2023 Decarbonization Conference for the Built Environment
October 25th - October 27th, 2023

Wednesday, October 25

Wednesday, October 25, 8:10 AM - 9:00 AM
**Keynote**

**Chris Turner**

**How to be a Climate Optimist**

*Room: Salon 4*

Energy transition strategist Chris Turner presents a powerful case for optimism in the face of the challenge of climate change. Turner has been reporting on clean energy, sustainable business, and smart green design the world over since long before any of these were mainstream interests, and he draws on the full breadth of his extensive reporting to paint a vivid portrait of a global energy transition already tackling the climate crisis and pointing the way to a much brighter future. Turner's presentation illustrates not just the viability but the deep desirability of decarbonization -- for the built environment and beyond.

Wednesday, October 25, 9:10 AM - 10:10 AM

**Panel 1 (Intermediate)**

**ASHRAE Decarb Guidebook Panel**

*Room: Salon 4*

*Chair: Troy Savage*

*Panelists: Heather Burpee, Austin Barolin and Christina Sanborn, (1)Mazzetti, San Francisco, CA(2)University of Washington, Seattle, WA*

Rather than “doing no harm,” healthcare is actively fueling the carbon fire. In response, ASHRAE commissioned a healthcare decarbonization guide, and the California Energy Commission sponsored decarb:Healthcare. In this interactive session with authors of the ASHRAE and CEC guides, we share a peek “under the hood” at the collaborative guidebook currently in development — technologies and methods that will be key to decarbonizing our healthcare systems. You will learn best practices in hospital design, review case studies from new healthcare decarbonization projects, and hear about the ideas for motivation and incentive programs to implement decarbonization.
Moving Decarbonization from Theory to Reality
Room: Studio E
Chair: Xudong Wang, PhD, Full Member, Air-Conditioning, Heating and Refrigeration Institute (AHRI), Arlington, VA,
Panelists: Stephen Yurek, Air-Conditioning, Heating, and Refrigeration Institute, Arlington, VA, Katrina Metzler, National Energy and Utility Affordability Coalition, Washington, DC, DC and Don Davis, Building Owners and Managers Association (BOMA), Washington, DC, DC
Federal, state, and local governments across North America are evaluating strategies to reduce greenhouse gas (GHG) emissions across building sectors. The US HVACR and Water heating industry has been playing a key role in achieving the nation’s decarbonization goal. Panelists from the industry will discuss some key unanswered questions about the economic, technical, and logistical feasibility of decarbonization strategies for building space and water heating. The discussion will also cover technology pathways, environmental and equity justice from perspectives of manufacturers, consumers and building operators.

Strategies to Achieve Low Carbon Operations: Tackling Overlooked Elements of Embodied and Operational Carbon
Room: Studio D
Chair: Manny Garcia, effecterra, Reno, NV
Part 1: Current life cycle assessment software applications offer powerful computational capabilities to estimate embodied carbon in the built environment. However, various challenges are encountered when applying these tools for certain use cases, in particular tenant improvements. We will discuss pragmatic approaches for estimating the embodied carbon from tenant improvements. Part 2: Operational Carbon cannot be minimized without tackling refrigerants. Current refrigerants are very potent greenhouse gases and can account for 20-30% of an organization's Scope 1 emissions. We will discuss how federal and state regulations will help reduce the climate threat from refrigerants and how we can do more.
1. Strategies to Achieve Low Carbon Operations: Tackling Overlooked Elements of Embodied Carbon
   Manny Garcia, effecterra, Reno, NV
2. Strategies to Achieve Low Carbon Operations: Tackling Overlooked Elements of Operational Carbon
   Michael May, Member and Manny Garcia, effecterra, Reno, NV

What Should I Know: Understanding the Existing and New Decarbonization Policies
Room: Studio B
Chair: Harry Bergmann, Associate, U.S. Department of Energy, Oak Ridge, TN
There are a number of programs and policies already in place and there are a number of them that are being developed across the USA that could help decarbonize the built environment. This session will dig deep into the US Department of Energy's State and Community Program that includes adoption of the latest model codes, zero energy codes and building performance standards, and how those strategies align with the Inflation Reduction Act. In addition, there will be clarification for the developing policies, in hopes that they will provide a harmonized system for regulations, that are envisioned by the policymakers.
1. Decarbonization through Innovative Building Codes and Performance Standards
   Harry Bergmann, Associate, U.S. Department of Energy, Washington, DC
2. Decarbonization Drivers: Guidelines, Standards and Regulations
   Helen A Walter-Terrinoni, Full Member and Jennifer Kane, (1)Trane Technologies, Skaneateles, NY, (2)Trane Technologies, Washington, DC
Building Industry Decarbonization Collaboration

Room: Studio E

Sponsor: TFBD ExCom
Chair: Clay Nesler, The Nesler Group, Fort Myers, FL
Panelists: Ginger Scoggins, Engineered Designs Inc, Cary, NC, Billy Grayson, Urban Land Institute, Washington, DC, Laurie Kerr, U.S. Green Building Council, Washington, DC, Emily Grandstaff-Rice, AIA, Don Davis, Building Owners and Managers Association (BOMA), Washington, DC, and Laurie Gilmer, IFMA, Houston, TX

Building industry collaboration can have a critical role in educating and training industry professionals and stakeholders on building decarbonization strategy, policies, and practices. Representatives from AIA, ASHRAE, BOMA, IFMA, ULI and USGBC will provide an overview of their organization’s building decarbonization activities; discuss why building decarbonization is important for their members; and share how greater industry collaboration can accelerate building decarbonization planning and progress.

