ANSI/ASHRAE/IES Addenda bu to
ANSI/ASHRAE/IESNA Standard 90.1-2007

ASHRAE ADDENDA

Energy Standard for Buildings Except Low-Rise Residential Buildings

Approved by the ASHRAE Standards Committee on June 20, 2010; by the ASHRAE Board of Directors on June 23, 2010; by the IES Board of Directors on June 24, 2010; and by the American National Standards Institute on June 26, 2010.

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FOREWORD

Justification for modifications to 6.4.1.1:

The new table 6.8.1H is being added to cover a new equipment type and rating test procedure (CRAC units and ASHRAE Standard 127). Systems serving computer rooms but not covered by Standard 127 (e.g. packaged rooftop) would still have to meet the requirements in Table 6.8.1A. This is to prevent creating a loophole where air conditioners not covered by 127 would have no minimum efficiency requirements if used on a data center. The dual path compliance option for CRAH units was added to make it easy for people to use packaged air handlers without having to do the fan power calculation but also to not require that custom air handlers be rated per Standard 127.

Justification for modification to 6.5.1, exception c:

Humidification is not a valid exception for data centers because of the addition of exception j, which exempts small data centers from the economizer requirement. Exception j only requires economizers in larger data centers where water economizers or air economizers with air-air HX are cost effective. Savings from such economizers are not affected by data center humidification. Furthermore, airside economizing is still cost effective for larger data centers, even if they are humidified. This is especially true if adiabatic humidification is used.

Justification for addition of exception 6.5.1, exceptions j.1, 2, 3:

Many computer rooms are located in buildings that do not contain access to chilled water from a chiller plant. The cost of a chiller plant system, with the redundancy requirements of an computer room, is justifiable if the total plant load is above 3,000,000 BTUh. This minimum size is based on concerns for airside economizers in data centers. While there is no evidence that humidification improves data center reliability, many data centers include humidification. Most types of humidifers (e.g. steam or infrared) erode the savings from airside economizing and make economizing less cost effective for smaller data centers. Similarly, while there is no proof that gaseous contaminants affect data center reliability and no evidence that airside economizing negatively affects gaseous contaminants, there is some concern that gaseous contaminants may be an issue in data centers and that airside economizers may contribute to a problem.

Research is currently underway on data center humidification and gaseous contaminants. This research is expected to be finished within 4 years and is expected to determine if airside economizing will affect data center reliability relative to these issues. The 90.1 SSPC intends to revisit exceptions j.1, 2, 3 when this research is available.

Justification for addition of exception 6.5.1, exception j.4:

It may be impractical to include an economizer in the HVAC design of a small computer room added to a large existing building.

Justification for modification 6.5.1.2.1

The standard temperatures of 50/45 are appropriate for an office building where the actual cooling load at 50/45 is a small fraction of the design cooling load. The expected cooling load in computer rooms at 50/45 is typically close to the design cooling load and it is not cost effective to size a waterside economizer to meet the full load at 50/45. 45/40 is more appropriate for computer rooms. Some owners prefer dry coolers to cooling towers due to freeze protection and potential lack of available water. Therefore, an exception is added with reasonable design conditions for dry coolers.

Justification for modification to 6.5.2.3, exception d:

Some computer rooms have humidity upper and lower limits, but these limits are wide thus there is no reason for simultaneous heating and cooling within a computer room. ASHRAE TC 9.9 has recently expanded the recommended humidity range for computer rooms from 40-55% RH to 5.5°C (41.9ºF) dew-point as the lower limit and 60% RH or 15°C dew-point (59 °F DP) as the upper limit.

Justification for the addition of Table 6.8.1h

Computer and data processing room unitary air conditioners units have unique design requirements (Higher static loads, higher sensible heat ratios, continuous operation year round) that have been recognized with a unique test and rating standard ASHRAE / ANSI Standard 127 -2007.

Note: In this addendum, changes to the current standard are indicated in the text by underlining (for additions) and ~~strikethrough~~ (for deletions) unless the instructions specifically mention some other means of indicating the changes.

