



# BUILDINGENERGY BOSTON

MARCH 7-9, 2017 • SEAPORT WORLD TRADE CENTER • [NESEA.ORG/BE17](http://NESEA.ORG/BE17)

Conference + Trade Show of the Northeast Sustainable Energy Association (NESEA)

## CONFERENCE SESSIONS ► WEDNESDAY, MARCH 8

### Plenary, Part I - Beyond Energy: The Concealed Environmental Impact of Buildings and Residents

When it comes to environmental impacts of buildings, operational energy (and to some degree, carbon) attracts the most attention. This is likely because buildings currently account for one third of the world's energy use, and this figure is projected to double by 2050 – presenting both a huge challenge and a great opportunity to improve the sustainability of the built environment. While the industry's main focus on operational energy can be justified, it is important not to neglect the other environmental impacts of buildings and residents, including water, toxicity, smog, acidification, eutrophication. This presentation will give a visual overview of the wider environmental impacts of buildings on residents. Dr. Craig Jones will reveal big picture impacts and show how your own local consumption can have unexpected impacts – even on the other side of the world. Plenary sessions are open to everyone with a name badge. **Craig Jones** *Harborview Ballroom*

## WEDNESDAY 10:30am-12:00noon

### The "Anti-Greenwash" Guide to Community Electricity Aggregation

Can a community get more renewable electricity for all of its residents at a competitive price? Massachusetts communities have the option to choose an electricity supplier for their residents and businesses through "community choice aggregation" (CCA) in order to obtain better pricing and more renewable energy. Join Mass Energy (a nonprofit organization) and Good Energy (a CCA consultant) to discuss a model that allows communities to harness the savings of CCA while investing in creating new renewable energy sources in New England. Learn how this approach, which has been promoted by the Metropolitan Area Planning Council and has been adopted successfully by two Massachusetts towns already, can allow communities to push more aggressively towards reducing carbon emissions without breaking the bank. **Philip Carr, Martha Grover, Patrick Roche, Erin Taylor** *Cityview 2*

### The Cannabis Cultivation Conundrum

As an increasing number of states legalize cannabis for not only medical but also recreational use, the energy consumption of indoor cannabis cultivation can no longer be ignored. Its relatively tentative legal state and its somewhat taboo status have stifled efforts to reduce the impacts of cannabis cultivation. Furthermore, why is indoor growing so dominant? This session will explore some of the main barriers to addressing the efficiency of cannabis cultivation, both from technical and program delivery perspectives. **Fred Davis, Ian Gordon, John Morris** *Waterfront 3*

### Getting to Yes: Winning and Making Your Next Project Net Zero, LBC, or . . .

We know how to design and construct net-zero and living buildings that are healthy, responsible, beautiful, durable and financially prudent. So why aren't clients demanding this? How can we clearly demonstrate that this is in their best interest? Three building industry leaders will share what has worked (and not) in pursuit of leading-edge environmental projects. With a common goal of increasing our collective success rate of winning projects and raising the bar on environmental performance (and compensation) for projects, participants will roll up their sleeves and dive into dialogue to determine together the best strategies for our renewable future. **Larry Jones, Bill Maclay, Megan Nedzinski, Charley Stevenson** *Federal Complex*

### Lightning Round! Day 1: Lessons from The Field

New this year, Lightning Rounds pack as much information into one session as possible. You'll hear succinct, to-the-point, and practical presentations on a variety of topics, including: Improvements in Phase Change Materials: R-value, heat flux, energy consumption, energy demand and what the future looks like for this exciting and economical technology. Small Facility Energy and Asset Management: Challenges and opportunities in managing portfolios of facilities less than 25,000 square feet, such as restaurant and small box retail chains. Indoor Air Quality: Proto-typing and deployment of low-cost, real-time sensors to monitor Indoor Air Quality (IAQ) as a measure of improved health-based outcomes in occupants of energy efficient buildings. Using the Winter Thermal Comfort Tool for Glazing Selection: Introducing a newly developed, publicly available tool that quickly analyzes glazing design parameters, representing the design's impact on radiant and downdraft discomfort in the wintertime. **Mick Dunn, Martin Flusberg, Doug Leaffer, Alejandra Menchaca, Betsy Glynn** *Harborview Ballroom*

### Multifamily Passive Buildings: Evaluation of Measured Performance

Since 2013 the Passive House Institute US has seen a significant increase in the design, construction and certification of multifamily passive buildings. Many first multifamily passive buildings, from 6-to-57-unit developments, have been completed and occupied since then. Monitored performance data are now available. This presentation will report on a detailed comparison of modeled performance predicted by passive design tools and actual measured performance data for three case study projects while occupied and under operation. The question of how well the currently used passive modeling tools, algorithms and underlying modeling assumptions match the measured performance in the field will be answered as well as if the anticipated overall energy and carbon reduction goals in these projects have been met. **Katrin Klingenberg, James Ortega** *Cityview 1*