Drivers for Decarbonization: Model Codes, Zero Codes and Building Performance Standards

Room: Salon 4
Chair: Harry Bergmann, Associate, U.S. Department of Energy, Oak Ridge, TN
Panelists: Bing Liu, PE, Fellow Member, Pacific Northwest National Laboratory, Portland, OR, Katie Bergfeld, DC DOEE, Washington, DC and Adam W Hinge, PE, Fellow Member, Sustainable Energy Partnerships, Tarrytown, NY

Experts from industry, government, and research will convene for a mix of presentations and discussion around the role that model codes, zero energy codes, and building performance standards can play in decarbonizing the building stock. The underlying question will push panelists to offer solutions to enable a lifecycle-approach to building energy and emissions management. Audience participation through Q&A will be encouraged.

Impact for Decarbonization: Existing Building Policies, Perspectives from the field on Building Performance Standards

Room: Studio B
Chair: Carolyn Sarno Goldthwaite, ClearlyEnergy, Bedford, MA
Panelists: William M Goodrum, PE, CEM, CMVP, Member, NORESCO, Monroeville, PA, Randall Higa, Southern California Edison, Pasadena, CA, Crystal Egelkamp, Colorado Energy Office, Denver, CO, Nicholas L Long, PE, Full Member, NREL, Lakewood, CO, United States and John Balfe V, Northeast Energy Efficiency Partnerships (NEEP), Boston, MA

Existing building decarbonization plays a key role in reducing the impact of buildings on the climate crises. Existing building policies, like energy benchmarking and building performance standards, are a method for driving decarbonization in existing building stock. These policies impact a wide group of stakeholders, and this panel brings together experts from several key stakeholder groups to share perspectives on development and implementation of equitable existing building policy. Panelists from national laboratories, state government, non-governmental organizations, utilities, software providers and code consultants will engage with the audience to discuss approaches for equitable and sustainable building decarbonization through existing building policies.


Room: Studio D
Chair: Derek Supplee
Panelists: Leigh-Golding DeSantis and David Ross, (1)Johnson Controls(2)ESG Climate and Infrastructure Advisory (KPMG)
To achieve net zero and meet environmental regulations, it’s critical that building owners accurately assess carbon footprints, set emissions targets, manage emissions and track progress for reporting. Complicated spreadsheets are not going to cut it. Instead, advanced digital data collection and analytics make it possible for building owners to effectively manage scope 1 and 2 emissions and generate reports for major certification and compliance frameworks. This presentation demonstrates how digital documentation simplifies accurate emissions assessment, target-setting, tracking and reduction management from the facility to enterprise level.

Wednesday, October 25, 12:15 PM - 1:00 PM
Keynote
Heather Clark
Director for Building Emissions
White House Climate Policy Office
Room: Salon 4

Wednesday, October 25, 1:40 PM - 3:10 PM
Panel 7 (Intermediate)
Leading by Example to Decarbonize the Building Stocks: Strategies, Best Practices and Financial Options from the Federal Programs in U.S.
Room: Salon 4
Chair: Bing Liu, PE, Fellow Member1
The global climate crisis demands urgent action. The Biden-Harris Administration has taken a bold step by setting an ambitious target of achieving net-zero emissions in buildings by 2050, with 50% reduction by 2035. To shed light on strategies for achieving low carbon buildings, retrofitting best practices, and funding options for low carbon building projects, we are honored to have a panel of distinguished leaders from the Building Technologies Office and Federal Energy Management Program Office at the U.S. Department of Energy, the White House Council on Environmental Quality and General Service Administration to provide valuable insights into this critical issue.

1:40 PM - 3:10 PM
Panel 8 (Intermediate)
Lessons Learned from the Trenches of Decarbonization
Room: Studio E
Chair: Emma Hughes, RE Tech Advisors, McLean, VA
This session presents a deep dive into how real estate companies are implementing strategies to decarbonize their assets and portfolios. Moving beyond the process of setting targets – the session will provide concrete, actionable strategies that industry professionals can use to move the needle on carbon emissions reductions and identify common pitfalls to avoid. Presenters will share their unique perspective on how they are translating their company’s targets into comprehensive carbon reductions at individual facilities or properties. They will discuss what it takes to successfully implement market-leading carbon reduction programs that drive meaningful reductions.

