



What Will It Take?

Operating Carbon-Free Buildings

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SPEAKERS



**FERNANDO
ARIAS**

Director of
Sustainability,
Clark Construction
Group, *Moderator*



**THERESA
BACKHUS**

Associate Director,
Building Innovation
Hub, *Host*



**JEREMEY
ALCORN**

Senior
Sustainability
Program Manager,
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**CARA
CARMICHAEL**

Principal, Carbon-
Free Buildings, RMI



**KRISTA
EGGER**

Vice President,
Enterprise
Community Partners



**BING
LIU**

Senior Strategic
Advisor, Pacific
Northwest National
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The Hub and Clark Construction Group recently hosted a conversation on the role building operations play in energy use and carbon emissions, the second event in the series, **“What Will It Take? The Path to 2050 And Carbon-Free Buildings”**. Theresa Backhus of the Building Innovation Hub set the stage explaining the need to think beyond compliance to leverage buildings as a tool for climate action, but that there is a challenge of segmentation within the building industry. Fernando Arias moderated a panel discussion that included audience questions. The robust and insightful discussion is worth **watching in its entirety**, but here are five key takeaways:

1. For our health and our climate, we need to scale up the number of efficient retrofits

Cara Carmichael quoted **Dr. Joseph Allen**, **“The person who manages your building has a bigger impact on your health than your doctor.”** Given the importance of indoor air quality, and recent research showing the negative (and costly) consequences of burning fuels indoors, she argued we need to electrify buildings. Jeremy Alcorn agreed and emphasized that buildings have a significant impact on **scope 1 and 2 carbon emissions**. Carmichael said that, in the United States, we currently retrofit only one percent of our buildings per year. To reach our climate action goal of a 1.5-degree

What we’re really talking about is improving the quality of life that we can experience in homes, buildings, and communities, so it’s really not about a lot of smart tech and things that seem foreign and complex.

— FERNANDO ARIAS

As a mechanical engineer, what I tell everyone is if you can reduce anything moving and running that’s the best because it’s helping to reduce the maintenance costs of your mechanical system.

— BING LIU

future, we need to increase the retrofit rate 3-4 times and have those retrofits be near-zero carbon. Bing Liu said we already have many efficient and effective technologies, but the real estate industry is inherently cautious, and uptake has been slow. Krista Egger expressed that if the money isn't available for a complete retrofit or a partial build-out to zero carbon standards, buildings can at least be made ready for **electrification** or solar PV in the future. It doesn't have to be an all-or-nothing proposition to create positive change. Fernando Arias emphasized the importance of partnerships and integrated solutions.

2. **Building operations must consider equity, especially for affordable housing**

Egger stated that housing affordability and racial equity issues are threat multipliers, and that climate change means we are adding to an already high energy burden that falls disproportionately on communities of color. A recent **University of North Carolina at Chapel Hill study** reviewed several cities across the United States and found that in 97 of the cities they examined, people of color were exposed to temperatures two degrees higher than white residents. In DC, the median energy burden of black households is **70 percent higher than non-Hispanic white households**. The challenge for affordable housing, and all housing, is ensuring buildings remain affordable to operate and resilient as climate change rapidly increases energy demand.

3. **Efficiency is an excellent financial investment when we look at it the right way**

Egger pointed out that one major challenge is that the budgets for building development and operations are separate, limiting opportunities to see the complete financial picture and the value of efficient and net-zero investments upfront. Liu confirmed that the right equipment technology is already available, but that there's a misconception that it's always more expensive than business as

usual. Carmichael emphasized that if we can right-time retrofits to building lifecycle activities, they can be cost-effective. This includes opportunities during tenant turnover and at the end-of-life for major operating equipment.

4. **We must listen to others and frame problems in terms that resonate with their values**

Liu offered that, as an engineer, she was trained in technical details, but persuasive presentations mean focusing on why your audience should care. Alcorn agreed: he uses active listening, which is a skill set he applies in his day-to-day work, and even with family members who don't understand the need for renewable technologies, such as solar panels or a microgrid. In many cases, it's helpful to show that there are financial savings and/or that there's a significant risk reduction for people inside the building.

