% shading by vegetation or structures, or alternatively paving with materials having a solar reflective index (SRI) of at least 29. Shade coverage is calculated based on the mean shade value at 10 am, noon, and 3 pm on the summer solstice. Climate zones 6, 7, and 8 are exempt from this hardscape shading requirement (Houston is climate zone 2). Building walls on the east and west must be shaded 30% up to a height of 20 feet above grade. Shade is to be calculated at 10 am for the east walls and 3 pm for the west. If 75% of the opaque surface of the east and/or west sides of the building are at least 29 SRI, it is exempt from the wall shading requirements. East wall shading is not required for climate zones 5 through 8 and west wall shading is not required for 7 and 8. Roof requirements apply for climate zones 1 through 3. 75% of the roof that is not in use for building systems must either have a minimum SRI of 78 for low sloped roof and 29 for steep slope roofs or comply with the Energy Star program requirements for roof products. Roofs covering parking garages are not required to comply. Proposed roofs can be exempt by showing through energy analysis and calculations in accordance with sections 7.5.2 and 7.5.3 that they provide a minimum of 2% less energy cost and total CO²e than a roof complying with the requirements in this section 5.3.2.3.

Section 5.3.1 "Reduction of Light Pollution" includes requirements that eliminate excessive lighting that pollutes the surroundings as well as wastes energy. Lighting pollution is defined in three ways according to 189.1: backlight, glare, and uplight. Backlight is a measure of light that is going past its useful purpose and becoming a

nuisance to other areas. Glare is how the light is negatively affecting human eyes. Uplight is light that is projected into the night sky, brightening it. Tables relating the exterior lighting level of the surroundings to the allowable backlight, glare, and uplight useful for determining the requirements for a specific building are found within the standard. When the area surrounding a building has less ambient lighting, the building will be required to comply with more strict light pollution standards. The reverse can be said for a building in an urban area with significant ambient lighting. Various exceptions are noted in the standard for safety, decorating, and recreational reasons.

Section 5.3.4 “Plants” helps maintain the natural ecology of the building site by required the disposal or destruction of all invasive plants on site. Section 5.3.5 “Mitigation of Transportation Impacts” ensures pedestrians have easy access to the building and that occupants of the building have easy access to public transportation by requiring each primary building entrance to extend a pedestrian walkway to a public walkway or a transit stop.

Prescriptive and Performance Options are either/or options that the project team can choose between. One or the other path must be selected, but the project teams can chose which based on individual project goals.

Section 5.4 “Prescriptive Option” has two requirements relating to the vegetation of the site.

The first requires that 40% of the entire site incorporates one or any combination of the following techniques: Vegetation of a minimum 12 inch deep growing medium, vegetative “green” roof, porous pavers, permeable pavement or pavers with a minimum percolation rate of two gal/min* ft^2 . Several exceptions are available for buildings wanting to utilize pervious surfaces and rainwater collection, as well as buildings built on brownfield sites where contaminants are left from previous use. Areas receiving less than 10 inches of water per year are exempt.

The second is that when a building site is located on a greenfield, there is a requirement that depends on the percent of the site covered in native or adapted plant life. If a predevelopment site has 20% or more area covered, 20% or more of the area must be retained for the native of adapted plants. If a site has 20% or less plant coverage, 20% of the site must be retained or developed as a vegetated area. Areas receiving less than 10 inches of water per year are exempt if they contain less than 20% plant coverage.

Section 5.5 “Performance Option” is intended as an alternative method to demonstrate site characteristics that meet or exceed the 189.1 requirements for projects that would not meet the prescriptive option. A certain percentage of yearly rainfall must be managed using infiltration, reuse, or ET depending on the site that the building is built upon. A building that is within another building envelope must manage a minimum of 20% of the average annual rainfall of the development footprint. If the building is built upon a grey or brownfield site, 40% must be managed. For all other sites, 50% minimum must be managed through infiltration, reuse, or ET.

Please note that there are exceptions and details associated with each category and option that we don’t have room to talk about here. But we hope to give a general outline of the requirements within 189.1 so that our readers will have a feel for the requirements if their clients ask about it. If interest is strong we may address specific topics in more detail or attempt a side by side comparison between 189.1 and LEED. Next month we plan on talking about Section 6: Water Use Efficiency.



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