## WEDNESDAY 10:30am-12:00noon continued

### Net Zero Water: Not a Dry Topic

Construction often negatively impacts the natural balance of water cycles. Even regions with historically abundant quantities of potable water are depleting aquifers, while record rainfall provides destructive amounts of storm water. The Living Building Challenge developed the “Net Zero Water” requirement as a response to the growing water crisis. Living Buildings challenge architects and engineers to develop a rigorous technical design, owners to embrace a cultural shift in operations, and regulators to adapt to a new water model. This panel will present the engineering, design, and policy requirements of resilient water systems highlighted by a recently constructed net zero water project on a college campus. **Christopher Nielson, Christopher Chamberland** *Cambridge Complex*

### Next Generation Energy Efficiency

Utility of the Future... EM&V 2.0... Zero Energy... duck curve! Today’s energy challenges encompass topics far beyond the “bread and butter” of energy efficiency in buildings. After more than 25 years of successful energy efficiency programs, states in the NESEA region are addressing the need to move beyond the traditional energy efficiency model and meet today’s challenges. Policymakers from around the region discuss initiatives to achieve deep, comprehensive energy savings in homes and buildings; integrate distributed energy resources and new technologies to address peak demand and systems constraints; assess innovative utility rate structures and work to make zero energy buildings the norm. **Brian Buckley, David Littell, Paul Markowitz, Danny Musher, Arah Schuur** *Waterfront 1*

### Retrofitting Residential Properties

One-to-four unit homes present special challenges to energy-efficiency upgrades. Many of these homes were built from 1890–1960 and lack insulation, leak air, and waste energy and water. This panel will share data and solutions to improve the energy- and water- efficiency of these homes, discuss cost-benefit analyses of planned improvements, describe options for testing results of completed upgrades, and explore how to pay for this work. **Joshua Jacobs, David Kelman, Lourdes Lopez, Jason Taylor** *Back Bay Complex*

### Transforming Institutional Buildings for the Next 100 Years

Beloved institutional buildings: These storied landmarks of architectural significance have a unique relationship to students, faculty, alumni, and the general public. We will explore the complex path of decisions and designs intended to meet the needs of a diverse constituency and changing resource climate. How do we maintain the integrity of experience and sense of place while meeting ambitious sustainability and programmatic goals? Oftentimes smaller structures (5-10k SF), these campus treasures may not have been upgraded in decades or more. They represent critical pedagogical spaces in the increasingly large-scale skyline of the modern campus. These singular, hand-crafted spaces require special attention as we take them apart and put them back together again. Topics will include mechanical and envelope choices as they integrate into design criteria as well as a look at how the use of space changes with time. Through case studies we will see how a special space can transition to resilience, accessibility, and enhanced function while maintaining its character. S.O.M.’s Chapel House (Colgate University, 1959), Kenneth Reynold’s The Log (Williams College, 1941), and others are examples of collaborative efforts to balance change with consistency, yielding high performance buildings ready for the next 100 years. **Thomas RC Hartman, Jesse Selman** *Waterfront 2*

## The Updated ILFI Net Zero Energy Certification, Reveal Label, and New Partnerships

The International Living Future Institute (ILFI) has radically reworked its Net Zero Energy Building certification to be significantly more straightforward and user friendly, at the same time as improving energy performance data and case study information. The Reveal high performance building label, which measures EUI, efficiency gains over baseline, and on- and off-site renewable offsets, has been reworked to show if projects met the 2030 Challenge as well as providing the project zEPI score. ILFI has also been building much stronger partnerships with New Building Institute and Architecture 2030 to provide a more cohesive advancing of the net zero energy/carbon movement broadly. Institute Net Zero Energy Director Brad Liljequist will share the latest as net zero energy moves into early adulthood. **Brad Liljequist** *Beacon Hill Complex*

## WEDNESDAY 1:30-3:00pm

### Building Partnerships to Increase Uptake of Residential Energy Efficiency Measures

Solarize campaigns are helping communities across New England transition to renewable energy, but whatever happened to “efficiency first?” The same collective approach can work for deploying other sustainable energy solutions at scale and addressing the barriers to participation in both rural and urban areas. In Maine, this has been demonstrated by the award-winning “Weatherization Week” model which has helped weatherize over 350 island homes, 18% of the year-round homes in Maine’s 15 island communities, and is now being replicated by other organizations and communities throughout Maine to increase uptake of air sealing and insulation jobs, LED retrofits, and heating system upgrades. This interactive session will feature examples of effective partnerships between contractors, program administrators, and local leaders that are driving investment in residential efficiency services. Participants will explore opportunities for collaboration in their own markets, learning how to partner effectively to boost sales, program participation, and energy savings. **Dana Fischer, Brooks Winner** *Beacon Hill Complex*

