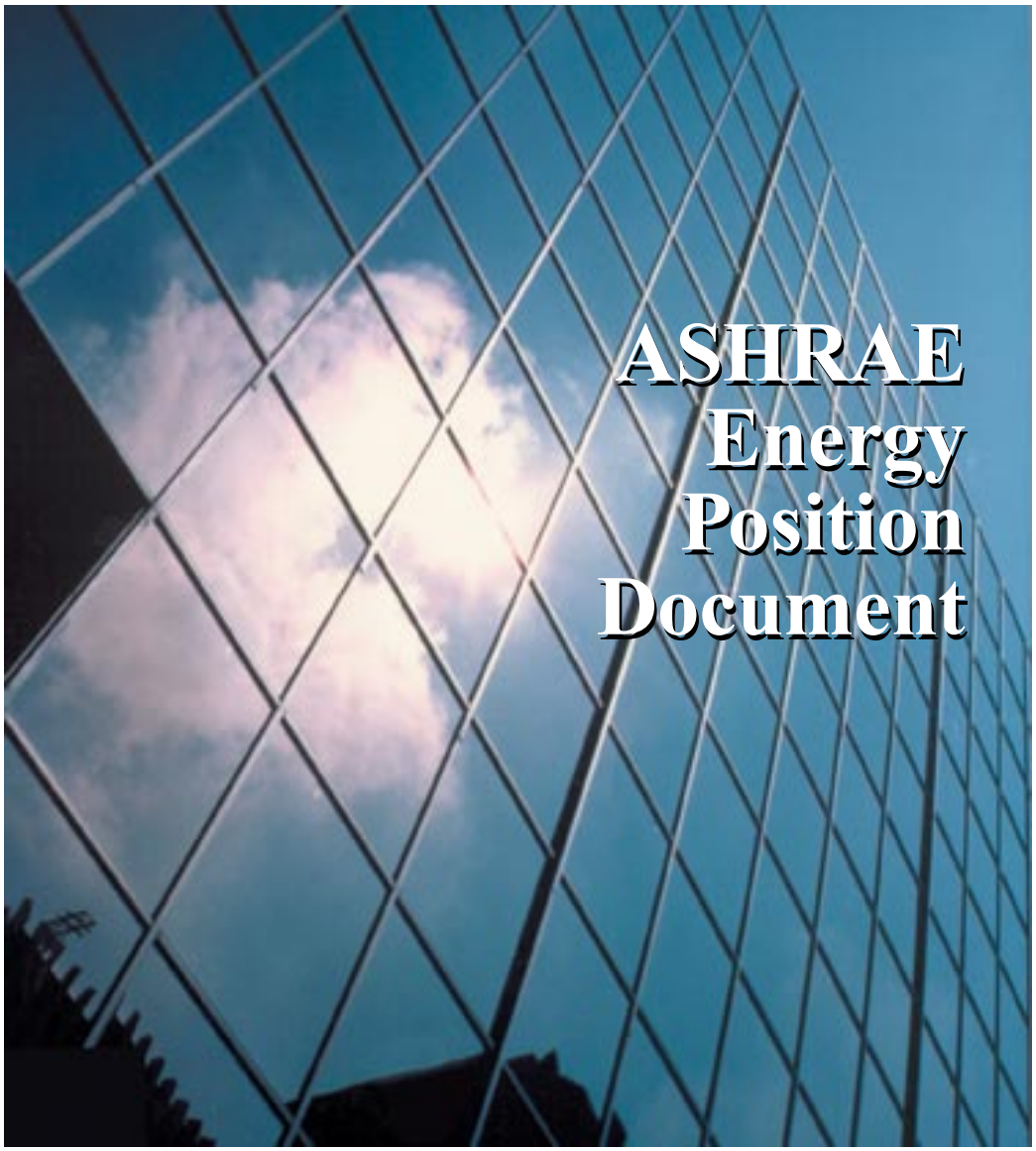

ASHRAE Energy Position Document

Approved by ASHRAE Board of Directors
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Executive Summary

Energy is a fundamental ingredient of all economic systems and is necessary for the defense of nations, to feed the world's population, for the production of goods and services, and for protection from the elements. ASHRAE has a direct interest and concern with issues related to energy use in buildings. ASHRAE has numerous technical and standing committees that deal specifically with energy-related matters. In fact, almost every one of ASHRAE's technical committees deals in some way with energy-related matters.

