

Modeling a Sustainable World

2010–11 ASHRAE Annual Report



American Society of Heating, Refrigerating
and Air-Conditioning Engineers Inc.



Editors Note: In the final stages of production of this Annual Report, ASHRAE 2010-11 President Lynn G. Bellenger passed away on Oct. 19.

The report contains a message written by President Bellenger shortly before her death. In honor of her legacy and contributions to the Society, the message is being included in this report. ASHRAE feels the membership would appreciate reading this inspirational message from her.

The following announcement was made by ASHRAE in regard to Presidential Member Bellenger's death.

ASHRAE Presidential Member Bellenger Remembered

ATLANTA — Immediate past ASHRAE President Lynn G. Bellenger, who served as the first woman president in the Society's 116 year history, passed away Wednesday, Oct. 19, 2011. She was president for the 2010-11 Society year, with her term ending in June 2011.

Bellenger, P.E., Fellow ASHRAE, was a recognized expert in energy management, with a strong focus on the need for energy modeling to help create and refine more efficient buildings. She was a partner, Pathfinder Engineers & Architects, Rochester, N.Y.

"We at ASHRAE are greatly saddened by the death of our former president and our friend," Ron Jarnagin, ASHRAE president, said. "Her lifelong passion for engineering excellence resonated within our membership and our industry, inspiring us through her belief that engineers will lead an energy revolution with innovation. Through her service, she showed that there is a path available to all who wish to extend the influence of engineering principles to better serve the world we live in."

As ASHRAE president, Bellenger focused on Modeling a Sustainable World, sharing her thoughts about the role of modeling tools and how all involved in the built environment industry must come together to take advantage of "the rich opportunities for optimizing building performance through a collaborative approach from the beginning."

In an interview last year, Bellenger talked about her involvement in energy efficiency and how much has been put in recent years on the need to save energy.

"One of the cool things about the sustainability movement is that it has ignited a passion in people that is changing the world. That passion has brought a sense of energy and excitement to the industry and attracted people who are committed to designing and operating sustainable buildings. I don't see that changing in the future."

Bellenger is a recipient of an ASHRAE Exceptional Service Award, a Distinguished Service Award, two first-place ASHRAE Technology Awards and the Lincoln Bouillon Membership Award.

She received a Bachelor of Science in mathematics from Principia College and a Master of Science in environmental science from Rutgers University.

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President's Report Modeling a Sustainable World



ASHRAE and its members have long acted as role models in the field of HVAC&R. Our prestigious history within the industry, sound technical standards, educational and certification programs and, most important, our members, all serve as a shining example of technical excellence within the industry.

During my presidential year I focused on modeling. My theme, *Modeling a Sustainable World*, highlighted the role ASHRAE

members play as leaders in sustainable design. More specifically, through energy simulation, daylight analysis, computational fluid dynamics and building information modeling software, we now have powerful modeling tools that enable us to create and refine our vision of a building – its appearance, systems, operation and performance.

This year we reached new milestones in our technical expertise. The legacy of Standard 90.1 continued, with the publication of the 2010 version of the standard and the increased energy savings. Additionally, Standard 189.1, ASHAE's green standard, saw adoption by the U.S. Army.

Also, I was particularly pleased to have initiated ASHRAE's first ever energy modeling conference, which focused on an integrated design approach to building energy modeling and the tools used in the process.

I trust that ASHRAE members will continue to act as role models in the field of HVAC&R and maintain ASHRAE's preeminent position in our industry.

A handwritten signature in black ink that reads "Lynn G. Bellenger".

Lynn G. Bellenger, P.E., Fellow ASHRAE
2010-2011 ASHRAE President

Secretary's Report ASHRAE as a Role Model in the Building Industry



The 2010-11 Society year was epic. Under President Bellenger's leadership, ASHRAE members and volunteers pushed the Society to the forefront of built environment innovation.