5. **We need to get people excited about buildings to scale our workforce**

Liu pointed out that new building performance laws are spurring demand for energy efficiency products and services; this could incentivize contractors to strengthen their knowledge of relevant concepts. Alcorn argued that we need to get young people excited about buildings and to see that they can make a good living working on them. Carmichael posited that we need to scale up the workforce just as much or more as we need to scale retrofits, and that we should orient people to carbon-related metrics. She said programs should be offered where people already are, including online and in local community colleges and vocational schools. Arias emphasized that workforce development programs are key to building wider capacity in the supply chain, which is essential to scale decarbonization retrofits. Egger said that building industry workforce development should be rooted in communities and mentioned the excellent work that **Emerald Cities Collaborative** is doing to help communities of color benefit from growing job opportunities.

SPEAKER PROFILES

KRISTA EGGER

Krista Egger is vice president at Enterprise Community Partners and she manages Enterprise's national sustainability efforts. She leverages Enterprise's Green Communities platform, climate disaster response work and cultural resilience programming to deploy equitable climate resilience solutions across the country. Prior to Enterprise, Egger directed Advanced Energy's Affordable Housing business unit. She led the award-winning SystemVision program and provided consulting services for Habitat for Humanity International, NeighborWorks, and utility clients. Additionally, Egger serves on the Network for Energy, Water and Health in Affordable Buildings (NEWAHB) Advisory Council, Oberlin EnviroAlums Steering Committee, and the Building Performance Institute (BPI) Board of Directors.

JEREMY ALCORN

Jeremy is a Certified Energy Manager and serves as the Senior Sustainability Program Manager for the Public Buildings Service, U.S. General Services Administration (GSA). He is currently on detail to the Office of Federal High Performance Buildings. He has over 20 years of experience in sustainability, facility energy and water management, high performance buildings, renewable energy, greenhouse gas mitigation, and climate risk. Prior to joining GSA, he served as a consultant with private and not-for-profit organizations as well as a U.S. Peace Corps Volunteer in Eastern Europe.

BING LIU

Bing Liu is the building sector manager at the Pacific Northwest National Laboratory (PNNL) under the U.S. Department of Energy. Liu oversees the strategic planning and implementation of PNNL's building portfolio and spearheads PNNL's building decarbonization, electrification, and grid integration efforts. Liu has over 26 years of experience in building codes and standards as well as clean energy technology demonstration and deployment. She is a registered Professional Engineer and ASHRAE Fellow. She currently serves on the ASHRAE's Task Force for Building Decarbonization and on the New Buildings Institute Board of Directors. Liu was featured as one of Top 20 Women in HVAC Industry for 2020 by Engineered System Magazine.

CARA CARMICHAEL

Cara Carmichael is a Principal with RMI's buildings practice where she leads RMI's grid interactive buildings work. She drives critical research around demand flexibility and the value proposition for building owners to adopt grid interactive buildings and market-based solutions. She is also leading several high-impact efforts with NYSERDA on the Carbon Neutral Building Roadmap pathways and impact analysis. She has a depth of experience in zero carbon and deep energy retrofits in the federal and commercial building sectors. Carmichael co-leads the Pathways to Zero initiative at RMI which is catalyzing early movers in the buildings industry on a path to—or beyond—zero carbon buildings.

On-site and off-site, it really comes down to renewables and carbon-free electricity. Even as we transition from fossil fuels in our equipment, it's important to make sure we can feed buildings with renewable, clean energy.

— JEREMY ALCORN

We are looking at a massive shift in how we orient ourselves to the built environment. That's going to take increasing incentives, streamlining economics, and creating more one-stop shop models so you're hiring fewer vendors.

— CARA CARMICHAEL

