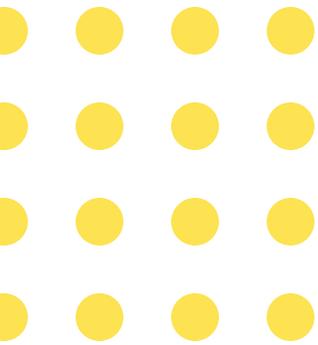




# What Will It Take?

The Path to 2050 and Carbon-Free Buildings





Visit the Hub website for more resources.

Buildings are at a critical moment of change and accountability. Historically, the way we designed, developed, constructed, and operated buildings have contributed significantly to carbon emissions and climate change. In fact, more than a third of global emissions are from the energy used to build or operate buildings.

Suppose we reimagine the function of buildings in the environment. They can become critical elements in strategies to lower greenhouse gases and improve indoor health, create local jobs, and more equitable access to clean air and economic opportunity. Owners, operators, contractors, and designers realize business as usual is no longer sufficient to sustain the value of the built environment. The building industry is starting to recognize that as companies become less carbon-intensive, doing so can be tremendously profitable.

That's why the Building Innovation Hub and Clark Construction Group came together to host our industry leadership series, **“What Will It Take? The Path to 2050 and Carbon-Free Buildings.”** For each of our four panels, we convened experts who shared successes and challenges in decarbonizing their businesses and insights into how the design, operations, development, and construction sectors are rapidly changing in addition to what kinds of jobs or skills might be needed to meet these new opportunities. Each conversation challenged traditional practices while shedding light on market realities and key obstacles.

In this summary guide, you can read the top five takeaways from each session. By visiting [buildinginnovationhub.org/whattitakes](https://buildinginnovationhub.org/whattitakes), you can access links to related resources, including complete session recordings and a strategy matrix to explore cross-sector positions on opportunities, challenges, and skills needed to capitalize on the opportunities. We hope you will come away inspired, with clear action steps for how you can play a key role in a more sustainable and equitable built environment.

**Fernando Arias**  
Director of Sustainability  
Clark Construction Group

**Theresa Backhus**  
Associate Director, Outreach  
and Engagement  
Building Innovation Hub

# Biographies



**Fernando Arias** is Clark Construction Group's Director of Sustainability and draws from over 20 years of experience in architecture, operations, and construction to shape the company's sustainability strategies. In his role, he works with company leadership to shape

Clark's sustainability strategy as the nation's #2 Green Builder since 2014, which includes a national portfolio of more than 500 LEED and other green building certified projects, totaling nearly 1.2 billion square feet and valued at more than \$53.6 billion. He is responsible for overseeing Clark's national sustainability operations teams, promoting and advising preconstruction teams, and leveraging his department's technology team to find solutions and innovations that meet a wide range of project goals, including building decarbonization.

Fernando is an architect and former military mechanic that became passionate about solving massive global challenges centered around health and the built environment. He has recently been recognized for his leadership in Advancing Health and Wellness in the Built Environment by the U.S. Green Building Council, along with his government appointments to the U.S. General Services Administration Green Building Advisory Committee, and the District of Columbia Green Building Advisory Council.



website



LinkedIn



Twitter



**Theresa Backhus** is the Associate Director of Outreach and Engagement for the **Building Innovation Hub**, ensuring that the Hub's mission and strategic vision is executed.

Theresa has over 15 years of experience designing, measuring, and improving the performance of buildings, landscapes and communities in the DC metro region. Prior to joining IMT, she was with Sustainable Building Partners, supporting owners and practitioners navigating policy, code, and green building certifications from early design phases through construction. At the U.S. Green Building Council, she was integral in the development of the LEED v4 rating system program. Her past work also includes planning, design, and construction observation in both the public and private sectors. Theresa holds a BLA from Virginia Tech, and a Master of Environmental Management from Duke. She is a Registered Landscape Architect, LEED AP BD+C and ND, and SITES AP.