Standards and other design guidance documents drove building professionals to target new levels of energy stringency. New educational programs such as the HVAC Design Essentials Workshop and datacom center programs rolled out to

high acclaim, driving demand to run the programs repeatedly.

ASHRAE's largest Winter Conference in more than 15 years brought the full spectrum of building professionals together in Las Vegas to network and learn the latest design trends and technologies. ASHRAE's sponsorship of Engineer's Week and the launch of *New Faces of Engineering: College Edition* anchored ASHRAE's continued commitment to promote engineering and engage the spirit and enthusiasm of young engineers.

From webcasts to new ASHRAE chapters to a record research program, ASHRAE volunteers created a perfect storm of influence in the rapidly evolving built environment. All of this was accomplished on a foundation of strong fiscal performance, ensuring Society resources are available for continued expansion of member benefits and influence.

It was truly a model year for the Society, creating powerful momentum that will help drive new opportunities and benefits for ASHRAE members for many years.

A handwritten signature in black ink that reads "Jeff Littleton".

Jeff Littleton
ASHRAE Secretary

Treasurer's Report

ASHRAE: Rays of Sunshine through the Clouds

Despite the turbulent economic conditions, ASHRAE had strong financial results for the 2010-11 Society Year. Our budget for the General Fund going into the year was planned to be balanced. The actual results at year's end were favorable to the plan with an operating surplus of \$789,700. As of June 30, 2011, ASHRAE and affiliates' net assets totaled \$24,508.74. Our very strong operating fiscal performance and the income from reserves resulted in an overall consolidated net asset growth of \$4,096,515 over the previous Society Year.

A primary role of your Finance Committee is to work with the councils and committees to balance member benefits and benefits to society-at-large and while keeping our Society fiscally strong. The improvement in financial performance that we had in 2010-11 is due primarily to the hard work of the volunteers and staff in making tough decisions with our budgeting priorities in recent years.

Some highlights in the past year were stable membership, the highest Winter Conference attendance in 15 years; a U.S. Department of Energy contract to distribute standards for \$385,000; advertising sales 12.7 percent better than budgeted; and sales from eLearning and in-company seminars 17 percent over budget. Donations to ASHRAE's Research Promotion were a record \$2,167,000, marking the fourth straight year in which donations have exceeded \$2 million.

Looking forward, we must continue to invest in the products and programs to support the challenge from President Lynn G. Bellenger who called on us "to set the example in energy efficiency, in elegant, innovative solutions to meeting the energy needs of today and the future – to model a sustainable world." Meeting this challenge as well as advancing the goals of our Strategic Plan is key to our Society's future.

The Board of Directors approved a budget for the 2011-12 Society Year with a General Fund operating surplus of \$150,000. The budgeted surplus is intended to help increase the General Reserve Fund assets in a financial climate that is still very volatile. The Finance Committee is very aware that the economic situation, although improving, requires a conservative approach.

In part because of its financial strength, ASHRAE has been able to commit to several investments that will benefit our Society including:

- Development of our future leaders through a new college HVAC follow-on course and launch of ASHRAE Leadership University
- Redesign of the ASHRAE website to improve the navigation to items essential for volunteer participation in ASHRAE and educational and technical resources. The design will debut in January 2012.
- Continued expansion of topical conference offerings, building on the success of conferences focused on high performing buildings and energy modeling.

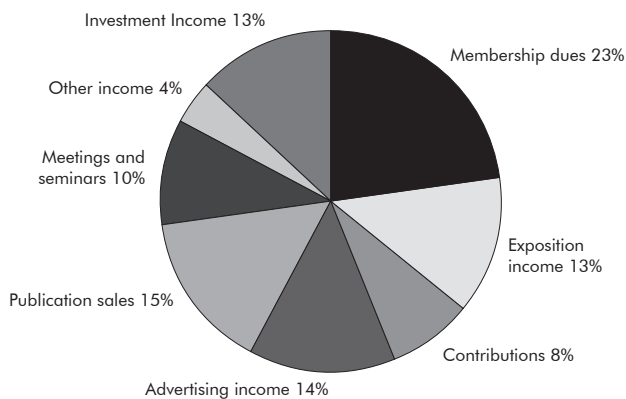
The Society remains financially sound and your Finance Committee continues to manage our funds in a disciplined fashion. Our financial strength helps give us the capability to work to fulfill our mission around the globe.