Addendum bu to 90.1-2007

Revise the standard as follows (I-P Units)

3.2 Definitions

computer room: a room whose primary function is to house equipment for the processing and storage of electronic data and that has a design electronic data equipment power density exceeding 20 watts/ft^2 of *conditioned floor area.*

essential facility: those portions of a building serving one of the following functions:

1. Hospitals and other health care facilities having surgery or emergency treatment facilities.
2. Fire, rescue and police stations and emergency vehicle garages.
3. Designated earthquake, hurricane or other emergency shelters.
4. Designated emergency preparedness, communication, and operation centers and other facilities required for emergency response.

5. Power-generating stations and other public utility facilities required as emergency backup facilities for other *essential facilities*.
6. Structures containing highly toxic materials where the quantity of the material exceeds the maximum allowable quantities.
7. Aviation control towers, air traffic control centers and emergency aircraft hangars.
8. Buildings and other structures having critical national defense functions.

6.4.1.1 Minimum Equipment Efficiencies – Listed Equipment—Standard Rating and Operating Conditions. Equipment shown in Tables 6.8.1A through 6.8.1G shall have a minimum performance at the specified rating conditions when tested in accordance with the specified test procedure. Where multiple rating conditions or performance requirements are provided, the equipment shall satisfy all stated requirements, unless otherwise exempted by footnotes in the table. Equipment covered under the Federal Energy Policy Act of 1992 (EPACT) shall have no minimum *efficiency* requirements for operation at minimum capacity or other than standard rating conditions. Equipment used to provide water heating functions as part of a combination system shall satisfy all stated requirements for the appropriate space heating or cooling category.

Tables are as follows:

a. Table 6.8.1A—Air Conditioners and Condensing Units
b. Table 6.8.1B—Heat Pumps
c. Table 6.8.1C—Water-Chilling Packages (see Section 6.4.1.2 for water-cooled centrifugal water-chilling packages that are designed to operate at nonstandard conditions)
d. Table 6.8.1D—Packaged Terminal and Room Air Conditioners and Heat Pumps
e. Table 6.8.1E—Furnaces, Duct Furnaces, and Unit Heaters
f. Table 6.8.1F—Boilers
g. Table 6.8.1G—Heat Rejection Equipment
h. Table 6.8.1H – Air Conditioners and Condensing Units Serving *Computer Rooms*

All furnaces with input ratings of 225,000 Btu/h, including electric furnaces, that are not located within the conditioned space shall have jacket losses not exceeding 0.75% of the input rating. Air conditioners primarily serving *computer rooms* and covered by ASHRAE Standard 127 shall meet the requirements in Table 6.8.1H. All other air conditioners shall meet the requirements in Table 6.8.1A.

6.5.1 Economizers. Each cooling system that has a fan shall include either an air or water economizer meeting the requirements of Sections 6.5.1.1 through 6.5.1.4.

Exceptions: Economizers are not required for the systems listed below.

a. Individual fan-cooling units with a supply capacity less than the minimum listed in Table 6.5.1.
b. Systems that include non-particulate air treatment as required by Section 6.2.1 in Standard 62.1.
c. Where more than 25% of the air designed to be supplied by the system is to spaces that are designed to be humidified above 35°F dew-point temperature to satisfy process needs. This exception does not apply to *computer rooms*.
d. Systems that include a condenser heat recovery system required by Section 6.5.6.2.
e. Systems that serve *residential* spaces where the system capacity is less than five times the requirement listed in Table 6.5.1.
f. Systems that serve spaces whose sensible cooling load at design conditions, excluding transmission and infiltration loads, is less than or equal to transmission and infiltration losses at an outdoor temperature of 60°F.
g. Systems expected to operate less than 20 hours per week.
h. Where the use of *outdoor air* for cooling will affect supermarket open refrigerated casework systems.
i. Where the cooling *efficiency* meets or exceeds the *efficiency* requirements in Table 6.3.2.
j. Systems primarily serving *computer rooms* where

    1. the total design cooling load of all computer rooms in the building is less than 3,000,000 Btu/h and the building in which they are located is not served by a centralized chilled water plant, or
    2. the room total design cooling load is less than 600,000 Btu/h and the building in which they are located is served by a centralized chilled water plant., or
    3. the local water authority does not allow cooling towers, or
    4. less than 600,000 Btu/h of computer room cooling equipment capacity is being added to an existing building

k. Dedicated systems for *computer rooms* where a minimum of 75% of the design load serves:

    1. those spaces classified as an *essential facility*
    2. those spaces having a mechanical cooling design of Tier IV as defined by ANSI/TIA-942
    3. Those spaces classified under NFPA 70 Article 708 – Critical Operations Power Systems (COPS)
    4. Those spaces where core clearing and settlement services are performed such that their failure to settle pending financial transactions could present systemic risk as described in "The Interagency Paper on Sound Practices to Strengthen the Resilience of the US Financial System, April 7, 2003"

6.5.1.2 Water Economizers

6.5.1.2.1 Design Capacity. Water economizer systems shall be capable of cooling supply air by indirect evaporation and providing up to 100% of the expected system cooling load at *outdoor air* temperatures of 50°F dry bulb/ 45°F wet bulb and below.