### Data-Driven Design and the Living Building Challenge

Super-insulated construction, simple yet efficient building systems, and modern solar generation have made net zero energy a realistic project goal for new construction even in cold climates. However, achieving this without the use of red-list materials is a serious balancing act. Moisture control, air tightness, and thermal isolation are critical; evolving envelope products must be tested. This presentation illustrates the modeling and research one team used to target the Living Building Challenge. It will analyze the preliminary building energy data and moisture content of a double-stud cellulose wall employing a vapor open fluid-applied water resistive barrier. **Christopher Nielson, Marc Rosenbaum** *Waterfront 1*

### Energy Codes and Zero Energy Buildings: Strategies for Today, Tomorrow, and Beyond

New building energy codes have arrived and others are on the horizon. This intensive session begins by introducing the newest codes in the region: specifically the amended IECC2015/ASHRAE 90.1-2013 and updated stretch code in Massachusetts as well as the stretch code and zero energy plan under development in Rhode Island and New York. Looking forward, the IECC2018 and the ASHRAE 90.1-2016 standards have been finalized, and we provide a synopsis of what changes are coming. Finally, we delve into what a zero energy code might look like and discuss when it may be coming to

## WEDNESDAY 1:30-3:00pm continued

the region. **Dimitri Contoyannis, Ian Finlayson, Maureen Guttman, Kevin Rose, Becca Trietch** *Waterfront 2*

### Evolving Assemblies

We know. You want to geek out about clever construction details and cutting edge construction methods, and in the process perhaps learn some strategies that you can bring back and apply to your own work. Well then, this is the session for you. A panel of talented building professionals will quickly present some of their more advanced, even adventurous, assemblies and details, then engage each other AND the attendees in a discussion of how and why these details came to be and how they impact their projects and their own practice. This session is not for the faint of heart. Evolution is messy business, and there are usually casualties. "Lessons learned" will be shared, and perhaps "better ways" will be forged on the spot. We'll grow together. It'll be fun. **Steven Baczek, Chris Briley, David Hall, Matthew O'Malia, Jesse Thompson** *Back Bay Complex*

### Getting Real About Renewables: Passive House and the Future of Energy

The growth of renewable energy is a hopeful and positive sign for society. It is not merely a fuel switch, however; it is a disruptive technology that is revolutionizing the fundamental economics of the grid itself. As fossil-fuel "storage" is supplanted by intermittent renewable energy, peak load is transitioning from demand-driven to supply-driven, and shifting the focus from "energy" to "power." Load shifting and shaving, demand response, and energy storage will be more critical and valuable than ever before. This presentation explores the untapped value of thermal storage, high performance building shells, and other Passive House principles within the context of this "new grid." **Graham Irwin** *Cityview 2*

### Materials Transparency: Choosing Better Products for Your High Performing Building

High performance building products improve energy efficiency to create more sustainable buildings. However, the materials used to make these products can also create adverse effects, such as depleting natural resources, causing pollution, and exposing us to harmful chemicals. In recognition of these realities, product ingredient transparency is becoming a primary objective of ambitious project teams who want both high efficiency (even net positive) and healthy buildings. This objective is a challenge to teams as chemicals of concern are ubiquitous in the building materials that we traditionally specify. Our session will discuss impediments to specifying "ideal" materials, how project teams can devise a framework during the design process from which to make material and product choices, a "how-to" approach for researching products, and the importance of aligning the goals of the design team, owners, contractors, and suppliers. **Lisa Carey-Moore, Paula Melton** *Cambridge Complex*

### Neighborhood Development: One Project at a Time

This session offers a basic "how to" about high performance housing development and a critical look at the impact that high performance infill housing development can have on an entire neighborhood. Declan Keefe, Strategic Director of Placetaylor, an architecture, construction and development company, will use their development projects in the Fort Hill neighborhood of Boston as a case study to explore how high performance speculative housing can be done and the impacts that it can have beyond just the building itself. **Declan Keefe** *Cityview 1*

### Performance-Based Procurement: Infusing Your New Construction Contract with Energy Requirements

The obstacles to a high performing building are legend, but those barriers can now be surmounted. A new performance-based procurement process, developed and successfully executed at NREL, targeted and achieved an EUI of 35 kBtu/sf/yr while keeping costs in check. Owners expect the energy performance of new construction or major renovation projects will meet or exceed expectations in design; however, they're frequently left with less savings and increased operations and maintenance expenses. This session will explore how to empower owners to achieve high performance buildings while controlling costs and how to establish a measurable energy performance requirement in your next project. **Joseph Clair, Connor Jansen, Paul Torcellini** *Federal Complex*

### Real World Data of Domestic Hot Water Consumption and Energy

What are the real-world loads and efficiencies of domestic hot water (DHW) systems in multifamily buildings? New Ecology, Inc. has tested many DHW systems using data loggers and Btu meters, and used these data to inform the design of new and upgraded DHW systems. Testing has determined tenant usage patterns, system efficiencies and issues with controls and system components. We'll dig into hourly DHW usage profiles, the efficiencies of different gas-fired systems and ASHRAE DHW sizing methodology. Finally, we will explore the ways that these data have informed equipment recommendations and system design for multifamily buildings. **Neil Donnelly, Andrew Proulx** *Waterfront 3*