LinkedIn



website

# What Will It Take?

## Designing Carbon-Free Buildings

June 8 2021



### SPEAKERS



**FERNANDO  
ARIAS**

Director of  
Sustainability, Clark  
Construction Group  
*Co-host*



**THERESA  
BACKHUS**

Associate Director,  
Building Innovation  
Hub *Co-host*



**ARATHI  
GOWDA**

Associate Director,  
Team Leader  
Performative  
Design Group,  
SOM



**ANICA  
LANDRENEAU**

Senior Principal,  
Global Director of  
Sustainable Design  
at HOK



**MELISSA  
WACKERLE**

Senior Director,  
Sustainable Practice  
& Knowledge,  
The American  
Institute of  
Architects (AIA)



**TOMMY  
ZAKRZEWSKI,  
PH.D.**

Vice President,  
Director of Building  
Engineering  
Physics, HKS

The Hub and Clark Construction Group kicked off its series, “What Will It Take? The Path To 2050 And Carbon-Free Buildings,” with a panel focused on the role design and design professionals play in building sustainability, energy efficiency, and carbon emissions reduction. The robust discussion is worth watching in its entirety, but here are some of the key takeaways:

**1. Focusing on building performance gives us a tremendous opportunity to address multiple societal challenges simultaneously.**

Landreneau emphasized that by investing in existing buildings, we can save an enormous amount of embodied carbon by using existing infrastructure investments while also preserving historical and cultural heritage. Wackerle seconded this notion and argued that since many older buildings are blighted, there is an opportunity to engage community members and correct historic inequities while building stronger local economies. Finally, Zakrzewski highlighted the opportunities for smart buildings to integrate with the grid.

**We have to figure out how to design spaces that engage occupants in being efficient and simultaneously create a sense of delight in being there.**

— ANICA LANDRENEAU

**In the next 10, 20 years, there isn't one discipline that's not going to be thinking deeply about decarbonizing the entire economy, so we need to help everyone realize that and invest accordingly.**

— ARATHI GOWDA

**2. The greenest materials are the ones we don't use.**

Landreneau and Wackerle pointed out that even the greenest building project uses additional embodied carbon, so the solution should be to reuse buildings and materials as much as possible. Landreneau emphasized that designers should first focus on designing intelligently, for example, supporting future reconfigurations to avoid later use of virgin materials. Wackerle discussed the need for a secondary market of building materials, which is so far nascent and localized but could become more far-reaching and sophisticated.

**3. Human behavior will determine the success or failure of building decarbonization.**

To fully decarbonize, both building occupants and the building industry need to shift behavior. The only way to do so is to change the way people think about their interactions with the built environment. Landreneau argued that we need to figure out how to design spaces that engage occupants in being efficient. People don't understand how buildings relate to the environment or know how to read a building for efficiency or other measures. Similarly, Wackerle stressed the need for more practitioners to utilize simulation tools that demonstrate the value of passive building techniques and the ways buildings respond to nature. These simulations also need to factor in the human element into the design so that high-performing spaces genuinely feel better. "If a building is too hot or people are wearing sunglasses indoors, then that is a failure," said Landreneau.

**4. Change is coming rapidly, and we need to be ready.**

While sustainability professionals have been pushing for change for decades, the coming years are likely to produce a sea change in how companies and clients prioritize climate action. Gowda stressed the need to prepare for this opportunity by talking to clients now about what's coming. Zakrzewski called for more cohesive higher education programs that enable graduates to execute immediately on low- and zero-carbon buildings and building materials.

**5. If we care about building decarbonization, we need to become activists for it.**

Zakrzewski emphasized that we need to cultivate a carbon-reduction mindset by helping everyone understand how carbon plays into design decisions and talking about it at every opportunity. Gowda added that more organizations need to move from benchmarking toward advocating for more robust policies. In particular, Zakrzewski called out building performance policies as particularly powerful for incentivizing industry-wide shifts.



## SPEAKER PROFILES

### MELISSA WACKERLE

Senior Director, Sustainable Practice & Knowledge, The American Institute of Architects (AIA)

Melissa Wackerle, LEED AP BD+C, ND, is Senior Director Sustainable Practice & Knowledge with the American Institute of Architects. Melissa has 20+ years of experience in the design and construction industry and a Master's degree in Sustainability and Development. Her expertise ranges from green building certification management to enterprise and community consulting, Carbon Disclosure Project reporting, energy and water efficiency recommendations, and green construction practices. In addition, Wackerle directs programming for the AIA's Sustainability initiatives.