Exceptions: ~~Systems in which a water economizer is used and where dehumidification requirements cannot be met using outdoor air temperatures of 50°F dry bulb/45°F~~

~~wet bulb must satisfy 100% of the expected system cooling load at 45°F dry bulb/40°F wet bulb.~~

a. Systems primarily serving *computer rooms* in which 100% of the expected system cooling load at 40°F dry bulb / 35°F wet bulb is met with evaporative water economizers.

b. Systems primarily serving *computer rooms* with dry cooler water economizers which satisfy 100% of the expected system cooling load at 35°F dry bulb.

c. Systems where dehumidification requirements cannot be met using outdoor air temperatures of 50°F dry bulb/45°F wet bulb and where 100% of the expected system cooling load at 45°F dry bulb/40°F wet bulb is met with evaporative water economizers.

6.5.2.3 Dehumidification. Where humidistatic controls are provided, such controls shall prevent reheating, mixing of hot and cold airstreams, or other means of simultaneous heating and cooling of the same airstream.

Exceptions:

a. The system is capable of reducing supply air volume to 50% or less of the design airflow rate or the minimum rate specified in Section 6.2 of Standard 62.1, whichever is larger, before simultaneous heating and cooling takes place.

b. The individual fan cooling unit has a design cooling capacity of 80,000 Btu/h or less and is capable of unloading to 50% capacity before simultaneous heating and cooling takes place.

c. The individual mechanical cooling unit has a design cooling capacity of 40,000 Btu/h or less. An individual mechanical cooling unit is a single system composed of a fan or fans and a cooling coil capable of providing mechanical cooling.

d. Systems serving spaces where specific humidity levels are required to satisfy process needs, such as ~~computer rooms,~~ museums, surgical suites, and buildings with refrigerating systems, such as supermarkets, refrigerated warehouses, and ice arenas. ~~This exception also applies to other applications for which fan volume controls in accordance with Exception (a) are proven to be impractical to the enforcement agency.~~ This exception does not apply to *computer rooms*.

e. At least 75% of the energy for reheating or for providing warm air in mixing systems is provided from a *site-recovered* (including condenser heat) or *site-solar energy* source.

f. Systems where the heat added to the airstream is the result of the use of a desiccant system and 75% of the heat added by the desiccant system is removed by a heat exchanger, either before or after the desiccant system with energy recovery.

Add new Table 6.8.1H

TABLE 6.8.1H Air Conditioners and Condensing Units Serving *Computers Rooms*

Equipment Type	Net Sensible Cooling Capacity[a]	Minimum SCOP-127[b] Efficiency Downflow units / Upflow units	Test Procedure
Air conditioners, air cooled[3]	<65,000 Btu/h	2.20 / 2.09	ANSI / ASHRAE 127
	≥ 65,000 Btu/h and < 240,000 Btu/h	2.10 / 1.99	
	≥ 240,000 Btu/h	1.90 / 1.79	
Air conditioners, water cooled	<65,000 Btu/h	2.60 / 2.49	ANSI / ASHRAE 127
	≥ 65,000 Btu/h and < 240,000 Btu/h	2.50 / 2.39	
	≥ 240,000 Btu/h	2.40 /2.29	
Air conditioners, water cooled with fluid economizer	<65,000 Btu/h	2.55 /2.44	ANSI / ASHRAE 127
	≥ 65,000 Btu/h and < 240,000 Btu/h	2.45 / 2.34	
	≥ 240,000 Btu/h	2.35 / 2.24	
Air conditioners, glycol cooled (rated at 40% propylene glycol)	<65,000 Btu/h	2.50 / 2.39	ANSI / ASHRAE 127
	≥ 65,000 Btu/h and < 240,000 Btu/h	2.15 / 2.04	
	≥ 240,000 Btu/h	2.10 / 1.99	
Air conditioners, glycol cooled (rated at 40% propylene glycol) with fluid economizer	<65,000 Btu/h	2.45 / 2.34	ANSI / ASHRAE 127
	≥ 65,000 Btu/h and < 240,000 Btu/h	2.10 / 1.99	
	≥ 240,000 Btu/h	2.05 / 1.94	

