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**2022-23 ASHRAE President**

**Presidential Address Manuscript
Challenge Accepted: Tackling the Climate Crisis**

I am a child of the 1970s. What a fabulous decade to be a teenager! A number of monumental events occurred during this decade, including:

* Space exploration reached new heights,
* We witnessed the end of the Vietnam War,
* and Margaret Thatcher became the first female to be elected as Prime Minister of the UK.

Also, some amazing music also came out of the 70s – music that has stood the test of time and still speaks to the current state of our world like music by Marvin Gaye, Joni Mitchell and John Lennon, just to name a few.

But, as a teenager in the 70s, I was more focused on simple things, like:

* Going to the skating rink on the weekends, which we did EVERY weekend
* Trying to style my hair like Farrah Fawcett
* And Donny Osmond, whom I had a mad crush on. Now, for those of you who weren’t around to know who Donny Osmond was back in the 70s, let me say I AM SO SORRY for you. Every teenage girl had a crush on Donny Osmond!

The 70s were also known for iconic TVs shows and it seemed like many of the popular shows of that time included cool-looking, souped-up muscle cars like those shown on the Dukes of Hazard and Starsky and Hutch, which was my favorite show at the time. My friends and I LOVED sliding across the hood of a car like they did on Starsky and Hutch’s red and white Ford Gran Torino.

I got my own muscle car when I turned 16…

Actually, it was a Ford Pinto.

Some of you might remember that the Pinto from the 70s had a reputation for exploding if the gas tank side was hit in a wreck. I don’t think my parents knew about this issue before they bought me this car – at least I hope they didn’t!

Luckily, all of my teenage wrecks impacted other parts of that car, so I survived! But in my mind, I was driving souped-up Camaro! I even had a license plate on the front that proudly stating:

Ginger’s Pony.

But, as a teenager, I was really only “vaguely” aware that the world was experiencing an energy crisis. Aside from long lines at the gas station, the biggest impact on me personally was the fact that my mother would not let us turn on the air conditioning in the car OR in the house!

You see, a few years before I could drive my “Pinto Pony,” during the height of the energy crises, my mother drove us around in the iconic car of that decade – the family station wagon. Some of you might remember it from the classic movie “Vacation” as the “Queen Family Truckster.”

There were no SUVs in the 70s. The station wagon was the car of choice for families. But, as you can imagine, they were not the most fuel-efficient vehicles.

My mother told us that her reasoning for NOT using the AC was so that we would not become dependent on the comfort of a controlled environment. In hindsight, however, most likely she was concerned with rising gas prices and higher electric bills. So, riding around on hot summer days in the South with the car windows rolled down - and yes, we actually had to “roll” the car windows down – my brothers and I would end up getting very hot.

I can tell you, when it’s hotter inside of the house than it is outside, you find reasons to GET OUTSIDE.

Some of you might remember those days of the past – when we sat on our porches on warm summer evenings and talked to our neighbors. In my small Tennessee town, we rode our bikes and motorcycles and went to the local pool to stay cool.

Little did I know that the organization to which I would be a volunteer member for most of my professional career, was already hard at work creating the first version of a standard to connect with the urgency of the energy crisis - Standard 90 – which has become the benchmark for building energy codes and is accepted around the world. ASHRAE accepted the challenge to improve energy efficiency in 1975.

And, since the 1970s, we’ve gone from approximately 20% of homes in the U.S. having central heat and air conditioning to over 70% currently, with that number still rising. Similar growth in the use of central heat and air conditioning has been seen in many other parts of the world.

Today, buildings account for nearly 40% of all Green House Gas emissions worldwide and that number is not expected to decline in the near future.

With the growth of developing economies in other parts of the world, and people moving from rural to urban areas, it is estimated that we are building the equivalent of a New York City every month across the globe. Allow that to sink in – a New York City EVERY MONTH! This is a staggering statistic.

Fifty years ago, in the 1970s, when it was hotter inside than it was outside, we went outside to cool down. Now, we are dealing with conditions where in many locations it is much hotter outside than it used to be, driving people inside to controlled environments to escape the climate extremes we’re experiencing across the globe.

So, we see where we have come from in 50 years. Where will we be 50 years into the future?

It is estimated that climate change migration, which refers to people leaving their current environment for one more stable in terms of climate-affected events, will impact over 100 million people by the year 2050, with a possible 2 billion people being directly affected in the next 50 years. This migration from current habitats to other areas of the world is due to rising sea levels, rising temperatures and natural disasters.