1:40 PM - 3:10 PM
Panel 9 (Basic)
Embodied Carbon Harmonization and Optimization (ECHO) Project
Room: Studio D
Sponsor: 2.5 Global Climate Change
Chair: Andrew Flines, Carbon Leadership Forum
Panelists: Jessica Bristow, ILFI, Melissa Morancy, AIA, Katie Poss, Building Transparency, Lauren Alger, Infrastructure, Pamela Conrad, Climate Positive and Kayleigh Houde, BuroHappold, Los Angeles, CA
Reducing the carbon footprint of the built environment is possible, but it will require collaboration to foment the needed market transformation toward regenerative carbon strategies in the coming years and decades. During this panel you will hear from individuals that are part of Architecture 2030, MEP 2040, Carbon Leadership Forum and more. Together, they are working toward streamlined carbon data collection and reporting, key terminologies, consolidated industry capacity building, and speaking together with a harmonized voice on the topic of whole life carbon.

**1:40 PM - 3:10 PM**

**Panel 10 (Advanced)**

**Paradigm Shift: How Building Performance Standards Reshape How Building Owners Plan for Building Updates and Renovations**

*Room: Studio B*

*Chair: Theresa Backhus, LEED AP, Institute for Market Transformation, Washington, DC,*

*Panelists: N. Scott Emery, PE, Full Member, Baumann Consulting, Washington, DC, Nigel Twose, Board at Shoreham West Cooperatives, Washington, DC, Charles E Kirk, P.E., Full Member, TRC Engineering, Gaithersburg, MD and Matthew Borger, Donohoe Commercial Real Estate, Bethesda, MD*

Building Performance Standards are gaining regulatory ground in efforts to decarbonize the built environment. Washington, DC’s Building Energy Performance Standard (BEPS) was signed into law in 2019 and is now two and a half years into its first cycle. DC owners of every building type are taking steps to reduce energy use and bring their buildings up to the standard. This panel of DC based stakeholders shares how DC’s BEPS is changing the existing building market. The panel explains policy basics, addresses policy-related challenges and opportunities, and shares examples of implementation successes.

**Wednesday, October 25, 3:30 PM - 5:00 PM**

**Seminar 3 (Intermediate)**

**Applying GHG Emission Reduction Audits to Decarbonize Buildings**

*Room: Studio E*

*Chair: Nora Hart, Lawrence Berkeley National Lab, Berkeley, CA, Stet Allen Sanborn, AIA, Full Member, Smithgroup, Washington, DC, Barry C Abramson, Life Member, Servidyne, LLC, Atlanta, GA and Hannah Debelius, U.S. Department of Energy*

With many organizations making ambitious public commitments to reducing their operational greenhouse gas emissions, there has been a shift in the building industry from a focus on energy efficiency to decarbonization. This panel will discuss how typical energy audits can be augmented to develop a plan for systematically decarbonizing buildings. A DOE representative will briefly present a recently published resource titled, GHG Emissions Reduction Audit: A Checklist for owners, an ASHRAE 211 expert will share how the 211 Informative Appendix will be updated to include decarbonization, and there will be a discussion on how audits can enable impactful decarbonization.

**Applying GHG Emission Reduction Audits to Decarbonize Buildings**

*Hannah Debelius, U.S. Department of Energy*

**3:30 PM - 5:00 PM**

**Seminar 4 (Intermediate)**

**Benchmarking and Reductions: Evaluation Processes and Whole Life Carbon Approach**

*Room: Studio D*

*Chair: Luke C H Leung, PE, Fellow Member, Skidmore Owings & Merrill, Chicago, IL*

Understanding the decarbonization process is critical for the ability for the owners, operators, and designers to evaluate the process to benchmarking your facilities. Having an informed team on how to perform the benchmarking process is critical to understanding your starting point on the path to carbon neutral. The path to achieving those goals must include the concern over current emissions from grid connected equipment and the future expected electric grid emissions rate over the span of the project expected life and sensitivity analysis. This process focuses on whole life carbon zero, and beyond, to arrive at a low entropy future.

1. **Whole Life Carbon and Beyond to a Sustainable Future**

   *Luke C H Leung, PE, Fellow Member, Skidmore Owings & Merrill, Chicago, IL*

2. **An International Portfolio Perspective: Carbon Measurement, Benchmarking and Reduction**

   *Danielle Khoo, PE, Associate, Marriott International*

3. **Decarbonization 101: Exergy-Based Measures, Metrics and Terminology**

   *Birol I Kilkis, Ph.D., Fellow Life Member, OSTIM Technical University, Ankara, Turkey*
Reducing Emissions through Policy, Planning and Action
Room: Studio B
Chair: Coral Winona Pais, P.E., Full Member, DLR Group, Omaha, NE
In an effort to address climate change and move towards decarbonization of buildings, policymakers across the country are enacting building performance laws that require buildings and agencies to meet certain performance standards. This session will review trends across the country that are driving building-focused legislation and codes and ways in which institutions are at the forefront in raising awareness and providing support to those impacted by these standards. This session will also provide a detailed review of how a government agency like the DC Department of Government Services developed an Energy Management Plan to reduce emissions.