a. net sensible cooling capacity: The total gross cooling capacity less the latent cooling less the energy to the air movement system. (Total Gross – latent – Fan Power)
b. sensible coefficient of performance (SCOP-127): a ratio calculated by dividing the net sensible cooling capacity in watts by the total power input in watts (excluding re-heaters and humidifiers) at conditions defined in ASHRAE Standard 127. The net sensible cooling capacity is the gross sensible capacity minus the energy dissipated into the cooled space by the fan system.

Revise the Standard as follows (SI units)

3.2 Definitions

computer room: a room whose primary function is to house equipment for the processing and storage of electronic data and that has a design electronic data equipment power density exceeding 215 watts/m^2 of *conditioned floor area.*

essential facility: those portions of a building serving one of the following functions:

1. Hospitals and other health care facilities having surgery or emergency treatment facilities.
2. Fire, rescue and police stations and emergency vehicle garages.
3. Designated earthquake, hurricane or other emergency shelters.
4. Designated emergency preparedness, communication, and operation centers and other facilities required for emergency response.
5. Power-generating stations and other public utility facilities required as emergency backup facilities for other *essential facilities*.
6. Structures containing highly toxic materials where the quantity of the material exceeds the maximum allowable quantities.
7. Aviation control towers, air traffic control centers and emergency aircraft hangars.
8. Buildings and other structures having critical national defense functions.

6.4.1.1 Minimum Equipment Efficiencies – Listed Equipment—Standard Rating and Operating Conditions. Equipment shown in Tables 6.8.1A through 6.8.1G shall have a minimum performance at the specified rating conditions when tested in accordance with the specified test procedure. Where multiple rating conditions or performance requirements are provided, the equipment shall satisfy all stated requirements, unless otherwise exempted by footnotes in the table. Equipment covered under the Federal Energy Policy Act of 1992 (EPACT) shall have no minimum *efficiency* requirements for operation at minimum capacity or other than standard rating conditions. Equipment used to provide water heating functions as part of a combination system shall satisfy all stated requirements for the appropriate space heating or cooling category.

Tables are as follows:

a. Table 6.8.1A—Air Conditioners and Condensing Units
b. Table 6.8.1B—Heat Pumps
c. Table 6.8.1C—Water-Chilling Packages (see Section 6.4.1.2 for water-cooled centrifugal water-chilling packages that are designed to operate at nonstandard conditions)
d. Table 6.8.1D—Packaged Terminal and Room Air Conditioners and Heat Pumps
e. Table 6.8.1E—Furnaces, Duct Furnaces, and Unit Heaters
f. Table 6.8.1F—Boilers
g. Table 6.8.1G—Heat Rejection Equipment
h. Table 6.8.1H – Air Conditioners Serving *Computer Rooms*

All furnaces with input ratings of 66 Kw, including electric furnaces, that are not located within the conditioned space shall have jacket losses not exceeding 0.75% of the input rating. Air conditioners primarily serving *computer rooms* and covered by ASHRAE Standard 127 shall meet the requirements in Table 6.8.1H. All other air conditioners shall meet the requirements in Table 6.8.1A.

6.5.1 Economizers. Each cooling system that has a fan shall include either an air or water economizer meeting the requirements of Sections 6.5.1.1 through 6.5.1.4.

Exceptions: Economizers are not required for the systems listed below.

a. Individual fan-cooling units with a supply capacity less than the minimum listed in Table 6.5.1.
b. Systems that include non-particulate air treatment as required by Section 6.2.1 in Standard 62.1.