Climate migration from rural to urban areas will result in hotter city environments, increasing the need for additional air conditioning and more refrigerant use, creating a circular loop of higher energy consumption, hotter cities and more GHG emissions. The increase of commercial and residential air conditioning loads in the coming years is anticipated to stress the power sector and potentially be the cause of grid outages, leaving customers without the ability to operate air conditioning sources during extreme heat events, resulting is life safety issues.

 We are living in a climate emergency.

Our desire to be more comfortable has brought us to a place where we need to make uncomfortable decisions. We are seeing examples of the impact of climate change around the world! Here’s a personal example.

After graduating from college, I relocated to North Carolina. The Outer Banks of North Carolina coast is part of an intracoastal waterway that runs from Massachusetts all the way to Texas. This waterway protects thousands of homes from the worst effects of hurricanes as it lies behind barrier beaches.

Based on scientific data, North Carolina has warmed by 1 degree Fahrenheit in the past 120 years while the earth as a whole has warmed by nearly 2 degrees Fahrenheit. 2019 was declared North Carolina’s warmest year on record going back 125 years. If emissions continue to grow, North Carolina is projected to warm an additional six to ten degrees Fahrenheit by the end of the century.

So, we are going from a 1degree Fahrenheit rise in 120 years to 6-10 degree rise in the next 70 years. This could be catastrophic for our state.

With the rise in air temperatures also comes a rise in water temperatures, leading to erosion and additional acidification of our oceans. It is estimated that most of the Outer Banks of North Carolina will be lost to erosion if sea levels rise by the 2 feet predicted to occur by 2100.

This occurrence and so many similar events around the world further magnify the environmental and economic impacts of the climate crisis on a broad scale. These effects are both collective, yet very personal for us all. It's affecting me and it's affecting you, whether you know it or see it yet in your area of the globe.

Warnings from scientists on the impacts of GHG emissions and climate change are not new topics of discussion. In the mid-1800s, pioneering scientist Eunice Foote was the first scientist known to have examined the warming effect of sunlight on different gases and to suggest that an increase in carbon dioxide in the atmosphere would change the atmospheric temperature and have an effect on climate.

She published the only two scientific papers in the field of physics to be written by an American woman prior to 1889 where she hypothesized that changing amounts of CO2 in the atmosphere would alter the climate.  Her papers, however, were presented to the scientific community by a male colleague, however, for reasons unknown today.

Foote died in 1888 and for almost a hundred years her contributions were lost. However, recently it was realized that her work predated discoveries made by other scientists by five years, making her the rightful first vocal climate change advocate.

I, for one, am excited to know that the rightful first voice of climate concerns came from a woman. I’ve often found myself wondering what it was like to be a scientist and a female in the 1880s. I know what it was like to be an engineer and a female in the 1980s - a scant 100-year difference in time between Ms. Foote’s career and the start of my own career.

While women in scientific fields had made significant strides from the 1880s to the 1980s, there were still challenges for women in our industry. I’ve been a consulting engineer since I graduated from college and started my career in 1986. Personally, 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. Career and parenthood are not mutually exclusive choices so, clearly, I didn’t have to decide between one or the other, but I did need to understand what I needed to do to succeed as both. I accepted this challenge and this decision took the shape of my leaving that company and starting my own business – 26 years ago – and now, my business competes with my old company.

Our industry has come a long way – and even further since the 1980s – in terms of gender acceptance, recruitment and recognition. I can see a day when “being a woman” in this industry will not be an anomaly, but will be the norm, with equal representation among genders. Diversity, Equity and Inclusion are more than mere buzz phrases for our Society. ASHRAE has accepted the challenge of addressing inequities, embracing our diversity and empowering all of our members to have a voice.

I’m sure I’m not the only one that has faced an individual challenge, but now it’s time to address our collective challenges.

Even today, after signing the Paris Climate Agreement and with the heightened focus on being climate aware and along with the catastrophic climate events that we are witnessing routinely, the world still has a strong appetite for fossil fuels, which are a major contributor to greenhouse gas emissions.  And this is not going to end overnight. Each year, humans across the globe emit more than 35 billion tons of carbon dioxide (CO2) into the atmosphere by burning fossil fuels.

This video from NASA shows the global accumulation of Co2 over the course of one year and how it moved across the globe between June 2020 and July 2021. While seasons greatly affect the absorption of Co2, there is no question that we have an excess of this gas on our planet.