There are numerous global, national, and local issues related to energy. This document presents ASHRAE's positions on relevant policy issues, research, technology development, education, and outreach. ASHRAE's positions at the present are:

- Energy Supply: Policy discussions should include consideration of
  — the benefits of enhanced energy efficiency
  — regulation that is based on sound engineering principles
  — development of a diverse, sustainable supply portfolio

- Environmental Impacts: Regulated and free market resource decisions should include consideration of the environmental impacts of the development and use of new resources.

- Energy Supply Infrastructure: Buildings' impact on the infrastructure can be reduced by
  — improved price signals and market structures that clarify the impact of building energy use on peak demand
  — decentralized building-level supply systems that can reduce buildings' impacts and provide increased opportunities for building-level renewable resource development

- Utility Restructuring: Restructuring policies should encourage cost-effective demand-side and renewable resources.

- Market Barriers: Regulators should consider market impacts and promote market transformation in support of cost-effective improvements in building energy efficiency and the use of renewable resources.

- Energy Codes: Current codes are minimum standards, and buildings can often be cost-effectively built to exceed them. The minimum standards should be adequately enforced.

To carry out its role in energy policy development, ASHRAE is committed to:

- supporting development of technology that improves the efficiency of energy use in buildings;
- providing technical information and improving its dissemination in the building and policy community;
- increasing the public awareness of the benefits of improved energy efficiency;
- promoting the design, construction, and operation of highly energy-efficient buildings;
- helping its members become involved in policy-setting entities;
- promoting the development of performance-based design approaches; and
- developing and encouraging the use of improved energy-efficiency standards and guidelines.

ASHRAE ENERGY POSITION DOCUMENT

1. INTRODUCTION

Energy is a fundamental ingredient of all economic systems. It is essential to the defense of nations, necessary to feed the world's population, indispensable in the production of the world's good and services, and vital for protection from the elements. Buildings—their construction, use, operation, maintenance, and demolition—are responsible for more than one-third of the world's energy use. In the United States, 35% to 65% of the energy used in buildings is for space heating, cooling, and refrigeration.

Currently, most of the energy used in the built environment is derived from nonrenewable fossil fuels that have negative environmental effects, including the potential for global climate change and air and water pollution.

The American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE) is a recognized authority on energy use in buildings and the built environment. As stated in its bylaws, *" … the Society shall recognize the effect of its technology on the environment and natural resources to protect the welfare of posterity."*

2. FUNDAMENTAL PRINCIPLES

ASHRAE has identified six basic principles that are relevant to ASHRAE's mission and expertise and makes the following statements regarding them:

Energy Resources – Reliable and secure energy resources and the capacity to deliver them to buildings are critical to maintaining and improving humanity's quality of life.

Energy Security – Ensuring an uninterrupted supply of our nation's energy resources is vital to maintaining our standard of living as well as the defense of nations.

Environment – There are environmental limits to the use of all energy resources, especially fossil fuels. Reduced reliance on these resources will enhance the long-term sustainability of our environment and the quality of life of future generations.

Sustainability – Humanity must ultimately convert to sustainable energy systems; rapid development of renewable resources is essential for this transition. However, nonrenewable energy resources will continue to be needed, and environmentally sound, further development of these resources is necessary.

Energy Efficiency – Energy use in existing and new structures can be reduced significantly, in an economical fashion, while still providing the building services that society wishes, without sacrificing health, safety, comfort, or productivity.

Balance – Because all energy resources have both negative impacts and positive benefits and are not equal in terms of their abundance, expected lives, and availability, an appropriate balance of diverse resources, including fossil fuels, renewables, and nuclear, should be sought.

3. ISSUES

Numerous global, national, and local issues bear on these statements. ASHRAE identifies the following issues and offers the following informed opinion and policy positions regarding each issue. These issues are critical to ASHRAE members and can have significant impact on the HVAC&R industry and our quality of life.

3.1 Maintaining a Secure, Economical Energy Supply

A long-term secure supply of energy is critical to maintaining and improving our quality of life. Government policies have a significant impact on the types and economics of various resources that meet this need.

ASHRAE believes:

Policy discussions should include the following considerations:

Energy Efficiency – Policy development should recognize that improved energy efficiency in both new and existing buildings can limit exposure to risk associated with supply disruptions and can extend the economic life of existing nonrenewable energy resources. There are significant economic and quality of life benefits from energy efficiency that are not always captured in current economic models. These benefits should be quantified where possible and explicitly considered in policy-making processes.

