IN FOCUS

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In Focus features leaders from a discipline-specific professional membership society who discuss the trends in their profession and the opportunities presented to women in engineering and technology. In this issue, **Ginger Scoggins, P.E.**, president of the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE), discusses the latest developments and prospects in the built environment.

The built environment is undergoing a rapid and profound transformation driven by technological innovations, sustainability challenges, and the urgent need to combat the climate crisis. Within this evolving landscape, women engineers have opportunities to not only make significant contributions, but also to provide much needed leadership.

Addressing the climate

The built environment — encompassing our homes, workplaces, and infrastructure — is both a contributor to and a recipient of the effects of the climate crisis. Buildings and their systems are responsible for a significant portion of global energy consumption and carbon emissions. According to the International Energy Agency and the United Nations Environment Programme, buildings account for 40% of global energy consumption and about 33% of global carbon dioxide (CO_2) emissions. Heating, ventilation, and air conditioning, or HVAC, systems alone can account for 50% of a building's energy use. A significant portion of energy consumed by buildings often comes from inefficient design, equipment, and insulation. In some cases, buildings consume two to three times more energy than they would with optimal energy efficiency practices.

As we witness the intensification of climate-related challenges — from extreme weather events to rising sea levels — it becomes clearer that building professionals have a responsibility to lead the way in reducing our environmental impact and ensuring a resilient future.

Sustainability and energy efficiency

Throughout history, the principles of sustainability and energy efficiency have been woven into the fabric of human civilization to an extent, influencing building design and construction. From ancient civilizations that harnessed natural elements to optimize indoor comfort to modern architects and engineers who became early champions of passive solar design, the quest for balance between human comfort and the natural world has long been a driving force. Yet, today, these principles have assumed a greater sense of urgency, as the climate crisis and its effects have reached unprecedented intensity.

Every facet of the built environment is now being reimagined to minimize environmental impact. Women engineers are unquestionably positioned to drive change in this space by contributing their remarkable expertise and distinct perspectives to the building design and implementation process at every phase. Whether it involves real-time data analytics and

remote monitoring, systems driven by the Internet of Things, optimizing energy usage through smart building systems, integrating renewable energy sources such as solar panels or geothermal systems, or developing innovative heat pump technologies, women engineers can position themselves as invaluable professionals in an industry that relies heavily on data-driven decision-making.

ASHRAE global headquarters renovation project

I had the distinct honor of serving as chair of ASHRAE's $20 million building renovation project, which is intended to prove the economic viability of a fully net-zero energy operation. Using ASHRAE's own technical guidance and standards, the project incorporated myriad current technologies, from energy-efficient HVAC systems and radiant ceiling panels to water-source heat pumps and a photovoltaic system. It was exciting to lead this project and work with all the designers, contractors, and others involved in making a project like this a success. (Read "ASHRAE Nets a Big Milestone With Its Global Headquarters, *SWE Magazine*, Winter 2022.)

This flagship project showcases how advanced technologies, renewable energy sources, and intelligent design can converge to create a building that not only minimizes its environmental footprint, but also serves as a model for others to emulate. We are proud to have embarked on this journey to sustainability.

Indoor air quality and wellness

As the importance of good indoor air quality becomes more apparent, especially through the heightened awareness generated by the COVID-19 pandemic, the HVAC industry is evolving to prioritize occupant health and well-being. Women engineers can lead the charge in creating systems that not only regulate temperature but also ensure clean and healthy indoor environments. Specializing in air filtration, ventilation design, and indoor air quality assessment offers women engineers a niche within the HVAC industry, enabling them to contribute to both environmental and human health.

Diversity and inclusion

The HVAC field, like so many professions, is still grappling with a lack of diversity and inclusivity. While women in scientific fields have made significant strides since the mid-1800s, when pioneering scientist Eunice Foote first introduced the concept that we know today as global warming and climate change, there are still challenges for women in our profession. The biggest challenge in my career came shortly after the birth of my second daughter, when my boss at the time told me that I needed to decide if I was going to be a full-time mother or a full-time engineer. What I learned is that I did not need to choose between the two, but instead find a way to succeed at both. I left the company to start my own successful engineering firm.

Women engineers can advocate for a more inclusive workplace culture and drive positive change within their organizations. By participating in industry associations, networking events, and mentorship programs, women engineers can amplify their voices and contribute to reimagining the dynamics of our profession.

Staying abreast of the latest advancements is paramount for women engineers in all industries as they aim to excel in their careers. To navigate the evolving landscape, continued education and professional development are essential. Women engineers can seize opportunities for training in emerging technologies, sustainability practices, and leadership skills. By continuously honing their expertise, they position themselves for leadership roles and increased influence within their organizations.

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Entrepreneurship and innovation

The dynamic shifts in the built environment create an ideal landscape for entrepreneurial endeavors and innovative thinking. As has been the case with my own experience as a business owner, women engineers with an entrepreneurial spirit can explore opportunities to develop and market new technologies, products, or services that address emerging market needs. From designing sustainable construction materials and infrastructure solutions to launching consulting firms specializing in building decarbonization strategies that shape policy, women engineers are rapidly carving a path to address the collective challenges of our time.

Women engineers have the power to break down barriers and lead change within the industries we represent. Women engineers bring diverse perspectives and fresh insights that are crucial for tackling the complex challenges posed by the climate crisis. From optimizing energy-efficient systems to designing smart buildings that prioritize occupant well-being, women engineers have the capacity to drive innovation and usher in a new era of sustainable design and operation.

Ginger Scoggins, P.E., is a fellow of the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) and founder and principal of Engineered Designs Inc. She is serving as the 2023-24 president of ASHRAE.