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## WEDNESDAY 3:30-5:00pm

### Air (vital stuff): Strategies for Getting It Into (and out of) Multifamily Buildings

In an increasing market for multifamily, energy-efficient and high-performance building shells, efficient ventilation strategies become paramount in maintaining health and comfort without sacrificing high level project goals such as Passivhaus Certification. So what is the best approach to creating a well-ventilated multifamily building? As with most issues in design, it depends.... This session will discuss ventilation approaches to be considered from large central air handlers, to individual systems in each dwelling, to options in between. The pros and cons of several strategies will be presented with ample time to pose questions and debate methods. How important is distribution? Is heat recovery necessary? Should occupants have control? How much air is enough? What do you do with ancillary spaces? These questions and more will be addressed through outlining general concepts and presenting case studies. **Aubrey Gewehr, Steven Bluestone** *Waterfront 3*

### The Appropriate Future Roles of Monopoly Electricity Utilities

In the face of an industry that often seems to have outgrown the business model, what is the role of a regulated monopoly in the 21st-century electric grid? This session will explore changes needed in the utility business model and regulatory framework in order to establish a fair, innovative, and competitive energy industry. **Peter Kelly-Detwiler, Nate Owen, Karl Rabago, Fred Unger** *Cityview 2*

## WEDNESDAY 3:30-5:00pm continued

### Buildings in the Age of Electric Vehicles

In 2013, eight states signed a memorandum of understanding that commits them to work toward getting 3.3 million zero-emission vehicles (ZEVs) on their roads by 2025. These states – six in the northeast – and others are implementing market transformation programs to increase adoption of ZEVs, many of which are plug-in electric vehicles. This session will explore how this new interaction between buildings and personal transportation is affecting building design. Are you ready to incorporate electric vehicle-ready components into your work? **Sean Anderson, Andy Hoskinson, Steve Russell** *Cambridge Complex*

### Carbon Counts! Calculating the Carbon of Commercial Construction

Beyond the energy used during building operations, the construction of buildings causes atmospheric emission of carbon dioxide and CO<sub>2</sub>-equivalent gases (CO<sub>2</sub>e). Some of these emissions are related to the materials' "embodied energy" but some materials have high emissions due to other factors, such as direct emissions from chemical processes, or the use of high GWP blowing agents. We can quantify these emissions, and learn how to reduce them by design. This workshop delves into the magnitude of CO<sub>2</sub>e emissions of building structures of steel, concrete, masonry and wood, as well as facade and window construction, based on new information from Environmental Product Declarations (EPDs) and other sources. We will tally emissions represented by the construction of a standard commercial building, and explore the effect that design decisions can make on the tally. Then we will compare this to the annual emissions of heating and cooling the same building. **Jim D'Aloisio, Mark Webster** *Waterfront 2*

### Lessons from Abroad: The Danish Way or the (Bicycle) Highway

This session will dive deep into Danish ideas and solutions we might consider importing to Boston and other US cities, despite our very different regulatory environment. Speakers will introduce Denmark's fundamental value of planning for the common and collective good, and will share how the oil market and two back-to-back severe weather events drove this small nation to become a leader on the resiliency front. Denmark's Ramboll Environ will discuss how they are translating Danish ideas around resiliency in the US. Then, panelists from Boston's Women Leading Change delegation will present specific projects and examples from their recent learning exchange in Denmark. Topics will include stormwater management and designing with water, transportation planning, wind energy and district heating and cooling, and social resiliency. **Isabel Kaubisch, Christina McPike, Susanne Rasmussen, Mette Søs Lassen, Ellen Watts** *Beacon Hill Complex*

### Moisture Safe? The Writing is on the Wall

Our speakers are building enclosure consultants steeped in wall moisture solutions through data-rich research, computer simulations, lab testing, live performance monitoring – as well as a myriad of "house-calls" to clients. They'll offer takeaways on building moisture-safe walls, including insulating sheathing, ventilated claddings, inward vapor drives, and vapor retarder paints. You can expect a lively Q&A. **John Straube, Kohta Ueno** *Waterfront 1*

### State of the Art: High-Performance Natural Building for Cold Climates

The phrase "natural building" tends to evoke images of humble, rustic homes built out of mud and sticks by barefoot idealists in rural backwaters. The natural building movement has come of age, however, and today's professionally-executed natural buildings can match any green building in air-tightness, energy use intensity, durability, and aesthetics, all while achieving reduced levels of embodied carbon and enhanced social benefits. In this presentation we will look at real-world case studies and design details to explore the solutions offered by the next generation of natural buildings, with a focus on cold-climate strategies. **Jacob Racusin, Ben Graham, Ace McArleton** *Federal Complex*