1. Building Performance Standards: Driver of Decarbonization
   Theresa Backhus, LEED AP, Institute for Market Transformation, Washington, DC

2. The Role of Energy Management Planning in Reducing Carbon Emissions
   Jen Croft, Department of General Services, Washington, DC

   Jui-Chen Roger Chang, P.E., BEMP, Fellow Member, Buro Happold, Washington, DC

Update on ASHRAE's Decarbonization Guides
Room: Salon 4
Sponsor: TFBD
Chair: Blake E Ellis, PE, Fellow Member, Burns & McDonnell, Kansas City, MO
ASHRAE is in the process of developing six (6) decarbonization guides. Each of the guides covers a different segment of decarbonization. A member from the ASHRAE working groups that led the development of the guide will provide insight into the purpose of the guide and the intended audience. For guides that will have already been published, a deeper overview of the guide will be presented than what can be gathered through the table of contents. For guides that are still under development, this seminar provides the audience with a sneak peek at the content of the guide.

   Adam W Hinge, PE, Fellow Member, Sustainable Energy Partnerships, Tarrytown, NY

   Katherine G Hammack, CEM, LEED-AP, GBCI, Neskowin, OR

   Michael P Deru, PhD, Full Member, NREL (National Renewable Energy Lab), Lakewood, CO

   Ted Michael Tiffany, Building Decarbonization Coalition, Member, Building Decarbonization Coalition, Santa Rosa, CA

5. Decarbonizing Hospital Buildings Guide Update
   Timothy M Peglow, PE, SASHE, Associate, MD Anderson, Houston, TX

Thursday, October 26

Thursday, October 26, 8:10 AM - 9:00 AM
Keynote
Industry Executive Roundtable
Chair: Wade H Conlan, P.E., Member ASHRAE, BCxP, CxA, LEED®-AP BD+C, Full Member, Hanson Professional Services, Maitland, FL
Ginger Scoggins¹, Lakisha Woods², Henry Chamberlain¹ and Laurie Gilmer⁴, (1)Engineered Designs Inc, Cary, NC, (2)The American Institute Architects, (3)BOMA, (4)IFMA, Houston, TX
Room: Salon 4
The goal of this session is to highlight the organizations and their industry leaders, that created this event so they can address how the building industry can improve the impact buildings have on the global climate crises. The discussion focuses on the path forward for these organizations and how working together can reduce or reverse the impacts of the built environment on the
global carbon footprint. This includes discussions on the roles of each member of the different organizations. The intent is to discuss macro level issues within the industry and to see where the built environment is shifting.

Thursday, October 26, 9:10 AM - 10:10 AM
Panel 11 (Advanced)

Whole Life Carbon for Building Systems
Room: Studio D
Chair: Webley Lynn Bowles, Senior Project Manager, New Buildings Institute (NBI), Portland, OR
Panelists: Ghina Annan, Stantec, Calgary, AB, Canada, Josh Jacobs, LEED AP+ BD&C, WAP Sustainability, Nashville, TN, Michael P Deru, PhD, Full Member, NREL (National Renewable Energy Lab), Lakewood, CO and Luke Leung, Principal of the Sustainability Engineering, Fellow ASHRAE, Skidmore, Owings and Merrill LLP, Chicago, IL
Mechanical, Electrical, and Plumbing (MEP) systems are the largest energy consumers and the largest source of operational carbon emissions in buildings; however, the embodied carbon, (i.e. emissions from the production, transportation, and installation of these components) is also important. Whole life carbon is a crucial concept that considers the total carbon footprint, including the operational carbon, refrigerant leakage, and the embodied carbon over the life of a building. A whole life carbon approach allows designers to focus on the carbon intensive components and the interaction between components. This session will provide strategies for reducing whole life carbon of MEP systems.

9:10 AM - 10:10 AM
Seminar 7 (Intermediate)

Decarbonization of Fully Occupied Public Housing
Room: Salon 4
Chair: John B Peavey, PE, Home Innovation Research Labs, Upper Marlboro, MD
This session describes the process of decarbonizing two existing, 3-story, multifamily building in Albany, NY. Each building, circa 1973, consists of eight 2-story apartments on the upper levels that are above seven 1-story apartments on the lower ground level. The decarbonization process will incorporate two phases. The first is a major retrofit of the building thermal envelope and the ventilation system. The second is the replacement of the existing natural-gas-fired domestic hot water and space heating system with an electric heat pump system. The retrofits will be accomplished while retaining full occupancy of the building.

1. Envelope Upgrades for Public Housing Decarbonization
John B Peavey, PE, Home Innovation Research Labs, Upper Marlboro, MD
2. Combined Electric Space Heating and Domestic Hot Water for Public Housing
Daniel H Nall, PE FAIA FASHRAE CPHC, BEMP and HBDP, Fellow Life Member, Daniel Nall, Consultant, LLC, Princeton, NJ

9:10 AM - 10:10 AM
Seminar 8 (Advanced)

Minimizing Operational Carbon within Whole Life Carbon for New Construction
Room: Studio B
Chair: Jamy Bacchus, PE, Full Member, ME Engineers, Denver, CO
This session will review the operational carbon from (B6) energy usage emissions along with (B7) water and wastewater emissions and (B1) refrigerant leakage (C1) end-of-life leakage with respect to the building's (A1-A5) construction related emissions for a 28-yr study period. We will present the results for office and multi-family buildings in five different climate zones to review what strategies led to the lowest operational GHG emissions. We will tally the GHG emissions per ASHRAE Standard 240P (using EN 15978 nomenclature) and review the carbon offsets in order to achieve net zero carbon per ASHRAE Standard 228.