Tom Watson
ASHRAE Treasurer, 2010-11

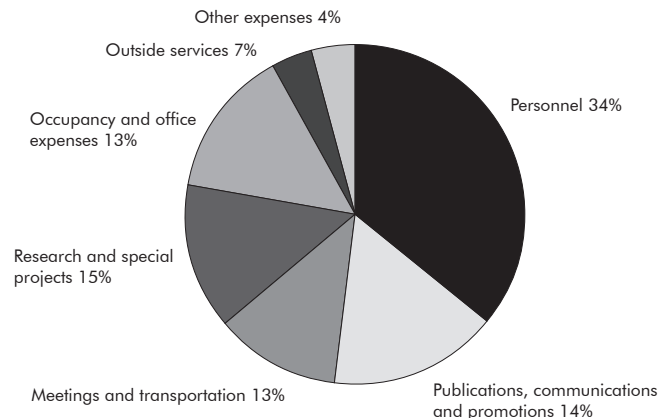
ASHRAE Source of Funds

Fiscal Year Ended June 30, 2011



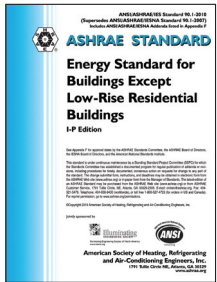
ASHRAE Application of Funds

Fiscal Year Ended June 30, 2011



Standard 90.1: 35 Years Later and Still Achieving Advanced Energy Savings

2010 marked the 35th anniversary of the publication of the ASHRAE/IES energy standard now known as Standard 90.1 ANSI/ASHRAE/IES Standard 90.1, *Energy Standard for Buildings Except Low-Rise Residential Buildings*. Since being published in 1975, the standard has been republished six times, evolving as input from the building community was given and as technology changed. Some 38 states currently have building codes that meet or exceed a version of 90.1.



ASHRAE acknowledges that in order to move the industry forward toward more energy efficient design, this important energy standard must be readily available to designers and engineers. Through a funding contract with the Department of Energy, copies of the I-P Standard 90.1-2007 were offered as a free downloadable PDF. Of the 25,000 copies available, all were downloaded within a month. These copies are now being circulated and utilized by professionals in the industry, demonstrating the demand for strong energy standards.

It's no wonder that ASHRAE's flagship energy standard is still going strong after all these years. The latest 2010 version of 90.1 achieves more than 30 percent energy savings over the 2004 version of the standard. Extensive analysis work was performed by a team from Pacific Northwest National Laboratories in support of the DOE Building Energy Codes Program. Sixteen different building prototypes were modeled in 17 different climate zones for a total of 272 building types and climate zone combinations. Without plug loads, site energy savings are 32.6 percent and energy cost savings 30.1 percent. Including plug loads, the site energy savings are estimated at 25.5 percent and energy cost savings 24 percent.

Building the Future by Investing in Students

In early 2011, ASHRAE once again served as the lead society of National Engineers Week, which celebrates the contributions that engineers make to our society and encourages engineering as a career path among young students by promoting pre-college literacy in math and science.

The last time ASHRAE served as lead society, in 2003, the Society launched the New Faces of Engineering program as part of the weeklong celebration. The New Faces program promotes the accomplishments of young engineers across various disciplines by highlighting their engineering contributions and the resulting impact on public welfare. This year, ASHRAE was pleased to announce New Faces of Engineering: College Edition. This new legacy program will promote the accomplishments of third, fourth and fifth year engineering students by highlighting their academic success and student contributions to the industry and sponsoring society.