Don’t get me wrong, fossil fuels are a necessary energy source until we can make a clean-energy transition. Until our power grids can sustain increased electrical loading and be dependable during natural disasters. Until we have affordable solutions for remote areas of the globe where central power is not available nor reliable. We are not going to be able to eliminate our dependance on fossil fuels immediately, but we can look at ways to reduce and accept the challenge of our day regarding the impact of our buildings on the climate crises by reducing our dependance on fossil fuels.

For the last two years, ASHRAE has had the distinct honor of being involved in the UN’s Climate Change Conference with leaders from around the world and one of the most profound conclusions from these events is that the world is currently NOT on track to limit global warming to a 1.5 degree Celsius, but instead global warming is estimated to rise by over 3 degrees C by 2100 at this point. Researchers now say there's a 66% chance we will pass the 1.5C global warming threshold between now and 2027. Breaking the limit even for just one year is a worrying sign that warming is accelerating and not slowing down.

Mitigation efforts may slow the rate of increase but are not likely to reverse the trend. Science tells us that to keep global temperatures from rising by more than 1.5° Celsius consistently, we need to achieve net-zero greenhouse gas emissions in just two decades from now, meaning our dependance on fossil fuels has to be addressed in order to meet this challenge.

The climate crisis is here. Whether you believe we are in a human-made crises or experiencing a natural climate transition, based on scientific evidence, there is no doubt that humans are accelerating the change in the climate that we are experiencing.

But there is hope!

Through human ingenuity and determination, we can find solutions to the global climate crisis. As ASHRAE volunteers, this *is* what we do!  We accept challenges and we solve problems!

Let me give you a quick snapshot of positive efforts that have occurred in recent years and what you can do as ASHRAE members to accept the challenge of addressing the climate crisis and decarbonizing the global built environment.

* In 2022, China’s total installed solar power was 1,180 gigawatts. China is the leader in renewable energy installations around the world. The US is second.
* In 2008, the government of British Columbia, already well ahead of the national and global curves with its carbon tax, began requiring local governments to include climate targets and plans in their community planning and growth strategies.
* New York City and several other cities and states throughout the US are implementing building performance standards with a focus on carbon reduction.

Renewable energy has been the largest source of NEW electricity generation on earth since 2015. It will take the combined efforts of ASHRAE engineers, architects and other building professionals to address the challenges of the building sector’s impact on climate change. We must augment the skills we have with new information necessary to adapt to a climate-adjusted future with resilient buildings.

An understanding of how climate change and the resulting natural disasters affect building planning, design, construction and operation is necessary to properly execute projects going forward. ASHRAE’s thought leadership in the area of building decarbonization is recognized now more than ever.

In 2019, the American Institute of Architects (AIA), commissioned a Blue Ribbon panel to determine organizational influences in addressing the challenges of the future. In the panel’s document, titled “Disruption, Evolution and Change,” ASHRAE is cited as being and I quote “best positioned to play a significant role in facilitating transition to the higher performance levels proposed in their plan. As a significant provider of industry training and continuing education.

ASHRAE is recognized as a leader in the accelerated transfer of knowledge to achieve the plan’s goals.”  Other organizations need us and we need them.

In order to address the coming challenges to our industry, we have to commit to action. ASHRAE has committed to the following efforts:

**Equipping** our members with sufficient knowledge and tools to design resilient new and renovated buildings so they can address the impact of the built environment on climate change.  We have accepted this challenge!

**Expanding** our efforts of designing energy efficient buildings by being cognizant of all aspects of carbon reduction in buildings, including embodied carbon, refrigerant use and reduction, and end-of-life carbon. We have accepted this challenge!

**Providing** meaningful leadership, action, resources and advocacy to the global built environment in response to the challenges of climate crisis.  We have accepted this challenge!

In order to equip our members with the knowledge needed for our climate advocacy efforts, our Task Force for Building Decarbonization has laid out a road map for our organization to follow, and provided guidance, education, and training for our members to use on their journey. ASHRAE’s focus on building energy efficiency is as important today as ever, because the cleanest energy is energy not used!

Seven guides are being developed, along with “how to” videos, providing practical information and applications for our members to understand how to design new and renovate existing buildings to reduce or eliminate carbon emissions.

The first guide - the Building Performance Standards guide - was released in February of 2023 and is available for free download on our website. The other guides are anticipated to be released this coming Society year.