### Systems and Stewardship: Placemaking as Practice

Systems Thinking invites us to observe and propose the "boundary conditions" that will ultimately define every project's design goals. By extending that conversation to include our responsibility to be stewards of the project's "Place," we invite our clients into a fundamentally different evaluation of what matters to them, us, our community, our environment, and most essentially, the place that we will be making together. Don't you want to work on projects grounded by this premise? In this session we will reveal the relationships between Systems and Stewardship and the ways in which the act of Placemaking can ground that practice. **David Foley, Jamie Wolf** *Back Bay Complex*

### Zero Energy and Affordability: Can These Words Go Together?

Experience, technology, new architectural approaches, and many other factors are advancing toward Zero Energy Buildings being more affordable, especially in a residential setting. In addition, tax incentives, renewable energy credits, and solar financing can potentially swing a Zero Energy project from "in the red" to "in the black." This session will examine these trends and present real case studies which demonstrate how Zero Energy can actually cost less, not more, to build. Can cost competitiveness and cost positivity be the fuel that leads to a market transformation? Come with your questions and experiences to share. **Jacob Knowles, Paul Ormond, Alex Pollard** *Cityview 1*

**End of session schedule for Wednesday, March 8.  
Thursday, March 9 begins on next page.**



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## CONFERENCE SESSIONS ► THURSDAY, MARCH 9

8:30-10:00am

### Plenary, Part II: Methane Leaks, Public Policy, the Future of the Natural Gas Grid – and the Implications for Your Projects

A discussion on the serious environmental, legal, and policy issues regarding distribution losses along the natural gas grid. Is methane really a useful bridge fuel, or is it a serious part of our problem? **Pat Parenteau, Marc Rosenbaum, Audrey Schulman, Nathan Phillips** *Harborview Ballroom*

## THURSDAY 10:30am-12noon

### The Future City

This facilitated conversation is on the future city and its impact on the practice of NESEA thinkers and practitioners. Historically, BuildingEnergy has focused on isolated parts – the building or a renewable energy installation. This session will address the whole place like a city or village and what can be done to improve energy efficiency and connectivity among people by integrating all of the parts. We begin with a short presentation on future city practices such as: the building as a self-contained ecosystem; using big data to create smart cities; managing density; water conservation; developing whole neighborhoods with a soul and sense of place. The rest of the session: working on issues that matter to you. We will end with identifying and declaring what you most want to work on back home. **Robert Leaver** *Beacon Hill Complex*

### Harnessing Energy Storage to Meet New England's Energy Challenges

Energy storage systems can provide multiple benefits and related revenue streams to residential and commercial ratepayers but business, finance, and ownership models are still emerging. But while most acknowledge that the benefits of storage can outweigh its costs, not every market allows for storage owners to capture its full value. This dynamic time for storage is seeing various initiatives proposed, debated, and implemented. Hear from government officials and other experts as they discuss the latest state efforts to stimulate market growth and adoption of this critical technology. **Will Lauwers, Galen Nelson, Todd Olinsky-Paul** *Cityview 2*

### HERS Raters: They Do Play Well With Others

HERS raters do more than “crank out a model and give you a number.” The right HERS rater can be a building science practitioner who helps project teams throughout design and development, filling a role analogous to structural engineer or code compliance consultant. If you don't have a HERS rater on your team, your life is probably a lot more difficult than it needs to be. HERS raters can help navigate various code requirements,

standards, and incentive programs, including RESNET/ANSI 380 and 301, ASTM E779, and can help develop cost-effective ways to meet the 2015 IECC Performance path. Expect a lively discussion between industry experts about how to utilize HERS raters from the beginning of a project to the very end. **Michael Browne, Mike Duclos, Paul Eldrenkamp, John Lojek, Parlin Meyer, Ben Southworth** *Waterfront 1*

### Integrative Design Process (for real): Mapping Your Delivery Process

Most firms claim to practice integrative design, but that's not reliably the case! With LEED's new “IP” credit and increased demand for NZ buildings, it's time to get real. Transforming the design process is not simply adding a kick-off charrette – it's a systemic transformation that even can help overcome the typical dysfunctional dynamics between architects and engineers. In this roll-up-your-sleeves session, participants will dig in, deconstruct what they do on a “typical” project, and “ReDesign” the future to achieve a desired performance outcome. Participants leave with actionable items to put into practice immediately. **Barbra Batshalom** *Federal Complex*