As yet another way to support students, ASHRAE awarded for the first time two high school senior scholarships. The scholarships were established in 2010 for high school seniors entering their freshman year of college in engineering or engineering technology program.

Advancing HVAC&R and Digital Technology

What better way to sustain the Society's future than by investing in digital outreach? During the year, ASHRAE took several steps to increase its online presence as well as target new smartphone technology.

A new application developed for Apple's iPhone, iPod touch and iPad, will help to advance the Society in digital world. The ASHRAE Duct Fitting Database app allows users to perform pressure loss calculations for more than 200 HVAC duct fittings in both I-P and SI units.



Additionally, ASHRAE published its first eBook for use on the Apple iPad. The third and most recent edition of "ASHRAE GreenGuide: The Design, Construction and Operation of Sustainable Buildings" is now available in an eBook format to allow iPad users convenient access to the book's guidance, which covers each stage of the building process, from planning to operation and maintenance of a facility, with emphasis on teamwork and close coordination among interested parties. The GreenGuide eBook includes embedded links to other sections of the book and to graphics and relevant web pages

Over the past year, the Society has also been increasing its social media presence. ASHRAE has over 6,000 fans on Facebook as well as more than 2,500 followers on Twitter. Both social media sites are updated frequently to keep fans and followers up-to-date on ASHRAE activities.



Publication/Education/Certification

ASHRAE also released several new books and standards of industry importance. These include Standard 62.1-2010 User's Manual; Standard 62.2-2010 User's Manual; Standard 189.1 User's Manual; ANSI/ASHRAE Standard 135-2010, *BACnet*—*A Data Communication Protocol for Building Automation and Control Networks*; and "ASHRAE GreenGuide: The Design, Construction, and Operation of Sustainable Buildings," third edition.

ASHRAE Learning Institute also saw outstanding success with a launch of an intensive three-day workshop focusing on the essentials of HVAC design in buildings. HVAC Design Essentials: Tools for High Performance Building Designers, held at ASHRAE Headquarters in May, focused on both the fundamental and technical aspects of HVAC design in commercial buildings, providing practical strategies for HVAC designers and others involved in delivery of HVAC services. The workshop was so well-attended that additional rounds of the course were scheduled for August and early 2012 to meet the needs of a wait-list of participants eager to attend.

Meetings and Programs

For the fourth year in a row, the Society was pleased to surpass its \$2 million goal, reaching an all time high, with donations of \$2,167,000. The total represents a 4 percent increase over previous years.

Contributions from members and their companies fund 40 percent of ASHRAE's annual budget. The money raised will fund research projects beginning in the 2011-12 fiscal year. ASHRAE conducts about \$12.5 million in research in total value in any given year, with projects often spanning several years. Currently, there are 74 active research projects, including ones focusing on the role non-western clothing, such as burqas or saris, play in thermal comfort (1504-TRP) and the development of a set of standard data-driven metrics, interfaces and dashboards for advanced building operation and management (1633-RP).

ASHRAE hosted a specialty conference in April titled ASHRAE's Energy Modeling Conference: Tools for Designing High Performance Buildings. The Conference highlighted an integrated design approach to building energy modeling – and learning how to use modeling tools more effectively – in order to improve the accuracy and reliability of simulation results and increase the return on time and resources invested to generate the models. Nearly 220 people attended this event.

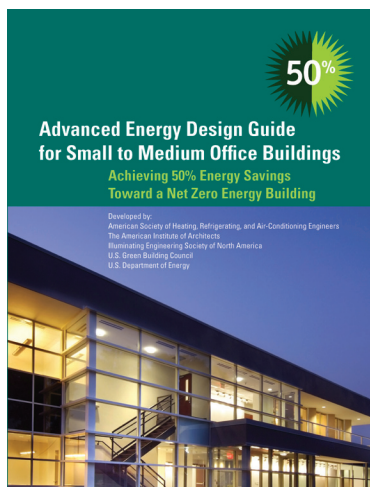
The 2011 Winter Conference, held in Las Vegas, Nev. saw its highest attendance numbers in years. Some 3,400 people attended the Conference; of that number, 400 were first-time attendees. The 2011 Annual Conference, held in Montreal, Quebec, also saw increased attendance. With some 1,690 people, attendance was higher than the previous three Annual Conferences.