### ANICA LANDRENEAU

Senior Principal, Global Director of Sustainable Design at HOK

Anica Landreneau leads HOK's global sustainable design practice, serving on the firm's board of directors and design board, and leading the firm's AIA 2030 carbon-neutrality commitment. She also serves on the LEED Advisory Committee, the AIA National Codes and Standards Committee, and the AIA Blue Ribbon Panel on Codes. Locally, Landreneau is serving her second term on the District of Columbia Green and Energy Codes TAG and her second term on the Mayor's Green Building Advisory Council. Landreneau is a graduate of the University of Houston, a frequent author and speaker, and has testified before Congress on climate issues.

### TOMMY ZAKRZEWSKI, PH.D.

Vice President, Director of Building Engineering Physics, HKS

Dr. Tommy Zakrzewski is Director of Building Engineering Physics at HKS. He leads the integration of sustainable development goals with building engineering physics and analytics as a primary practice focus. Dr. Zakrzewski completed his Ph.D. in Architectural Engineering at the Illinois Institute of Technology advancing design sizing and performance optimization methods for building integrated thermal and electrical energy generation systems. He believes that a low carbon future is forged by integrative architecture and engineering and our purpose is to reimagine the built environment as an opportunity to be regenerative and adaptive for a more sustainable tomorrow.

### ARATHI GOWDA

Associate Director, Team Leader Performative Design Group, SOM

Gowda is a team leader for SOM's High Performance Design Group, which spearheads the firm's sustainability work. As an educator, she is committed to training the next generation of sustainable practitioners and she has taught coursework on sustainable urbanism at multiple universities. She is an advocate for collective climate action, and she serves as the co-chair of AIA Chicago's 2030 Commitment Working Group and one of 20 Steering Committee members for U.S. Architects Declare. In 2019, she was named one of ten recipients of Green Building & Design's Women in Sustainability Leadership Award.

**You have the potential to lift a whole community by reusing buildings. Through engagement processes, you can ensure the building responds to community needs as well as the needs of the owner. So now you're not only getting carbon reduction, you're also growing your economy and supporting communities that need investment.**

— MELISSA WACKERLE

**One way that we can begin to reduce the carbon intensity of materials is to think about the regionality and the availability of materials by focusing on shortening the distances of those materials being delivered and potentially extracted from project sites. This would significantly reduce the carbon intensity embodied in materials while also sustainably stimulating regional economies.**

— FERNANDO ARIAS

**We have to start thinking about preparing the next generation of designers and construction professionals, and scientists who make materials so they can execute all the things we're confronted with right now.**

— TOMMY ZAKRZEWSKI

# What Will It Take?

## Operating Carbon-Free Buildings

July 27 2021



### SPEAKERS



**FERNANDO ARIAS**

Director of Sustainability, Clark Construction Group, *Moderator*



**THERESA BACKHUS**

Associate Director, Building Innovation Hub, *Host*



**JEREMY ALCORN**

Senior Sustainability Program Manager, GSA



**CARA CARMICHAEL**

Principal, Carbon-Free Buildings, RMI



**KRISTA EGGER**

Vice President, Enterprise Community Partners



**BING LIU**

Senior Strategic Advisor, Pacific Northwest National Laboratory

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



# What Will It Take?

## Developing Carbon-Free Buildings

October 5 2021



### SPEAKERS



**FERNANDO ARIAS**  
Director of Sustainability, Clark Construction Group,  
*Co-host*



**THERESA BACKHUS**  
Associate Director, Building Innovation Hub, *Co-host*



**SANDRA ADOMATIS**  
Incoming Vice President, Appraisal Institute



**DAVID EDSEY**  
Climate Director, Zurich North America



**SONJA WELLS**  
Chief Lending Officer, CityFirst Bank



**ADRIAN WASHINGTON**  
Founder, Neighborhood Development Company

The Hub and Clark Construction Group recently hosted a conversation on the role building development plays in energy use and carbon emissions, the third 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, from Clark Construction, moderated the discussion. The robust and insightful discussion is worth watching in its entirety, but here are five of the key takeaways:

**1. Government needs to regulate and incentivize action to send signals to the market and drive behavior change.**

Adrian Washington of the Neighborhood Development Company argued that government needs to step in because climate pollution is an externality that the market is not accounting for, and therefore incentives are necessary to motivate people to make investments in building performance. David Edsey of Zurich North America agreed and said that government support allows markets to mature and plays a critical role in researching new materials, such as carbon-intensive concrete and steel.

**By the middle of the century, the built environment in the world is going to double. When you think about that, it really makes the embodied carbon of buildings so much more significant.**

— DAVID EDSEY

**We have an opportunity to save the world. And I mean, unless you're a member of the Avengers or the Justice League, I mean, how often do you get that?**

— ADRIAN WASHINGTON

**2. People need to understand the benefits of high-performing buildings to be willing to pay more for them**

Sandra Adomatis from the Appraisal Institute said there's a misconception that appraisers add value versus representing market value. Washington pointed out that consumers are still attached to older technologies, particularly gas appliances, which can make it difficult to get a better price for fully-electrified properties. She asserted that people don't always think about the total costs of buildings, which include things like climate risk and potential noncompliance with future carbon legislation.

One challenge on the development side is that the industry puts more emphasis on "first costs," because they are more certain, and less value on long-term operating costs, which are where the economic benefits of better building performance improvements are recognized. Sonja Wells from CityFirst Bank explained that this makes it difficult for banks to achieve the desired loan-to-value ratio, which is only improved by either higher valuation or by lower costs.

**3. We need more disclosure of carbon emissions, both operating and embodied, and to communicate why they matter.**

Edsey said that many companies haven't yet made emission reduction commitments, but that they are necessary to address the urgency of climate change, and they should include both embodied and operational carbon. Changing course means addressing new building materials as well as the operating efficiency of existing buildings. However, there needs to be a more standardized way of disclosing the embodied carbon in materials and whole buildings.

**4. We need to preserve green value for the long term to make sure information transfers with the property.**

There's no standard for how building performance information is stored, so once a building has been sold to a new owner, details about solar system capacity or other sustainable building improvements can be lost. Adomatis said we need a protected way to transfer information, suggesting that storing information inside of the electrical panel using a barcode, for example, would be a natural fit. Wells argued we need a database equivalent to a "CarFax for buildings" so we can see building asset value and physical alternations even 10 or 20 years later.

**5. We need to each take the lead in coordinating and educating across disciplines to break down silos and properly value high-performing buildings.**

The conversation revealed that there are system barriers to appraising green buildings or building improvements for greater value. Adomatis said there are under-utilized trainings for appraisers that help them understand how appraisers can show the added value of better building performance, and mentioned available **resources for all stakeholders**. Wells asserted that lenders need to be better educated about the value of sustainable projects, and about resources, such as databases of appraisers with experience valuing green properties. Lenders could also offer lower rates for energy- and emission-savings projects. Owners and developers need to ensure their property improvements are recorded in a database used by appraisers, such as EarthAdvantage for residential properties. It's critical to get everyone in the room, and using the same language, to understand their role in making the system work in favor of higher-performing buildings.



## SPEAKER PROFILES

### SANDRA ADOMATIS

Vice President, Appraisal Institute

Sandra K. Adomatis, SRA of Punta Gorda, FL is the 2022 incoming vice president of the Appraisal Institute. Adomatis is the principal of Adomatis Appraisal Service in Punta Gorda, FL. She specializes in residential valuation, green construction, solar photovoltaic systems, and expert witness testimony for assignments that include eminent domain, construction defects, bankruptcy, and fraud litigation cases. She authored the book, “Residential Green Valuation Tools” and has published in the Appraisal Journal. Adomatis has received numerous Appraisal Institute Awards, including two lifetime achievement awards; the Swango Award; Outstanding Service Award; President’s Award; Dr. William N. Kinnard Junior Award; and Region X Volunteer of Distinction.