1. Optimizing Buildings for Zero Carbon Lifetime Operations
Jamy Bacchus, PE, BEMP, Full Member1, Caitlin Erin Anderson, P.E., Associate2 and Sedighehsadat Mirianhosseinabadi, Ph.D., Associate3, (1)ME Engineers, Denver, CO, (2)ME Engineers, Boulder, CO, (3)ME-Engineers, Eureka, MO

9:10 AM - 10:10 AM
Seminar 9 (Intermediate)

Moving Faster to Net-Zero and Building Decarbonization Utilizing Automated Emissions Reduction
As renewable energy generation accelerates, the grid cannot always accept renewable generated power so wind or solar is curtailed. Knowing when these periods of wasted clean energy happen enables a powerful new tool to deploy for building decarbonization: timing. Timing a building’s energy usage to consume more during periods when renewables would otherwise be wasted and reducing usage during periods when fossil fuels are generating, overall emissions are reduced while keeping energy use largely the same. Wasting less renewable energy creates favorable market conditions for new solar and wind to be built, further accelerating the transition to net-zero.

**1. Moving Faster to Net-Zero and Building Decarbonization Utilizing Automated Emissions Reduction**

*Geoffrey J Hancock, Full Member* and *Josh Mullen*, (1)WattTime, Oakland, CA, (2)BrainBox AI, Montreal, QC, Canada

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Thursday, October 26, 10:30 AM - 12:00 PM

**Panel 12 (Intermediate)**

**Real Estate Strategies to Achieve Low Carbon Operations**

*Room: Studio D*

*Chair: Marta Schantz, LEED GA, Fitwel Ambassador, Urban Land Institute, Washington, DC*

*Panelists: Elena Alschuler, LaSalle Investment Management, Washington, DC, Summer Haltli, FCP, Washington, DC and Eric Tilden, PE, LEED AP, Elme Communities, Washington, DC*

We all know it’s critical to decarbonize commercial buildings operations as the industry works to reduce emissions in line with the Paris Agreement. How is real estate doing it? What strategies are they using to reduce carbon operations in existing buildings, and how are they making it pencil financially? Energy efficiency, renewable energy, grid interactivity, electrification… join speakers as they walk through their firms’ asset-level and portfolio-level strategies – as well as the business case for them - to decarbonize toward net zero.

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10:30 AM - 12:00 PM

**Panel 13 (Intermediate)**

**Tackling Carbon: Ways to Reduce Operational and Embodied Carbon for your Building and Site from Design through Post-Occupancy**

*Room: Studio B*

*Chair: Amy Pastor, PE, CxA, LEED AP, ENV SP*

*Panelists: Tom Hoepf, FAIA, Lindsey Landwehr-Fasules, LEED AP, WELL AP, SITES AP and Curt Wade, CEM, BEP, PMP, LEED AP, (1)EXP, Maitland, FL, United States(2)Turner Construction Company(3)University of Notre Dame*

Decarbonization of our buildings and sites is important in our industry and for the world. This session will explore opportunities to reduce and eliminate operational and embodied carbon for your building and associated site through best practices and practical approaches for architecture, engineering, design, construction and operations. From integrated design processes, use of all-electric technologies, lower carbon options for structures and paving materials (i.e. parking lots, landscape materials) and reducing emissions during construction, the panel will discuss how a collaborative team effort can create a ZERO building – today and for tomorrow.

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10:30 AM - 12:00 PM

**Seminar 10 (Intermediate)**

**So, How Are We Going to Decarbonize the Whole Federal Building Portfolio?**

*Room: Salon 4*

*Chair: Ken Sandler, PhD, GSA, Washington, DC*

The White House has set ambitious greenhouse gas (GHG) reduction goals, notably to cut federal building GHG emissions to net zero by 2045. The General Services Administration (GSA) is beginning to tackle the challenge of how to bring 185 million square feet of space in 1670 owned assets to carbon neutrality. Among the issues to confront: how to prioritize existing buildings for energy retrofits; how to identify and apply the best clean energy & electrification technologies and practices; and how to fund these investments. This session will include illustrative case studies while describing the larger strategy GSA is pursuing.

**The Federal Building Decarbonization Moonshot**

*Ken Sandler, PhD, GSA, New York, NY*

1. GSA Case Study on Decarbonization

*John Anthony Kliem, PE, CEC, Johnson Controls, Inc., Fairfax Station, VA*

2. GSA Strategic Outcomes
Unique Methods to Minimize Operational Carbon

There are many strategies to reducing your carbon impact through the operation of the facility and systems, and this session covers some unique concepts that can be applied to your facility and projects. Understanding how potential incentives, such as the Inflation Reduction Act (IRA) can be applied to change some financial hurdles, it is crucial to understand and evaluate different energy contracts and how those can be utilized to increase cost savings and return for facility improvement measures. This session also covers the impact of cold climate on a campus and its path to carbon neutrality.

