



# Shaping Tomorrow's Built Environment Today

## CLIMATE CHANGE AND THE BUILT ENVIRONMENT

### THE ISSUE

Worldwide concern for changes in the global climate has escalated as scientific evidence has become more definitive, linking increased concentrations of atmospheric greenhouse gases (GHGs) with global warming. As a response, ASHRAE is increasing our attention and consideration on standards, regulations, legislation and policies that involve GHGs.

When developing policy to combat climate change, it is important to consider that buildings and their heating, ventilating, air conditioning and refrigeration (HVAC&R) systems directly and indirectly contribute to GHG emissions. Buildings are responsible for more than 35% of global final energy consumption and nearly 40% of energy-related CO<sub>2</sub> emissions worldwide.<sup>1</sup> These emissions are associated with construction and the energy needed to operate buildings and building systems, and to a lesser extent indirectly through the release of refrigerants, if not properly managed. According to the United Nations Intergovernmental Panel on Climate Change (IPCC), “buildings offer immediately available, highly cost-effective opportunities to reduce energy demand, while contributing to meeting other key sustainable development goals including poverty alleviation, energy security and improved employment.”<sup>2</sup> Improving the energy efficiency, and the ongoing efficient performance of building systems provide a significant opportunity for climate change mitigation.

### ASHRAE's ROLE

ASHRAE is the leading source of information and research for HVAC&R systems and building performance making this issue a key area for our members. ASHRAE's members use their expertise to educate policymakers and promote the implementation of energy efficient design practices and sustainable technologies that can help reduce GHG emissions. This is done most notably through ASHRAE's wide-ranging standards development such as *Standard 90.1 Energy Standard for Buildings Except Low-Rise Residential Buildings*, *Standard 100 Energy Efficiency in Existing Buildings*, *Standard 189.1 International Green Construction Code*, and *Standard 105 Standard Methods Of Determining, Expressing, And Comparing Building Energy Performance And Green House Gas Emissions*. ASHRAE also has an MOU with the International Codes Council to collaborate on the development of materials and resources related to quantifying GHG emissions.

ASHRAE and its partners have published several free-to-download Advanced Energy Design Guides (including Zero Energy Building Guides for K-12 Schools and Offices), which are available for free download and provide educational guidance to reduce energy consumption while achieving proper IEQ conditions.<sup>3</sup>

<sup>1</sup> United Nations Environment Programme, International Energy Agency (IEA) , and Global Alliance for Buildings and Construction (GlobalABC), “2018 Global Status Report Towards a Zero-Emission, Efficient and Resilient Buildings and Construction Sector.” .

<sup>2</sup> Lucon, Oswaldo, and Diana Ürge-Vorsatz. “AR5 Synthesis Report: Climate Change 2014.” *Chapter 9: Buildings*, United Nations Intergovernmental Panel on Climate Change, 2014, [https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc\\_wg3\\_ar5\\_chapter9.pdf](https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_chapter9.pdf).

<sup>3</sup> For more information, see [www.ashrae.org/technical-resources/aedgs](http://www.ashrae.org/technical-resources/aedgs).

ASHRAE also developed ANSI/ASHRAE Standard 228 which sets requirements for evaluating whether a building or group of buildings meets a definition of “zero energy.”

With respect to refrigerants, ASHRAE also advances the HVAC&R field by performing research on low global warming potential (GWP) refrigerants and developing safety and classification standards on refrigerants<sup>4</sup>, developing guides and a standard for designing systems that minimize energy consumption and reduce emissions of high GWP refrigerants. As part of this effort, ASHRAE supports the global phasedown of the production and consumption of refrigerants that are high-GWP HFCs, including through legislation, regulations, and policy.

### **ASHRAE's VIEW**

ASHRAE is committed to a leadership role in reducing climate change contributed to by building systems and responding to climate change experienced in the built environment. ASHRAE recommends:

- States adopt the most recent version of ANSI/ASHRAE/IES Standard 100 for existing buildings and ANSI/ASHRAE/IES Standard 90.1, which has been a benchmark for new commercial building energy performance in the United States and a key basis for codes and standards around the world for more than 40 years. The 2019 version of Standard 90.1 is 4.3% more energy efficient than the 2016 version.
- A full evaluation of new and existing buildings' climate impacts, carbon balance, and energy performance.
- Funding for research that improves energy efficiency/utilization in HVAC&R technology to minimize GHG emissions.
- Funding for building science research leading to advanced equipment and systems, grid-interactive designs and ability to load-shift, integration of the Internet of Things (IoT), net metering, and building based energy storage systems capable of providing dispatchable energy systems.
- Promotion of carbon and energy life-cycle analysis to building owners to encourage sustainable building construction, operation and renewal.

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<sup>4</sup> For more information, see: <https://www.ashrae.org/technical-resources/bookstore/standards-15-34>