### Lightning Round! Day 2: The Many Uses of Data

New this year, Lightning Rounds pack as much information into one session as possible. You'll hear succinct, to-the-point, and practical presentations on a variety of data-focused topics, including: Laser Scanning and BIM: Reduce the costs and complexities associated with traditional measurement methods for existing structures. Mainstreaming Solar Energy: With insights gleaned from thousands of transactions in EnergySage's online marketplace, this session will explore the factors that differentiate successful solar companies and share strategies that work for mainstream adopters. Watching Our Energy Use: Kilowatch's energy management approach integrates inquiry-based science, math and language arts and provides students with a real-world learning experience while saving schools 10% on utility costs. Online Marketing for Solar Businesses: How are homeowners and consumers are really behaving online – and how can solar businesses leverage that behavior to grow sales through online lead generation? Automated Ongoing Commissioning in Hospitals: A tool called AtSite is able to automatically monitor, store and run algorithms on data to identify significant inefficiencies. **Todd Bairstow, Aaron James, Todd Rogers, Alex Wyczalkowski, Betsy Glynn** *Harborview Ballroom*

## THURSDAY 10:30am-12noon continued

### Liquid Assets: Water Monitoring and Conservation in Multifamily Buildings

We all know we should be saving water in our multifamily buildings, but how? Most tenants pay their own electric bills so switching off lights makes economic sense, but since water is usually included in rent, thousands of running toilets and leaky faucets go mostly neglected every day. This leakage (economic pun intended) can significantly impact building operating costs. The good news is that the solutions are relatively cheap to implement, and new monitoring techniques can allow building operators to quickly identify problems before they show themselves on a monthly or quarterly water utility statement. In this session's multilevel look at water monitoring and conservation in multifamily buildings, we'll hear from four speakers whose varied perspectives run the gamut from regional water utility to startup water meter developer to building owners and managers. **Stephen Estes-Smargiassi, Ely Greenberg, Vlada Kenniff, Howard Pollard** *Cityview 1*

### Mind the Gaps: Post-Occupancy Discoveries from Design to Operation

Vanderweil has piloted post-occupancy review to determine how buildings are used and discovered that gaps in installation, operation, and maintenance, which can result in excess energy and resource use, may be avoidable. Post-occupancy evaluation requires a small investment but yields results that can help alleviate owner issues with controls, circulation, and operational strategy. This session will share ways that project design, process, requirements, and communication can influence responsible use of building resources, and describe how the RGV360 program has helped evaluate and inform the design approach for upcoming projects. **Patrick Murphy, Charles Stellberger** *Waterfront 3*

### Three Vermont High-Performance Homes, Three Approaches

This session offers a thought-provoking comparison of the construction and performance of three high-performance homes completed in Vermont in 2015-2016: all two story, one with a basement, one traditional double stud, one double stud with air barrier behind the inner stud, one exterior I-joist wall. The projects' architect and construction leaders will discuss design, ease of construction, cost and performance of the different systems, and reasons to choose one over the other. **Alex Carver, Tom LeBoeuf, Jared Moats, Jean Terwilliger** *Back Bay Complex*

### Using Whole Systems Thinking in High Performance Design: The New MacArthur Elementary School

In 2011, the Susquehanna River flooded Binghamton NY. The MacArthur Elementary School was inundated with contaminated flood waters and declared a total loss. This session will recount the inspiring process by which the city created a new school – a 125,000-square-foot, LEED platinum (pending) building with an EUI of 10 that embodies new models of educational engagement. Community discussions yielded five overarching vision statements which guided all decisions about site, building form, and materials. The design team used detailed energy and daylight modeling to create an energy budget and select high-performance systems for climate control, ventilation, and lighting. Commissioning, data collection, measurement and verification progress will show how the project is performing since its completion in late 2015. **Calvin Ahn, Michael McGough, Edward McGraw** *Waterfront 2*

## WELL, LEEDv4, and the Quest for Material Health

This session offers a three-part consideration of healthy materials. Part 1 investigates why built environment professionals should and do care about this growing topic of concern, and explores the history of chemicals of concern, their prevalence within the built environment, and what we have done to date to combat their unintended consequences. Part 2 explores the overlap between LEEDv4, the Living Building Challenge, and the new WELL Building Standard, particularly in regard to indoor air quality and materials procurement. Part 3 rounds out the discussion with a look at what leaders in this new realm of practice are doing to achieve their goals innovatively and inspirationally. **Steven Burke, Blake Jackson, Lisa Goodwin Robbins** *Cambridge Complex*

## THURSDAY 1:30-2:30pm

### All About Windows

Windows are arguably the most important architectural element in a home, impacting the appearance, comfort, energy use, ventilation, and overall enjoyment of our homes in a number of ways – some not so obvious. This interactive session will explore important details concerning windows, including how they impact comfort, how they can be used to supplement a heating system and assist with "passive survivability" when the power fails (with real data from four homes), and their impact on annual energy use. We will cover window construction, the meaning of the various performance parameters, the impact of windows on home floor-planning and design, construction and space heating and cooling mechanicals, and window considerations for zero net energy homes, Passive House and Deep Energy Retrofits. Bring your opinions and questions! **Mike Duclos** *Back Bay Complex*