1. The Coming Age of a Smart Grid and Smart Buildings
   Thomas M Lawrence, PhD, LEED-AP P.E. Ph.D., Fellow S-B-a Member, University of Georgia, Athens, GA

   Jason Masters, Buro Happold, New York, NY

3. The Path to Decarbonizing Campuses in Cold Climates
   Ghina Annan, Stantec, Ottawa, ON, Canada

4. Decarb Retrofits: The Role of O&M Programs
   Charles Jelen, Associate, Trane Technologies, La Crosse, WI

Leading by Example: Let’s Examine Several Case Studies that Emphasize Decarbonization at Scale and Discuss How USGBC is Prioritizing Decarbonization in the Next Version of LEED

With decarbonization of the built environment being at the forefront of sustainability, identifying opportunities for intervention to reduce carbon emissions are vital to increasing the scale of impact. In this panel, the participants will evaluate the opportunities and challenges of addressing holistic carbon throughout a building’s lifecycle. They will explain strategies for reducing carbon from the perspective of materials, electrification, and energy efficiency; will analyze two case studies of decarbonization principles being applied in a new construction and existing building LEED project; and will discuss the updates coming in LEED v5, relating to decarbonization within the EA and MR categories.

Building Integrated Strategies for Grid Decarbonization and Net Zero Operations

Achieving low-carbon operations ultimately requires designing building and infrastructure systems with a changing power-grid mix in mind, creating a transitional foundation for full-scale decarbonization. This session will explore the critical links between building-scale, district-scale and grid-scale energy systems focusing on heat pump efficiencies, air versus water heating and cooling, and why sewage and geothermal heat exchange are so critical to decarbonization. The presenters will evaluate integrated strategies for grid-responsive design that improve operational performance while anticipating and bolstering larger grid decarbonization efforts.

1. Building Integrated Strategies for Grid Decarbonization and Net Zero Operations
   Stet Allen Sanborn, AIA, Full Member, Smithgroup, Washington, DC

2. Planning for the Decarbonization of the Grid
   Katrina Kelly-Pitou, Dr., Smithgroup, Washington, DC

3. Cold Climate Implications for Grid Decarbonization and Net Zero Operations
Decarbonizing Existing Tall Buildings in Cold Climates

Room: Salon 4

1. The Empire Building Challenge
Sophie Cardona, New York State Energy Research & Development Authority, New York, NY

2. Decarbonizing Thermal Loads in Tall Office Buildings
Molly Ramasamy, P.E., JB&B, New York, NY

3. Converting Tall Multifamily Buildings from Fossil-Based Heating and Hot Water
Marc Marc Zuluaga Zuluaga, P.E., Cadence OneFive, New York, NY

4. Owner's Perspective on Tall Building Decarbonization
Benjamin Rodney, PE, Full Member, Hines, New York, NY

Designing through Regulations to Achieve Low Carbon Buildings

Room: Studio D

1. Strategies to Lead the Buildings to the Zero Energy Path
Bing Liu, PE, Fellow Member, Pacific Northwest National Laboratory, Portland, OR

2. The Future of Equipment Energy Efficiency Metrics
Mark W Fly, PE, Fellow Life Member, AAON, Inc., Merritt Island, FL, United States

3. Decarbonization, Heat Pumps and Thermal Energy Storage
Mark M MacCracken, PE, Life Member, Trane Technologies, Miami, FL

4. Decarbonizing Data Centers through Performative Building Enclosure Design
Thomas Zakrzewski, Principal, Director of Building Engineering Physics, BEMP, Associate, HKS, Inc., Chicago, IL

Developing and Enacting an Effective Decarbonization Plan in Healthcare

Room: Studio D

Chair: Christine Foster, ECRI

Panelists: Christina Sanborn and Alex Podolsky, (1)Stanford Children's Health | Lucile Packard Children's Hospital, San Jose, CA (2)Mazzetti, San Francisco, CA (3)Ameresco, Lafayette, CA

Healthcare has a special responsibility to decarbonize as climate change continues to put pressure on public health worldwide. The health sector represents 8% of US emissions and health damages from US Healthcare pollution are equal to deaths from preventable medical errors. In recognition of these impacts, the industry is embracing change. Stanford Medicine Children’s Health undertook a strategic decarbonization plan in 2021 and began implementation in 2022. Hear how this forward-thinking institution and key partners organized its stakeholders to develop its plan, decided to make public commitments, evaluated implementation and funding options, and is now moving forward with decisive action.
To drive the transition towards carbon neutrality, the development of scalable frameworks is critical. Together, JPMC and JLL have created a technical framework that identifies optimized building designs for achieving zero carbon in retail sites across the US. The panelists will provide insights into the prototyping and optimization approaches, as well as the strategies that have successfully achieved carbon savings in the field. Attendees will gain valuable knowledge on the development of the framework and the potential barriers to its adoption. Furthermore, the session will explore the lessons learned on cost, schedule, and performance impacts.
Friday, October 27

Friday, October 27, 8:10 AM - 9:00 AM
**Keynote (Intermediate)**

Sue Hall  
Climate Neutral Business Network

*Room: Salon 4*

Beyond the built environment, why and how are decarbonization efforts mainstreaming in other sectors? Spanning corporate, financial market and governmental policy innovations, commitments to decarbonize have deepened across all sectors of the economy – not just in the US but globally. We will explore some of the leading forces restructuring such diverse markets towards a low carbon future, examine why they are gaining traction -- and ask how such trends could benefit decarbonization efforts in the built environment.