### DAVID EDSEY, J.D.

Vice President, Climate Director, Zurich North America

David Edsey is Zurich North America’s (ZNA) Climate Director, responsible for identifying and developing insurance products and service solutions to address climate change mitigation and adaptation, and providing thought leadership on climate change risk, mitigation, and resiliency strategies. Edsey has been with Zurich for 14 years, including roles on the Property Technical Underwriting Team and the Claims Legal group. Prior to joining Zurich, Edsey worked as a litigator and coverage counsel at several Chicago area law firms. He has significant experience with insurance for the commercial real estate and construction sector, most recently in developing a construction weather parametric insurance policy.

### ADRIAN WASHINGTON

Founder and CEO, Neighborhood Development Company

Adrian Washington has over 30 years of experience in urban real estate development, construction and management. Mr. Washington founded NDC in 1999 and served as President from 1999-2005. From 2005 to 2007, he then served as the President and CEO of the Anacostia Waterfront Corporation (AWC), the entity charged with leading a \$10 billion, 20 year initiative to revitalize Washington, DC’s Anacostia Waterfront and surrounding communities. Mr. Washington grew up in the Anacostia neighborhood and is a lifelong resident of DC. He has a B.S. in Economics and Political Science from Stanford University and an MBA from Harvard University.

### SONJA SANDERS WELLS

Executive Vice President and Chief Lending Officer, City First Bank

Sonja Sanders Wells has over three decades of experience in commercial lending. She is responsible for the strategic direction of the Commercial Banking Group and is the bank’s brand ambassador. Prior to joining City First Bank; Sonja was a Vice President and Senior Relationship Manager at M&T and a Business Banker for First Union Bank/Wachovia.

Sonja is a member of DC Chamber of Commerce, Jubilee Baltimore, Inc., the African American Real Estate Professionals, the Southeast Community Development Corporation, Wildflower Public Charter School’s Board of Directors, and the Maryland Casino Business Investment Fund’s Loan Committee. Sonja has also been active in numerous local professional and community organizations.

**The only way that we can hope to get [more sustainable buildings] is that you get increased financial performance based on either higher lease rates or lower energy costs.**

— SONJA WELLS

**Being ahead of the game with estimating your carbon loading or carbon budget on the embodied and on the operating side is a smart way of mitigating the risk of being exposed to penalties, fees, and other things that may come along as policy evolves.**

— FERNANDO ARIAS



# What Will It Take?

## Constructing Carbon-Free Buildings

November 8 2021



### SPEAKERS



**FERNANDO ARIAS**

Director of Sustainability, Clark Construction Group  
*Co-host*



**THERESA BACKHUS**

Associate Director, Building Innovation Hub  
*Co-host*



**CHRISTIE GAMBLE**

Senior Director of Sustainability, CarbonCure Technologies



**JULIA GISEWITE**

Vice President and Chief Sustainability Officer, Turner Construction Company



**LUCAS HAMILTON**

Manager, Applied Building Science, Saint-Gobain North America



**JIM MARTINOSKI**

Vice President, Miller and Long Co., Inc.

The Hub and Clark Construction Group recently hosted a conversation on the role building construction plays in energy use and carbon emissions, the fourth and final 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. Still, there is a challenge of segmentation within the building industry. Fernando Arias, Clark Construction’s director of sustainability, moderated the discussion. The robust and insightful discussion is worth watching in its entirety, but here are five of the key takeaways:

**1. The construction industry can reduce carbon emissions by focusing on materials, suppliers, and transportation.**

Christie Gamble explained that much of the carbon emissions from buildings are embodied. Therefore the construction industry can play a huge role in helping reduce the amount of carbon emitted in producing and distributing building materials. Lucas Hamilton argued that by valuing carbon (and not just cost), construction firms can

**To me, the challenge is human behavior. How do you create change? How do you get people talking together?**

— CHRISTIE GAMBLE

**When it comes to decarbonizing, we have to tell others what works and what doesn't because we don't have time for every company to recreate and relearn.**

— JULIA GISEWITE

indicate demand for more efficient manufacturing. Julia Gisewite emphasized prioritizing this demand with subcontractors and suppliers by making procurement choices that reflect sustainability commitments. Jim Martinoskwi called for a focus on transportation, both supplies to the job site and on the site itself. Similarly, Fernando Arias discussed the importance of choosing local suppliers and reducing vehicle emissions related to deliveries of construction materials.