We are also providing training through ASHRAE Learning Institute courses focusing on building decarbonization, as well as providing invaluable technical guidance focusing on our commitment of reducing carbon emissions with the release of a new Building Decarbonization resource page.

We have also expanded our focus from providing guidance on energy-related carbon, or operational carbon, to focusing on the whole life cycle of carbon in buildings – this is the carbon that goes into our buildings during construction, during the building life, and during its demolition.

We are retooling the focus of our existing standards to address carbon as well as energy, including our major Standards like 90.1, Standard 100 and the International Green Construction Code (IgCC).

ASHRAE is addressing the greenhouse-gas emissions of refrigerants in Standards 15 and 34. Refrigerant leakage is a huge contributor to greenhouse gas emissions each year and our TFBD is discussing how to address this issue within the ASHRAE structure.

We have also developed two new standards addressing carbon as well as energy -- Standard 228 was recently released which provides a standard method of evaluating zero net energy and zero net carbon building performance.

And Standard 240p, which is in the final stages of addressing public review comments, will provide a methodology to assess greenhouse gas emissions associated with buildings over their life cycle. This standard went from conception to public review in just 4 months – an ASHRAE record – which shows what we can do when we want to move fast.

We have worked to integrate a carbon-reduction focus throughout our ASHRAE committees, councils, and leadership and PROVIDE our industry with a clear indication of our commitment to this issue. We have several other initiatives underway, with a plan for their completion during this society year.

The Honors and Awards committee is developing a new award based on carbon metrics named after Eunice Foote. We hope the first awardee to be at the 2024 Annual Conference in Indianapolis.

Last year, the ASHRAE Hellenic Chapter held ASHRAE’s first Decarbonization Conference in Athens, Greece. This year, we are expanding that focus with an industry-wide decarbonization conference in the fall of 2023 in the Washington, D.C. area where we will be bringing together architects, engineers, facility managers, owners and operators to discuss how we, as an industry, will be addressing the impact of buildings on carbon emissions. We are also in the preliminary planning stages of our 3rd decarbonization conference in the Spring of 2024 in Madrid, Spain.

ASHRAE is also leading the industry by working to reduce our own Scope 1, 2, and 3 emissions. We are in the process of researching and understanding our Society’s carbon footprint with the goal of reducing our own impact on climate change. As part of this effort, we will also be providing developing guidance to ASHRAE chapters so they can work to understand, improve, and reduce their carbon footprint.

Decarbonizing the built environment will require an incredibly broad array of actions and applicants are encouraged to think creatively about their submissions, collaborate with local engineering and community organizations, and engage industry partners to maximize their impact and visibility of their efforts.

Awardee’s will be invited to receive their grants in person at the ASHRAE winter meeting and discuss their efforts at the next Annual meeting in Indianapolis.

So, we’ve come full circle. It’s OUR time to act.

We did it in the 70's and we will do it today. We have accepted this challenge.

Personally, the more I read and understand about the climate crisis, the more I feel compelled to change the way I think about my impact on the world in order to leave it in the best shape for my kids and my future grandkids. We’ve come a long way in technology development since the days of my explosive Pinto Pony!

Everyone can help limit climate change. From the way we travel to the electricity we use and the food we eat, we can make a difference.

As ASHRAE Presidential Member Farooq Mehboob, most recently reminded us, we need to arm ourselves with the knowledge that comes from seeking important, accurate and relevant information about our industry and the world around us in our journey towards ‘Securing Our Future’ for generations to come.

Now, here’s a collective challenge for everyone:

Educate yourself on the topics and initiatives that we highlighted and accept the challenge of passing your knowledge along to others – to your colleagues, to other industry professionals and to those in your community. You can accept this challenge by:

* Increasing your knowledge through attending an ALI course, downloading guidance from the building decarbonization resources page or by attending the Decarbonization Conference in the fall.
* Participate in a standards development committee.
* Learning from others that are further along on their journey of understanding than you are and being an advocate for change.

Pick one…or more…and take action.

The more I learn, the more I realize what a daunting task it is to understand all the concepts, the research, the endless data and the countless viewpoints on how best to address the climate crisis. I challenge you to rely on ASHRAE’s more than 125 years of research and dedication to the built environment. I challenge you to be a part of finding new solutions through your participation.

ASHRAE has accepted the challenge of our time…and we need you to join us.

Let’s learn as much as we can and implement what we learn.

Let’s build a better world for ourselves, our children and for generations to come.

I’ve accepted the challenge and I hope you’ll join me.