Friday, October 27, 9:10 AM - 10:10 AM
**Panel 17 (Intermediate)**

De-Carbonization at Boston University: Vision, Design, Construction and Operation!

*Room: Studio D*

Chair: Ari Tinkoff, Principal, Member

Panelists: Joshua D Michaud, Associate Principal, Associate, Dennis Carlberg, Associate Vice President for University Sustainability at Boston University and Dan Quigley, Director, Engineering & Building Systems at Boston University, (1)BR+A Consulting Engineers, Washington DC, VA(2)BR&A Consulting Engineering, Boston, MA(3)Boston University, Boston, MA

As a model for other organizations, we will describe one of the deepest ground-source heat pump-chiller system installation that unlocked fossil fuel free design for the new Center for Computing and Date Sciences building at Boston University. The vision of senior leadership, design process, challenges and operational considerations will be reviewed.

9:10 AM - 10:10 AM
**Seminar 17 (Basic)**

Building a Carbon-Free Future: Unlocking the Potential of Existing Buildings

*Room: Salon 4*

Sponsor: 7.1 Integrated Building Design

Chair: Marianna Vallejo, Full Member, Jacobs, Arlington, TX

The seminar focuses on the urgent need for decarbonization of existing buildings, which contribute significantly to greenhouse gas emissions. The seminar explores various strategies and technologies that can be employed to reduce the carbon footprint of existing buildings, including energy-efficient retrofits, renewable energy sources, and sustainable building materials. The seminar features presentations from experts in the field of green building design, energy efficiency and sustainable technology, who will share their insights and experiences on successful decarbonization projects. The seminar also includes case studies of real-world projects, highlighting the challenges and opportunities of decarbonizing existing buildings.

1. Preserving the Past, Building for the Future: The Montreal City Hall Zero Fossil-Fuel Retrofit  
   Lianne Cockerton, P. Eng., Full Member, Martin Roy et Associes, Deux-Montagnes, QC, Canada

2. The Phenix: A Zero-Carbon Living Laboratory for Sustainable Design in an Existing Building  
   Martin Roy, P.Eng, Leed Fellow, Full Member, Martin Roy et Associes, Deux-Montagnes, QC, Canada

3. Transforming Existing Buildings to Zero Carbon Design: The Uap Head Office  
   Oscar Hernandez, PhD, Full Member, Lemay, Montreal, QC, Canada
Deep Green, Market Rate, Net Zero: How ASHRAE's New Global Headquarters Renovation Achieved All Three

Room: Studio B
Chair: Stanton Stafford, PE, LEED Fellow, Member, Buro Happold, Atlanta, GA

As the global stock of buildings constructed prior to 1980 approaches a half century of use, design professionals will increasingly be asked to transform these structures via high performance, deep green renovations. To help minimize embodied and operational carbon impact, these renovations will need to achieve higher levels of sustained, demonstrated performance. The recently completed renovation of a 1970's suburban office building into a net-zero headquarters for ASHRAE provides a timely case study into how the right strategies can lead to better outcomes. The operational challenges of achieving net Zero outcomes are explored, with examples of some strategies.

1. ASHRAE Headquarters Building: The Journey to Net Zero
   Darryl Boyce, Carleton University, Kemptville, Canada

   Gregory Walker, AIA, NCARB, LEED AP, Houser Walker Architecture, Atlanta, GA

Dollars and Decarbonization

Room: Studio E
Chair: Jared Langenfeld, Associate, Member, Smith and Boucher, Olathe, KS

Often when someone mentions sustainable buzz words such as decarbonization, owners just see dollar signs. But is that necessarily the case? Does decreasing energy use always have a first cost associated with it? Are there cost effective low embodied carbon materials? Could there be more benefits to decarbonization beyond lower utility bills? Join Jared Langenfeld and Ashley Eusey as they tackle these questions with data and real world examples on possibilities and pragmatic applications for lowering your carbon footprint. Along with strategies, the team will also give tips for making these conversations with clients more palatable.