## **2. We need to adopt a circular approach to building materials.**

Martoski and Hamilton both highlighted the promise of recycled materials, as well as the challenges of changing business behavior. Martoski argued that opposition to change is often related to perceived risk and to anticipated costs of designing and implementing new processes and trainings. Hamilton talked about the need to make materials recycling the most lucrative and convenient option. Gisewite pointed out the need for more lifecycle carbon accounting and more awareness of where the carbon is in a building to change how we specify materials.

## **3. We need to have conversations about sustainability at all levels and use language that makes sense to others.**

To identify and scale best practices in sustainability, Gisewite argued that we need to collaborate with competitors. Gamble agreed, proposing the industry considers “**coopetition**” as a framework. Hamilton says that suppliers worldwide may not understand terms like “embodied carbon,” but they are already experiencing climate change and may respond to a discussion about reducing impact. Gamble suggested that even having a statement about sustainability in an email tagline can clarify to vendors that the issue matters.

## **4. Change is hard, but greater application of technology in construction and manufacturing will bring new perspectives.**

Hamilton discussed the many job openings and opportunities for master mechanics and manufacturing engineers. He further said that introducing technology into manufacturing processes with carbon management in mind can help remove some of the inefficiencies that exist that are causing us to have a more significant carbon debt than we should have.

## **5. Innovation will help the industry attract new and diverse workers.**

Gisewite argues that construction is consistently ranked low in terms of investment in research and development. It is a barrier to both technology development and new ways of thinking about sustainability. The next generation of workers wants to be part of the solution, not part of the problem, so change will help bring them in. Martoski agreed that innovation would bring in new faces, especially if they see the work as exciting and rewarding. Gamble asserted that greater diversity will foster new perspectives and industry innovation, likely in areas related to sustainability.



## SPEAKER PROFILES

### CHRISTIE GAMBLE

Senior Director of Sustainability,  
CarbonCure Technologies

Christie Gamble drives CarbonCure's mission to reduce 500 megatons of annual carbon emissions from the cement and concrete industry. CarbonCure manufactures a technology that enables concrete providers to utilize post-industrial carbon dioxide in their manufacturing processes in order to achieve significant embodied carbon reductions without compromising concrete quality. In her role, Gamble collaborates closely with designers and builders who seek to reduce the carbon impact of their building and infrastructure projects. Gamble lives in Regina, Saskatchewan, Canada with her husband and two young children, and is a top-ranked competitor on the World Curling Tour.

### JULIA GISEWITE

Vice President, Chief Sustainability  
Officer, Turner Construction Company

Julia Gisewite is responsible for setting and implementing sustainability policies, standards and strategies across Turner's national and international operations. Turner's sustainability program addresses topics relevant to the building industry including embodied carbon, energy, construction emissions, resiliency, waste, green building rating systems, and more. Gisewite has 16 years of construction industry experience and holds a BS in Civil Engineering from Cornell University.

### LUCAS HAMILTON

Manager, Applied Building Science,  
Saint-Gobain North America

Lucas is a physicist with 30 years of experience in construction and construction materials manufacturing. His expertise includes forensic building envelope diagnostics and testing as well as the development of non-intrusive construction analysis equipment and techniques. Lucas is a practitioner of a variety of building performance simulation software and has spent the past 15 years working with builders and design professionals on behalf of Saint-Gobain to achieve more sustainable, durable, and higher performing buildings.