3. Where more than 25% of the air designed to be supplied by the system is to spaces that are designed to be humidified above 1.7°C dew-point temperature to satisfy process needs. This exception does not apply to *computer rooms.*
d. Systems that include a condenser heat recovery system required by Section 6.5.6.2.
e. Systems that serve *residential* spaces where the system capacity is less than five times the requirement listed in Table 6.5.1.
f. Systems that serve spaces whose sensible cooling load at design conditions, excluding transmission and infiltration loads, is less than or equal to transmission and infiltration losses at an outdoor temperature of 15.6°C.
g. Systems expected to operate less than 20 hours per week.
h. Where the use of *outdoor air* for cooling will affect supermarket open refrigerated casework systems.
i. Where the cooling *efficiency* meets or exceeds the *efficiency* requirements in Table 6.3.2.
j. Systems primarily serving *computer rooms* where

    1. the total design cooling load of all computer rooms in the building is less than 880kW and the building in which they are located is not served by a centralized chilled water plant, or
    2. the room total design cooling load is less than 175 kW and the building in which they are located is served by a centralized chilled water plant., or
    3. the local water authority does not allow cooling towers, or
    4. less than 175 kW of computer room cooling equipment capacity is being added to an existing building

k. Dedicated systems for *computer rooms* where a minimum of 75% of the design load serves:

    1. those spaces classified as an *essential facility*

2. those spaces having a mechanical cooling design of Tier IV as defined by ANSI/TIA-942
3. Those spaces classified under NFPA 70 Article 708 – Critical Operations Power Systems (COPS)
4. Those spaces where core clearing and settlement services are performed such that their failure to settle pending financial transactions could present systemic risk as described in "The Interagency Paper on Sound Practices to Strengthen the Resilience of the US Financial System, April 7, 2003"

6.5.1.2 Water Economizers

6.5.1.2.1 Design Capacity. Water economizer systems shall be capable of cooling supply air by indirect evaporation and providing up to 100% of the expected system cooling load at *outdoor air* temperatures of 10°C dry bulb/ 7°C wet bulb and below.

Exceptions: ~~Systems in which a water economizer is used and where dehumidification requirements cannot be met using outdoor air temperatures of 10°C dry bulb/7°C wet bulb must satisfy 100% of the expected system cooling load at 7°C dry bulb/4°C wet bulb.~~

a. Systems primarily serving *computer rooms* in which 100% of the expected system cooling load at 4ºC dry bulb / 2ºC wet bulb is met with evaporative water economizers.
b. Systems primarily serving *computer rooms* with dry cooler water economizers which satisfy 100% of the expected system cooling load at 2ºC dry bulb.
c. Systems where dehumidification requirements cannot be met using outdoor air temperatures of 10ºC dry bulb/ 7ºC wet bulb and where 100% of the expected system cooling load at 7ºC dry bulb/ 4ºC wet bulb is met with evaporative water economizers.

6.5.2.3 Dehumidification. Where humidistatic controls are provided, such controls shall prevent reheating, mixing of hot and cold airstreams, or other means of simultaneous heating and cooling of the same airstream.

Exceptions:

a. The system is capable of reducing supply air volume to 50% or less of the design airflow rate or the minimum rate specified in Section 6.2 of Standard 62.1, whichever is larger, before simultaneous heating and cooling takes place.
b. The individual fan cooling unit has a design cooling capacity of 23.5 Kw or less and is capable of unloading to 50% capacity before simultaneous heating and cooling takes place.
c. The individual mechanical cooling unit has a design cooling capacity of 11.7 Kw or less. An individual mechanical cooling unit is a single system composed of a fan or fans and a cooling coil capable of providing mechanical cooling.
d. Systems serving spaces where specific humidity levels are required to satisfy process needs, such as ~~computer rooms,~~ museums, surgical suites, and buildings with refrigerating systems, such as supermarkets, refrigerated warehouses, and ice arenas. ~~This exception also applies to other applications for which fan volume controls in accordance with Exception (a) are proven to be impractical to the enforcement agency.~~ This exception does not apply to *computer rooms*.
e. At least 75% of the energy for reheating or for providing warm air in mixing systems is provided from a *site-recovered* (including condenser heat) or *site-solar energy* source.
f. Systems where the heat added to the airstream is the result of the use of a desiccant system and 75% of the heat added by the desiccant system is removed by a heat exchanger, either before or after the desiccant system with energy recovery.