### Are You the Weakest Link? Resilient Design 101

Buildings are designed to be expendable. Codes focus on safe evacuation in an emergency, not on keeping buildings occupiable through a disaster. With climate change, displacement due to damage from extreme weather events like Superstorm Sandy is more common. Is building to code minimums really enough? This workshop will take you through the process of planning for resilient design, using the LEED pilot credits IPc98, 99, and 100. **Katie Courtney, Marcell Graeff** *Federal Complex*

### The Campus as Crucible for Catalyzing Change

College campuses are leading the transition from fossil fuels to renewable energy at the community level. This session will combine design, technology, and policy with real-life case studies of campuses moving toward carbon neutrality. We'll present three different colleges in Vermont, Massachusetts, and New Hampshire. What better way to help the rising generation prepare for their own future than to lead the campus, as community, into the clean-energy future? **Amelia Amon, Abbe Bjorklund, Morgan Casella, Steven Strong** *Waterfront 2*

### Data Loggers for Advanced Diagnostics

Data loggers are tiny computers which record temperature, humidity, water flow rates, and other environmental parameters over a long timeframe. How can they be used to diagnose building issues? What are some tricks and tips for using data logging systems? The possibilities of these inexpensive and useful devices will be explored through case studies on condensation issues, air and hydronic HVAC, and building ventilation. We will show techniques for manipulating the acquired data into useful formats, and share lessons learned in real-world investigations. **Doug Horgan** *Beacon Hill Complex*

## THURSDAY 1:30-2:30pm continued

### Five Market Trends That Are Re-Shaping C&I Energy

#### Management

Energy storage systems can provide multiple benefits and related revenue streams to residential and commercial ratepayers but business, finance, and ownership models are still emerging. Learn more about state efforts to stimulate market growth and adoption of this critical technology across a range of deployment scenarios. **Andrew Mulherkar, Brett Simon** *Cityview 2*

### For Good Measure: Monitoring Envelopes to Inform Masonry Building Renovation

Existing buildings have a unique story to tell, and we as designers and engineers must tune our design process to "hear" how our buildings actually perform. On-site monitoring of dynamic environmental conditions provides empirical evidence for building performance, which adds granularity to energy modeling practices and empowers the design team to effectively analyze unique envelope characteristics. In this session, case studies of low-rise masonry renovation projects will provide examples of how envelope monitoring supported design decisions and helped achieve sustainability goals pertaining to energy use, operational efficiency, economic viability, and longevity. **Cooper Schilling, Kit Elsworth** *Waterfront 1*

### Greening Affordable Housing: Driving Energy Efficiency, Clean Energy, and Health in Our Communities

How do we make affordable housing both healthier for residents and more energy efficient? This panel will document successful healthy housing and energy efficiency strategies that LISC and its partners have used to achieve results in New York City and Massachusetts. Codman Square Neighborhood Development Corporation, one of LISC Boston's partners at the forefront of creating and maintaining energy efficient and clean energy-powered affordable housing, will share recent highlights from their housing portfolio. **Michael Davis, Deborah Nagin, Drew Vernalia** *Cityview 1*

### The Key to the Castle: Who Has It and Do They Know Where the Lock is?

Improving the operational performance of buildings requires highly skilled and qualified workers, particularly as building technologies become more advanced. Yet many lack the skill-set they need to maintain these facilities. This session will cover what happens when you don't train or engage building operators in effective O&M strategies – and what can happen when you do. The panelists will lead an interactive discussion about the latest trends in credentialing, including the U.S. Department of Energy's development of commercial building workforce training and certification programs for four key energy-related jobs: building energy auditor, building commissioning professional, energy manager, and building operations professional. **Carolyn Sarno Goldthwaite, Ken Wertz** *Cambridge Complex*

### New IAQ Metrics to Avoid Being Stupid, Sick, and Tired

Our poorly ventilated homes and buildings are making us stupid, sick, and tired—at a cost that is staggering. Improvement of today's ventilation standards can increase human productivity with a value that is more than 100 times the associated cost of increased ventilation. Thus, a new home-design paradigm that places human health, well-being, and productivity is desperately needed. This session examines the impact of IAQ on our health and productivity, and defines a new set of IAQ metrics. These metrics

translate basic indoor air quality measurements of carbon dioxide and TVOC (Total Volatile Organic Compounds) into metrics related to human performance. The results of comparing homes without smart ventilation and homes with smart ventilation control using these new metrics are included. **Ty Newell** *Waterfront 3*

## THURSDAY 3:00-4:00pm

### The AIA 2030 Commitment: Building Energy Literacy

The AIA 2030 Commitment has impacted not only how we design, but also how firms practice by integrating performance information into the design process. This session is relevant both to those interested in learning more about the Commitment and to current signatories, and will cover new tools and developments, such as the online performance tracking tool, the Design Data Exchange. See how the AIA 2030 Commitment has made an impact on the culture and practice of three different organizations and share their paths to greater literacy and understanding about building energy. **Stephanie Horowitz, Andrea Love, Dee Spiro** *Waterfront 2*

