

ASHRAE and Sustainability

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Abstract: The building sustainability effort is critical to our global environment and society. Changing technologies, rising energy prices, and the increased focus on sustainability have challenged the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) to provide relevant guidance and advocacy efforts to transition the heating and air conditioning industry towards more sustainable operation. There is also a series of things happening on both the federal and local state levels in the United States to promote sustainable development and reduce our impact on carbon emissions.

Key Words: *ASHRAE, sustainability, energy efficiency*

1 INTRODUCTION

It is an honor and privilege to participate in the 9th International Energy Agency HEAT PUMP CONFERENCE 2008: *Advances and Prospects in Technology, Applications, and Markets*. On behalf of ASHRAE, I would like to extend our gratitude to the entire Organizing Committee for organizing this international conference to advance the air conditioning and heat pump standard of practice.

2 SUSTAINABILITY EXPECTATIONS

There is no question that our industry is in a period of change. High-performance green buildings with high-performance air conditioning and heat pump systems are quickly becoming the norm in the industry. This change will bring about many demands and challenges as the need expands for buildings and systems that are environmentally responsible.

I would like to share how ASHRAE is engaged in promoting sustainable practice and also share some activities in the U.S. to promote sustainable development. In the past several years, ASHRAE has embraced change and defined priorities. We have focused on what is important – improving the global built environment - while reducing its impact on the natural environment.

We have learned to streamline our processes to develop guidance and tools quicker and better allocate valuable volunteer resources. We have sought the cooperation of many other organizations in pursuit of common goals. I can report today that sustainability principles have now been woven into the very fabric of ASHRAE.

Rising energy costs and the increased global awareness of the potential impact of climate change continues to drive home the message that low-energy, environmentally responsible, environmental control systems are the future. In my theme this year, I challenged our members to be more innovative in our thinking, more elegant with our solutions and more determined to deliver buildings that perform. I have been encouraged by the collective efforts I am seeing around the world in this regard.

Today, building energy efficiency represents a vast and still underutilized energy resource in the world. Buildings are the single largest user of primary energy and the single largest contributor of greenhouse gases.

According to the 4th Assessment Report from the IPCC, the global residential and commercial building sector has the greatest potential to reduce greenhouse gas emissions using today's technologies.

However, according to a poll published late last year by the American Institute of Architects, just seven percent of U.S. voters knew that buildings were the largest contributor to U.S. greenhouse gas emissions.

Improving our public educational efforts could have an enormous impact on public perception and, in turn, spur far greater interest and investment in sustainable development.

ASHRAE has invested considerable time and money this year informing both media outlets and legislators on the energy and carbon impacts of buildings and the benefits of improving energy efficiency.

Our collective challenge is to move the whole building stock forward – both new and existing buildings, buildings that meet the minimum code requirements and high-performing green buildings. ASHRAE continues to be committed to providing aggressive sustainability improvements in both new and existing buildings through our standards, guidelines, and other publications.

The good news is that we have many activities currently underway aimed at helping the industry improve the performance of buildings.

3 ASHRAE SUSTAINABILITY ACTIVITIES

We continue to develop and update ASHRAE standards while actively participating in the international standards arena. ASHRAE Standard 90.1, *Energy Efficient Design of New Buildings Except Low-Rise Residential Buildings*, continues to serve as the model energy code in the U.S. and other countries and is referenced as the energy efficiency baseline for most green building rating systems. We are working to improve the energy efficiency requirements by targeting a 30% reduction on allowable energy in our upcoming 2010 version of this standard. Setting a more energy efficient baseline for building codes is a step that needs to happen, and we are working within our consensus process to make this a reality.

There are many ways to define a “green” building. Energy-saving measures, water efficiency, indoor environmental quality, materials and building orientations all play a role, but it is the way that all of these come together to make a healthy, safe and efficient building that makes it truly high performing.

In recognition of this, ASHRAE, along with the U.S. Green Building Council and the Illuminating Engineering Society of North America, have been working on a new standard that essentially defines the minimum requirements for a high-performance green building. As it is a code-intended standard, Standard 189.1P, *Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings*, could very well become the minimum code requirement in local jurisdictions for “green” buildings. We have recently completed the 2nd public review.