Regulation – An overly burdensome, or overly relaxed, regulatory environment can inhibit the development and construction of a reliable and secure energy infrastructure. Regulation of the energy industry, particularly nuclear generation, should be based on sound engineering principles that include full life-cycle assessment, balanced with the need for proper regulatory oversight.

Diversity – Energy sources vary in terms of their abundance, availability, and expected lives. As a matter of long-term security, state and national policies must support the development and use of a robust and diverse energy portfolio that can provide a long-term, sustainable energy supply, including increased support for the development of renewable energy resources.

3.2 Environmental Impacts of Energy Development and Use

Development and consumption of nonrenewable energy resources have significant and predominantly negative environmental impacts. Some of these impacts are included in the price of developing these resources, such as emissions control technology, mine reclamation costs, groundwater protection, and waste treatment and disposal. However, other costs, including air and water pollution, resource depletion, and possible global climate impacts, are not included in the price for nonrenewable energy. Improvements in energy efficiency have lower environmental impact than many supply-side

resources, and the use of renewable energy generally has significantly lower impact than the use of fossil resources.

ASHRAE believes:

The environmental impacts of new and existing energy resources, including demand-side and renewable resources, should be considered in all new energy resource decisions—both regulated and free market.

3.3 Impact of Buildings on the Energy Supply Infrastructure

Building use patterns are significant contributors to summer and winter peak demands on the electric supply grid, and electricity supply system reliability is strongly influenced by peak power demands imposed by buildings. They also have significant impact on natural gas delivery infrastructures. Buildings can be designed and operated in ways that help relieve these peak demands, but there is often limited economic incentive to do so. Energy-efficient buildings, micro-turbines, fuel cells, thermal storage, and advanced controls can all be used to lower the peak impact on the energy supply grid.

ASHRAE believes:

Improved market structures, such as expanded use of time-of-day utility rates and seasonal pricing, would clarify the impacts of energy use on the supply infrastructure and provide incentives to market participants to design and operate buildings that respond to these impacts.

Decentralized supply systems at the building level, such as micro-turbines, fuel cells, and photovoltaics can offer an effective method for reducing demand on the energy supply infrastructure and also promote opportunities for increased use of renewable energy resources.

3.4 Utility Restructuring

Changes in the natural gas and electric utility industry, including restructuring and regulatory uncertainty, have significantly reduced utility-based energy efficiency programs. Because energy efficiency improvements are diverse and difficult to trade, they have difficulty competing in the same market as competitive generation, even when they may be the economic least-cost resource. Improving energy efficiency and controlling energy use in buildings is an essential way to reduce demands on traditional energy resources and supply infrastructure.

ASHRAE believes:

Restructuring policies should encourage cost-effective demand-side and renewable resources, in order to minimize the total costs to energy consumers and maximize long-term benefits.

3.5 Barriers to Improved Energy Efficiency in Buildings

Energy efficiency in both existing and new buildings can be significantly improved over current practice. However, ASHRAE recognizes that there are barriers and imperfections that prevent the market from obtaining all cost-effective energy efficiency. Some of these barriers are institutional, while others are political and regulatory in nature.

ASHRAE believes:

Regulators should consider market impacts and promote market transformation in support of increased efficiency and use of renewable energy. Specific market barriers that should be addressed include, but are not limited to:

- Failure to recognize and accommodate the life-cycle impacts of improved efficiency (e.g., focus on first cost).
- The lack of guidelines, targets, and tools for measuring the performance of buildings during their entire life cycle.
- Design fee structures that do not encourage energy-efficient building design.
- Building code requirements and enforcement that discourage improved design initiatives.
- The fear of potential litigation as a deterrent to innovative design and construction.
- Split incentives created when different parties are responsible for design costs, construction costs, operation costs, and building services.

3.6 Appropriate Energy Codes for New Buildings

ASHRAE is a leading proponent and participant in developing standards for energy use in buildings and believes in the value of building codes based on those standards. The federal government and most states have adopted minimum energy codes based primarily on ASHRAE standards. ASHRAE acknowledges that present energy codes and equipment standards are minimum standards and that many buildings can be economically designed and built to substantially exceed the energy efficiency of the minimum code requirements. Currently most energy codes are based, at least in part, on average energy prices that do not provide accurate indications of the economic consequences of energy-related decisions and may also be outdated within the period the code is in place. Many energy codes are not enforced rigorously due to a lack of training of code officials and limited resources for enforcement.