In April, a highly successful satellite webcast, titled Ground Source Heat Pump Systems—Putting the Earth to Work for You, reached more than 11,000 viewers at over 800 sites around the world. Sponsored by the ASHRAE Chapter Technology Transfer Committee (CTTC) and the ASHRAE Foundation, the webcast focused on the method of using underground temperatures to create a system using natural resources to save energy and money at the same time.

Research and Technical Activities

This past year, ASHRAE was able to see the investments it had made in maintaining past programs advance even further: The first book in the 50 percent series of the Advanced Energy Design Guides was published in late spring of 2011.

Advanced Energy Design Guide for Small to Medium Office Buildings: Achieving 50% Energy Savings Toward a Net-Zero-



Energy Buildings is the first book in a series of Advanced Energy Design Guide (AEDG) publications that provides recommendations to achieve 50 percent energy savings when compared with the minimum code requirements of ANSI/ASHRAE/IESNA Standard 90.1-2004, *Energy Standard for Buildings Except Low-Rise Residential Buildings*. A significant addition to the new 50 percent guide is the

inclusion of a performance path; specifically, offering guidance for early stage energy modeling.

The series follows the earlier six-book series that provided guidance to achieve 30 percent savings. The ultimate goal is to provide guidance to achieve net-zero-energy buildings.

Additionally, ANSI/ASHRAE/USGBC/IES Standard 189.1-2009, *Standard for the Design of High-Performance, Green Buildings Except Low-Rise Residential Buildings* continued to see successful integration into the marketplace. In October of 2010, the U.S. Army incorporated the standard into its policy to promote sustainability and improve green building standards for its facilities. The Army's policy sets a new approach to the design and construction of efficient military construction projects and major renovations by using Standard 189.1 as the baseline. The policy requires that facility construction projects follow specified requirements and guidance in the standard. These requirements address siting, energy efficiency, cool roofs, metering, storm water management and indoor and outdoor water consumption.

Government Affairs

The Society continues to maintain a strong presence on Capitol Hill and within federal agencies by providing leadership within the building community on relevant public policy issues. ASHRAE provided technical expertise and information as Congress considered legislation on climate change and energy. Topics of specific interest included the advancement, adoption and enforcement of building codes, building energy labeling programs and incentives for pursuing energy efficiency projects. Mechanisms for input included face-to-face meetings with Congressional staff, providing testimony to Congressional committees and submitting formal letters and comments to Congress and federal agencies.

The Washington office once again led the charge for the 2011 High-Performance Building Week in late May. The week highlighted the importance of high-performance buildings to federal, state and local policymakers and the general public and included briefings with prominent members of the building industry and tours of high-performing buildings. Additionally, several topical briefings and events focused on educating policy-makers on high performance buildings drew attention from both press and top industry leaders. The briefings and events emphasized the importance of energy efficiency and technology transfer to achieve high performing buildings. Finally, ASHRAE's government affairs team provided direct guidance on legislative language supporting the continuation of a Commercial Building Energy Consumption Survey (CBECS) that reinforces the desire to maintain benchmarking data for buildings.

Furthermore, per a Board of Directors' vote at the 2011 Annual Conference, the Washington office is now developing advocacy programs at the state, local and provincial levels within the membership. To that end, the office is embarking upon a new venture: laying the foundation for building a network of engineer-advocates who, when appropriate, can be mobilized to encourage the adoption of ASHRAE standards in their states, cities, counties and provinces, as well as other public policies in line with ASHRAE advocacy priorities.



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