And because water is our most precious resource needed to sustain life, we are also starting on a new standard, Standard 191P, *Standard for the Conservation of Water Use in Building, Site and Mechanical Systems*, specifically focused on water conservation that will address water use efficiency through water conservation measures implemented during design and construction of building projects. We must reduce the demand and consumption that the built environment is placing on available water sources.

We must continue to improve the actual performance of heating and air conditioning systems. The stated intent for energy and water efficiency and indoor environmental quality at the design stage must transcend into the build, commissioning and operational stages if we are to succeed in substantially improving building performance.

ASHRAE and our partners are working together to develop better building performance metrics that will allow us to better benchmark performance. We need consistent methods of measuring, expressing and comparing energy use, water use, carbon emissions, and the indoor environmental quality of buildings around the world.

ASHRAE is working together with the United States Environmental Protection Agency to develop a Building Energy Labeling system. We view what Europe has implemented as a vital step to recognize actual building energy consumption and encourage the efficient use of energy.

Our Advanced Energy Design Guide (AEDG) series continues to play a significant role in our net-zero energy efforts. This series, now with three publications, has provided 30 percent energy reduction guidance for various types of buildings, including our latest for K-12 schools.

We are also working on a new series of *Advanced Energy Guides for Existing Buildings* that will help building owners and managers achieve at least 30% energy savings in existing buildings. We are serious about getting this valuable information into the marketplace. We have made all of the AEDGs available for free. Anyone can download a free electronic version directly from the ASHRAE web site.

Our next step is to progress to the 50 percent energy reduction guides starting later this year. After the 50 percent AEDG series, we will progress straight to net-zero energy building guidance.

4 UNITED STATES SUSTAINABILITY ACTIVITIES

There is a series of activities happening on both the federal and local state levels in the United States to promote sustainable development.

Our recent United States Energy Independence and Security Act (EISA) of 2007 was enacted late last year. This Act puts many activities and goals in motion to promote high-performance green buildings within the United States. It calls for reduced fossil fuel generated energy consumption in federal buildings reaching a goal of 100% reduction by 2030. The EISA also provides for coordinated research, development and market deployment strategies to transition to net-zero-energy commercial buildings. The goal is to have all new buildings be NZEB by 2030 with all commercial buildings by 2050.

The United States Mayors' Climate Protection Agreement includes more the 600 mayors of cities who have pledged to meet or beat the Kyoto Protocol original target for the U.S. - cutting GHG emissions to 7% below 1990 levels by 2012.

In 2006, California passed the Global Warming Solutions Act, committing to reduce its GHG emissions to 2000 levels by 2010, to 1990 levels by 2020, and 80% below 1990 levels by 2050.

There are also regional efforts underway to cut greenhouse gases, promote energy conservation and fight global warming. The Western Climate Initiative (WCI) is a regional initiative by states along the western rim of the United States and Canada to combat climate change caused by global warming. The Western Climate Initiative regional greenhouse gas emission reduction goal is an aggregate reduction of 15% below 2005 levels by 2020. The Regional Greenhouse Gas Initiative (RGGI) is a similar initiative of the Northeast and Mid-Atlantic states of the United States. Nine Midwest Governors have also recently signed the

Midwestern Regional Greenhouse Gas Reduction Accord. This third such pact between U.S. states means that nearly half of Americans will be living in areas covered by state agreements designed to improve energy efficiency and combat global warming.

It is becoming obvious in North America that action is occurring from both the top down and the bottom up to promote more sustainable development.

5 MOVING FORWARD

Now more than ever our industry needs to provide leadership. This leadership will require a steady vision, technical credibility, proper direction, and collaboration amongst organizations - with immediate action in many areas. ASHRAE is determined to work collaboratively with partners around the world to provide solutions to advance the built environment.

I know that we are ready for this challenge. When we do what is right, burden changes to benefit. It truly is a wonderful time to be actively involved in the heating and air conditioning industry pursuing more sustainable solutions.

Think about the difference we can make if we work together.

Let us go forward and demonstrate to the world we can engineer sustainable solutions to improve the environment in which we, and future generations, will live.

ASHRAE remains determined to make a positive difference.