ASHRAE believes:

Energy codes should provide accurate economic incentives to owners and operators of buildings by accommodating local variations in energy prices.

ASHRAE's energy standards serve as a basis for minimum code requirements, and, in many cases, buildings can be built cost-effectively to substantially exceed these minimums.

Minimum energy codes should be enforceable and adequately enforced to achieve the desired objectives.

3.7 Energy Efficiency and Indoor Air Quality

ASHRAE recognizes that indoor air quality and energy efficiency may be perceived as opposing goals. Traditional methods of dealing with indoor air quality rely on increased

ventilation air, which requires additional energy to condition. However, an efficient system (or building) is one that meets all requirements with fewer resources, and indoor environmental quality is a basic requirement in all buildings. Hence, the issue becomes one of maintaining indoor air quality *in the most energy efficient manner possible.* Improved technology, innovative design solutions, and improved equipment can achieve this.

ASHRAE supports:

Policies and develops standards that balance health, safety, and comfort needs with a high level of energy efficiency. ASHRAE has adopted a position document on indoor air quality that addresses this issue.

4. RECOMMENDATIONS

It is recommended that ASHRAE promote increased energy efficiency, environmental preservation, and responsible energy resource development and use as an integral part of the ethics of ASHRAE members, government, and the public. This will be accomplished through programs and activities in research and technology development, policy development, and education and outreach.

4.1 Research and Technology Development

ASHRAE should:

Continue to identify, encourage, coordinate, sponsor, and conduct research on energy use and improved energy efficiency in buildings and to support efforts to improve all forms of energy conversion technology.

Continue to identify and encourage the development of methods, systems, and equipment that improve the effective use of renewable energy resources in building design, such as solar, geothermal, biomass, hydro, and wind.

Continue to identify and encourage the development of technologies and practices that lower the risk of environmental degradation and its consequent damaging effects on health and the economy worldwide.

Continue to improve analysis tools to help engineers, designers, and owners make choices that are economically and environmentally sound over the project lifetime.

Develop quantitative advanced building design guidelines to facilitate designs that significantly exceed the minimum criteria in Standard 90.1.

Work with other organizations to develop performance-rating systems that go beyond minimum standards and considerations of cost/economics alone to encourage the incorporation of more energy-efficient processes, equipment, materials, and techniques in buildings.

Continue to support whole-building commissioning and continue to develop commissioning tools for performance monitoring and verification.

Address the quality of the indoor and outdoor environment while recognizing the need to provide for healthful human environments in an energy-efficient manner.

4.2 Policy Development

ASHRAE should:

Continue to provide technical information to all parties involved in policy making for use in formulating policies, laws, and regulations relating to the efficient use of energy resources in buildings, equipment, and systems.

Facilitate its members in becoming actively involved in policy-setting entities to encourage sound, balanced, and innovative actions to address long-range energy problems and objectives and recognize those members who are making such contributions.

Promote the development and use of performance-based design approaches that promote energy-efficient design.

Use its technology to support public and private programs that seek to achieve large-scale market-based improvements in energy efficiency.

Continue to develop, maintain, and improve ASHRAE standards and guidelines aimed at improving efficiency of energy use in buildings.

Continue to encourage use of its standards in appropriate codes and external standards.

Continue to contribute to the development of international energy conservation standards by serving as Secretariat to ISO TC 205.

4.3 Education and Outreach

ASHRAE should continue to:

Inform designers and decision makers about new and improved practices that lower the risk of environmental degradation and its damaging effects on health and the economy worldwide, through initiatives such as the development of a green buildings design guide.

Increase the public's awareness of the value and benefits of energy-efficient buildings, systems, and equipment.

Develop more effective means of communicating within the industry the knowledge and motivation necessary to improve techniques for designing, installing, and operating energy-efficient equipment and systems.

Improve and encourage the use of life-cycle cost techniques by providing better information on costs such as maintenance and equipment lifetimes.

Recognize and promote case studies of successful buildings that achieve high levels of energy efficiency and significant reductions in environmental impact through its Technology Awards Program.

5. BIBLIOGRAPHY

There is a tremendous amount of published information on the topics of energy resources, use, and development. Summarizing this information to provide background for this document would inevitably leave out significant information. Rather than attempt such a summary, and possibly bias the picture, we have provided the following bibliography. The bibliography is a starting point for those interested in further exploring the issues addressed in this document and in no way implies endorsement or any judgment on the accuracy of specific content.

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