### JIM MARTINOSKI

Vice President of Logistics,  
Miller & Long

Jim Marinoski manages operations and asset allocations including, but not limited to, tower cranes, mobile cranes, truck pumps, placing booms, batch plants, mixer trucks, and formwork/shoring. He and his team coordinate with field operations to ensure all necessary equipment is on-hand. Jim also collaborates with the Estimating and Project Management departments to align project approaches and improve efficiency for customers. In addition, he leads the innovation and sustainability programs, including advanced mix designs production and shotcrete operations. Jim has over 20 years of experience in the construction industry.

**We have the chance today to bring technology into our manufacturing processes with carbon in mind.**

— LUCAS HAMILTON

**We can't just look at one single aspect. We have to look at the compilation of them to create the embodied carbon reduction to ultimately achieve net zero.**

— JIM MARTINOSKI

**One of the ways that we can reduce the embodied carbon of all kinds of materials is to shorten transportation distances and make materials more locally available.**

— FERNANDO ARIAS



# Matrix: Opportunities and Challenges in Carbon-Free Buildings

	Opportunities	Challenges	Jobs
<b>Top Takeaways</b>	Think about building performance as an opportunity to address multiple challenges simultaneously, including human health, ecosystem and climate health, society, and equity.	Dramatically scale up the number of efficient and net zero retrofits by 2030.	Talk about decarbonizing buildings in terms of job opportunities for a wide range of skillset and levels, not just sustainability and climate.
<b>Designers</b>	Create award-winning designs that achieve green building certifications with carbon management as the key driver of building efficiency and materials excellence.	Propose climate action through design along with other priorities that clients value most.	Use simulation tools to gain and share new ways of understanding energy performance, demonstrating the value of this approach and the need for this skill in the industry.
<b>Operators</b>	Leverage data for tracking and improving building performance to achieve significant savings.	Develop a deep understanding of building energy use and refrigerant management.	Use mechanical and digital technologies to achieve greater efficiencies and help others understand how to do the same and why it matters, thereby driving demand for these skills.
<b>Developers</b>	Consider efficiency as an excellent long-term financial investment, especially when changes are made at key points in the building process	Preserve and translate green property value information so it transfers to future owners.	Seek out “green building” appraisers who understand how to properly value high-performing buildings.
<b>Construction Professionals</b>	Reduce carbon by focusing on the materials procured, the vendors chosen, and the supply chain.	Take a circular approach to materials rather than a one-way view culminating in disposal.	Prepare for new jobs related to tracking and procuring low-carbon building materials and calculating embodied carbon on projects.

# Matrix: Opportunities and Challenges in Carbon-Free Buildings *(cont...)*

	Opportunities	Challenges	Jobs
<b>Everyone</b>	Take an active role in breaking down silos and bringing the issue of building performance into decision-making.	Shift how both occupants and the building industry conceive of and interact with the built environment, from an isolated view to a more comprehensive one.	Talk about new business opportunities for companies that understand energy performance.
	Make sustainability mainstream by showing how it relates to what clients care about, including risk, ESG, and overall return on investment.	Support regulation to incentivize action, send clear signals to the market, and drive behavior change.	Encourage universities to have an intentional focus on buildings and climate to get the next generation ready.
	Track rapidly changing carbon analytics technologies and test for potential databases with new materials, new designs, and better tracking of Global Warming Potential results.	Collaborate to find and use best practices rather than competing.	Raise labor market demand for highly skilled workforce ready to face future demands and encourage collaboration to achieve that goal.
	Use retrofits and conscientious building design to improve indoor health and productivity while lowering the total costs of not just energy use, but also losses from poor health, productivity, and liability.	Focus on equity to make the benefits of building performance accessible to all, without incurring simultaneous gentrification and displacement.	Pair jobs in decarbonization with workforce development programs and thoughtful procurement strategies to benefit historically disadvantaged communities.
	Consider that retrofit projects allow for cultural preservation as well as carbon reduction.	Take an activist approach to building decarbonization by supporting actions, and policies, that support a rapid, large-scale change.	Talk about how innovation will help the real estate industry attract new and diverse workers.



[www.clarkconstruction.com](http://www.clarkconstruction.com)



[www.buildinginnovationhub.org/  
whatittakes](http://www.buildinginnovationhub.org/whatittakes)