1. Dollars and Decarbonization
   Ashley Eusey, Director of Sustainability, Hoefer Welker, Leawood, KS

Decarbonization Driver: A New Hybrid Ventilation Method to Achieve High IAQ, Low Energy, Climate Resilient Buildings

Room: Studio B
Chair: Marwa Zaatar, PhD, Associate, D Zine Partners, Austin, TX

This session introduces a new approach to hybrid ventilation to achieve low carbon building operations. The new approach is based on an expanded definition of hybrid ventilation systems that includes air cleaning in addition to ventilation (natural and mechanical). This new approach is supported by recent updates to the IAQ Procedure in ASHRAE 62.1 and builds on lessons learned from the COVID-19 pandemic regarding layered strategies and equivalent air changes. The presentations focus on updates to Standards and the carbon impact of applying hybrid ventilation with air cleaning in a modeling study and three case studies.

1. Hybrid Ventilation Approach: Introduction and Standards Update
   Marwa Zaatar, PhD, Associate, D Zine Partners, Austin, TX

2. Assess and Implement Hybrid Ventilation System in an Office Building to Achieve a Low Carbon Building
   Brandon J Harwick, PE, LEED AP, Full Member, Engenium Group

3. Ventilation Strategies to Achieve Low Carbon Operations: Harvard University Campus Case Study
   David H Ellowitz, PE, HBDP, Full Member, AHA Consulting Engineers, Inc., Boston, MA

   William Fuchs, PE, LEED AP, Associate, CMTA, Prospect, KY
Decarbonization Tales: Old, New and Historic!!!
Room: Salon 4
Chair: Kent W Peterson, PE, Presidential Fellow Member, P2S Inc, Long Beach, CA
The existing building stock must be improved for many reasons; IEQ, energy, failed equipment, and especially carbon neutrality. This session includes three separate case studies that provide details on how old and new, and even historic buildings were renovated to not only reduce the carbon footprint but to improve the overall comfort and IEQ for dated buildings and systems. They will discuss a switch in heating hot water strategies, using combined heat and cooling systems, geothermal systems, and expand beyond the HVAC into lighting strategies, insulation, and renewables. Learn the successes and avoid the pitfalls from these decarbonization tales.

1. Hhw System Decarbonization Retrofits: Opportunities and Constraints
   Kevin James Ricart, PE, Associate and Urwa Irfan, Associate, SmithGroup, Chicago, IL
2. Lessons from Decarbonization Retrofits
   Kent W Peterson, PE, Presidential Fellow Member, P2S Inc, Long Beach, CA
3. Fusing Historic Preservation with 21st Century Design Innovation: The Edsel and Eleanor Ford House Visitor Center and Administration Building
   Brittany K Fiema, PE, LEED Green Associate, Detroit ASHRAE Chapter President, Full Member, SmithGroup, Detroit, MI

Investing in Decarbonization! Getting in on the 'Radiant Floor'
Room: Studio D
Sponsor: 6.5 Radiant Heating and Cooling, Young Engineers in ASHRAE
Chair: Elizabeth Jedrlinic, Full Member, Trane, New York City, NY
Radiant floor heating and cooling systems can play a critical role in the effort to decarbonize construction, while ensuring comfortable, healthy indoor environments. Join this session to explore the key design considerations, strategies, and benefits of these systems, along with an honest discussion of the challenges that lead architects and builders to remove them. By combining theoretical energy simulations with lessons learned from real-life case studies of low carbon operations, we'll demonstrate how radiant systems are poised to play an important role in the future of decarbonization.

1. Radiant Floors: Decarbonization Using Building Simulation
   Brett Banadyga, P.Eng., LEED Green Associate, Associate, The AME Consulting Group Ltd., Calgary, AB, Canada
2. De-Value Engineering of Radiant Floors
   Ryan W Johnson, P.Eng., Associate, MacPherson Engineering, SK, Canada
3. The Learning Curve of Operating Radiant Floor Buildings
   Christopher Sawicki, CEFP, Member, University of Regina, Regina, SK, Canada

Show Me the Money...to Successfully Decarbonize the Built Environment
Room: Studio E
Chair: Nora Wang Esram, American Council for an Energy-Efficient Economy, Washington, DC
Project financing can always get creative, and it has been doing that for a very long time to reduce energy consumption. This session covers existing building models and financing arrangements to be able to scale comprehensive retrofit projects toward building electrification that can take advantage of programs and incentives. In addition, two case studies that revolve around the different financing models to achieve the greenhouse gas emissions targeted. Another financial strategy, through on-bill financing is evaluated by modelling for a representative of 50,000 dwellings to find how to apply this process across affluent and disadvantaged communities.

1. Reach Decarbonization Projects with Long Payback Periods
   Nora Wang Esram, American Council for an Energy-Efficient Economy, Washington, DC
2. Equitable Decarbonization: Leveraging Utility Bills for Residential Building Upgrades
   Katelyn Senger¹, Thomas Bowen², Janet Reyna³, Lixi Liu, PhD¹, Anthony Fontanini, Ph.D., Full Member¹, Noah Sandoval¹ and Christina Simeone², (1)National Renewable Energy Laboratory, Golden, CO, (2)National Renewable Energy Laboratory, Washington, DC
3. Supercharging Decarbonization through Innovative Financing Structures
   Saad Rashid, P.Eng., Mott MacDonald, Toronto, ON, Canada