Add new Table 6.8.1H

TABLE 6.8.1H Air Conditioners and Condensing Units Serving *Computers Rooms*

Equipment Type	Net Sensible Cooling Capacity[a]	Minimum SCOP-127[b] Efficiency Downflow units / Upflow units	Test Procedure
Air conditioners, air cooled[3]	<19 kW	2.20 / 2.09	ANSI / ASHRAE 127
	≥19kW and < 70 kW	2.10 / 1.99	
	≥ 70 kW	1.90 / 1.79	
Air conditioners, water cooled	<19 kW	2.60 / 2.49	ANSI / ASHRAE 127
	≥19kW and < 70 kW	2.50 / 2.39	
	≥ 70 kW	2.40 /2.29	
Air conditioners, water cooled with fluid economizer	<19 kW	2.55 /2.44	ANSI / ASHRAE 127
	≥19kW and < 70 kW	2.45 / 2.34	
	≥ 70 kW	2.35 / 2.24	
Air conditioners, glycol cooled (rated at 40% propylene glycol)	<19 kW	2.50 / 2.39	ANSI / ASHRAE 127
	≥19kW and < 70 kW	2.15 / 2.04	
	≥ 70 kW	2.10 / 1.99	
Air conditioners, glycol cooled (rated at 40% propylene glycol) with fluid economizer	<19 kW	2.45 / 2.34	ANSI / ASHRAE 127
	≥19kW and < 70 kW	2.10 / 1.99	
	≥ 70 kW	2.05 / 1.94	

a. net sensible cooling capacity: The total gross cooling capacity less the latent cooling less the energy to the air movement system. (Total Gross – latent – Fan Power)
b. sensible coefficient of performance (SCOP-127): a ratio calculated by dividing the net sensible cooling capacity in watts by the total power input in watts (excluding re-heaters and humidifiers) at conditions defined in ASHRAE Standard 127. The net sensible cooling capacity is the gross sensible capacity minus the energy dissipated into the cooled space by the fan system.

Revise Section 12 as follows (SI and I-P Units)

American Society of Heating, Refrigerating and Air-Conditioning Engineers, 1791 Tullie Circle, NE, Atlanta, GA 30329	
ANSI/ASHRAE Standard 127-2007	Method of Testing for Rating Computer and Data Processing Room Unitary Air Conditioners

National Fire Protection Association, 1 Battery March Park, P.O. Box 9101, Quincy, MA 02269-9101	
NFPA 70 Article 708-2008	Critical Operations Power Systems (COPS)

Telecommunications Industry Association, 2500 Wilson Boluevard, Arlington, VA 22201	
ANSI/TIA-942-2005	Telecommunication Infrastructure Standard for Data Centers

U.S. Security and Exchange Commission, 100 F Street, NE, Washington, DC 2-549	
The Interagency Paper on Sound Practices to Strengthen the Resilience of the US Financial System	The Interagency Paper on Sound Practices to Strengthen the Resilience of the US Financial System, April 7, 2003

POLICY STATEMENT DEFINING ASHRAE'S CONCERN FOR THE ENVIRONMENTAL IMPACT OF ITS ACTIVITIES

ASHRAE is concerned with the impact of its members' activities on both the indoor and outdoor environment. ASHRAE's members will strive to minimize any possible deleterious effect on the indoor and outdoor environment of the systems and components in their responsibility while maximizing the beneficial effects these systems provide, consistent with accepted standards and the practical state of the art.

ASHRAE's short-range goal is to ensure that the systems and components within its scope do not impact the indoor and outdoor environment to a greater extent than specified by the standards and guidelines as established by itself and other responsible bodies.

As an ongoing goal, ASHRAE will, through its Standards Committee and extensive technical committee structure, continue to generate up-to-date standards and guidelines where appropriate and adopt, recommend, and promote those new and revised standards developed by other responsible organizations.

Through its *Handbook*, appropriate chapters will contain up-to-date standards and design considerations as the material is systematically revised.

ASHRAE will take the lead with respect to dissemination of environmental information of its primary interest and will seek out and disseminate information from other responsible organizations that is pertinent, as guides to updating standards and guidelines.

The effects of the design and selection of equipment and systems will be considered within the scope of the system's intended use and expected misuse. The disposal of hazardous materials, if any, will also be considered.

ASHRAE's primary concern for environmental impact will be at the site where equipment within ASHRAE's scope operates. However, energy source selection and the possible environmental impact due to the energy source and energy transportation will be considered where possible. Recommendations concerning energy source selection should be made by its members.