### Building Local, Buying Local: Advantages and Challenges of Sourcing Materials from New England Forests

Sourcing materials from New England's 33 million acres of forest presents an opportunity to reduce shipping distances (thus lessening a building's embodied energy) and to directly support the socio-economic sustainability of local communities. This session will explore the design advantages—and challenges—of sourcing local forest products, referencing case studies throughout New England. Participants will learn about navigating structural code, LEED and Living Building Challenge ratings, searching for suppliers, specifying wood by application, and sourcing wood from trees growing onsite. Participants are welcome to contribute their own experiences working with local wood during the discussion. **Sean Mahoney** *Waterfront 3*

### Installing "Energy Smarts" for Your Multifamily Project: Providing Holistic Behavioral Energy Management

Your building is only as efficient as the operators and inhabitants. Even the most sophisticated and efficient building systems can be undermined by poor training and behavioral biases. New knowledge about these biases has led to proven, people-centered strategies with high savings to investment ratios. Todd Rogers, CEM, has been designing innovative programs in the energy and education fields for more than 20 years. His session will cover the best approaches for training operators and changing tenant behavioral patterns based on research and real-world field experience. **Todd Rogers** *Cityview 1*

### Permanently Passive: Building With AAC

Autoclaved Aerated Concrete (AAC) is a masonry product with a long history in much of the industrialized world, yet it has seen relatively limited use in the United States. The two presenters, Dan Levy and Steve Bluestone, both find AAC preferable to wood as a building material for many reasons, including resistance to fire, water, mold pests, and structural loads. And AAC does all of the above with a single material installed by a single trade. Steve's own home that was completed in 2015 was the first AAC building certified by PHIUS in the USA. Dan's AAC home may very well be certified also by the time the conference takes place. They will show their projects, discuss successes and trials, and answer questions about AAC and PH. **Daniel Levy, Steven Bluestone** *Back Bay Complex*

## THURSDAY 3:00-4:00pm continued

### **Redundancy. Diversity. Connectivity: Optimizing Your Projects, Your Business, Your Work**

Learn and be inspired by this session illustrating the methodologies nature uses to optimize. Through storytelling, discussions with the audience, and use of Prezi as background, we will learn about biomimicry, biophilia, and bio-utilization and learn to employ the clues in those realms to processes supporting project planning, business management, and workflow. As this is an inspirational talk, the content may be considered by some as introductory, yet it illustrates with clarity the skills experienced green building practitioners, green product manufacturers, and visionaries need and use. Expert practitioners will appreciate this session as a refresher/pick-me-up. **Jodi Smits Anderson** *Federal Complex*

### **Spending Through the Roof: Tall Building Energy Wasted Through Passive Vents**

Recent research revealed that an estimated \$11M in energy cost is wasted annually due to open vents at the tops of tall buildings. The vents are code-mandated but are left open, allowing tall buildings to become chimneys in winter. A NYSERDA study report published by Urban Green Council quantified the energy impact and recommended retrofits to halt the airflow escaping from elevator and stairwell shaft vents. This session will discuss the benefits of closing these vents, the enabling code change in NYC, and the recommended retrofit options to achieve enduring savings in tall buildings. **Robin Neri, Jamie Kleinberg** *Waterfront 1*

### **The Systems View: How the Energy Blockchain Will Unlock the Next Industrial Revolution**

Since the emergence of Bitcoin in 2008, awareness and conversations are expanding concerning the internet-like transformation of our economic,

business, and legal systems. With an entirely new data infrastructure model to manage our money, assets, and identity, we face a new beginning and ample opportunity. As the foundations of our economy mature due to the convergence of technologies like AI, Blockchain, and IoT, where do we stand? How do we develop the appropriate strategies, tools, and processes of mind to enable this consilience? The rewards are great and the timing is right to dive into what we may rightly acknowledge as a historic moment.

**Patrick Deegan, Shilpi Kumar, Chris Taylor** *Cityview 2*

### **Using the Building Permitting Process to Accelerate Clean Energy**

Traditional clean-energy and energy-efficiency incentive programs wait for people to apply. But what if building permitting, which funnels construction in every city and town, were connected to incentive programs? This session will present ideas to expand integration between incentives and permitting, to streamline the process, and to increase participation in energy-efficiency programs. Bring your ideas to enrich the dialogue. **Brian Butler, Craig Foley, John Lojek, Mark Pignatelli, Peter Sun** *Cambridge Complex*

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## THURSDAY 4:00-5:30pm

### **Reception and Closing Forum - Better Next Time: Lessons Learned in Scaling Efficiency**

We're all excited about the increasingly rapid adoption of sustainable building practices and codes. Join industry veterans to discuss potential pitfalls associated with scaling efficiency and what we, as an industry, can do to avoid them. **Marc Rosenbaum** *Harborview Ballroom*