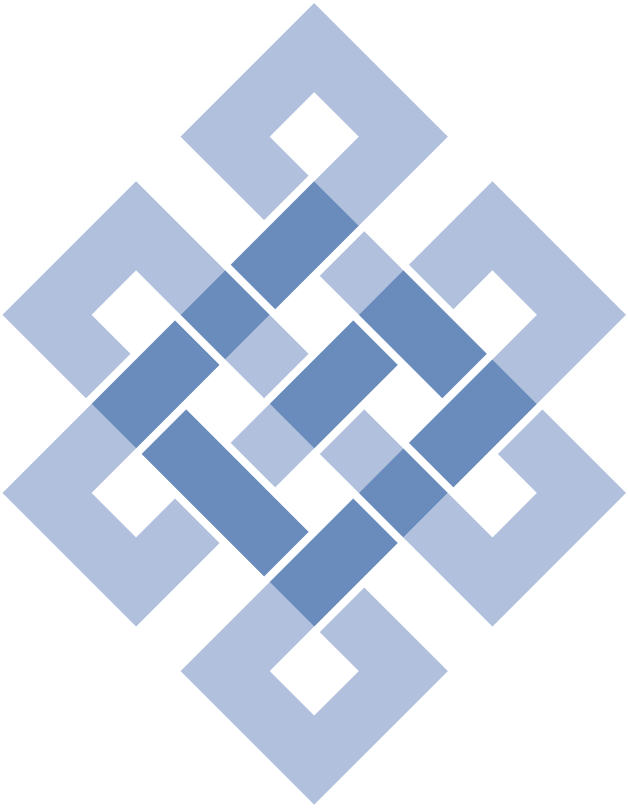

2013 CLIMATE, BUILDINGS AND BEHAVIOR SYMPOSIUM: SYNTHESIS REPORT

Deepening Feedback Loops

Using real life lessons learned to improve outcomes.

2013 CLIMATE, BUILDINGS AND BEHAVIOR SYMPOSIUM: SYNTHESIS REPORT

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Contents

Climate, Buildings and Behavior 4
Building Data 7
Building Awareness 8
Buildings Community 9
Forgiving Design 10
Working Together 11
Discovering Allies 12
Mining Mistakes 13
Select Presentations 14-15
Program Sponsors 16

Climate, Buildings and Behavior

In September 2013 the Garrison Institute convened over 60 real estate professionals including for-profit and not-for-profit firms, building industry experts, and social science researchers to explore successful approaches for enhancing sustainable practices, reducing energy consumption, and lowering the cost of operations in multi-family residential and commercial buildings. The theme of the symposium was 'deepening feedback loops' with a goal of using real life lessons learned to improve outcomes. This report is the distillation of the learning that took place over the three-day meeting.

Americans spend the vast majority of their lives indoors—that is, in buildings. People working in the building and real estate industries play a critical role in determining the quality of those indoor environments. There is a real opportunity to make huge strides in health, wellbeing and environmental impact by engaging in this work in ways that enhance building performance.

While blower doors tests, thermal cameras and the appropriate sizing of boilers are all necessary and important components in energy savings, it is human behavior along the building continuum that generates truly optimal building performance. Behavior change can be motivated in some obvious ways, for instance providing sufficient training and appropriate information to maintenance and residents on the operation of novel building components. In other ways, this motivation is much more subtle, such as recognizing and appreciating the web of relationships that enable the creation of great places to live and work. Such subtle shifts in awareness can have profound impacts on how building professionals do their jobs and in turn how building users engage with each other and their environment.

Shifts in awareness can be encouraged through simple exercises. Systematizing lessons-learned is a first step: creating a feedback mechanism, such as short reports followed by regular group exchanges, goes a long way in beginning to shift organizational culture towards awareness, learning and continual improvement. This basic feedback mechanism can be taken further to encourage reflection on the relationships that enable accomplishments. In all cases, coming together and effectively communicating across professional or other divisions is paramount. Slowly, through regularly learning to look and listen in a different way, appreciation of colleagues, neighbors and the environment can begin to flourish.

Green building professionals are, ultimately, working to create comfortable places to live and work that are in harmony with the natural environment. It is a pressing need but a daunting task. Isolation, fatigue and despair are common. In his rousing keynote talk, Peter Senge reminded us: "the world does not need our negativism, the problem is big enough by itself. We need to muster a sense of enthusiasm," which begins by celebrating each positive step, no matter how small.

This report synthesizes the presentations, discussions and insights generated during the 2013 Climate, Buildings and Behavior Symposium held September 18-20 at the Garrison Institute in Garrison, NY. The ideas presented here arose from the community of Symposium participants. The themes and bulleted points in this report are a synthesis of participant comments. We gratefully acknowledge the 2013 Symposium participants and their organizations:

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Building Data

"Every building should have a spreadsheet tracking gas, oil, electric, water. It's a very basic thing, but probably 1% of buildings have that."

HENRY GIFFORD, GIFFORD FUEL SAVING INC.

Data seems ubiquitous. Instant feedback on indoor environmental quality is known to motivate resident behavior change. And yet, many building owners, managers and users still lack access to basic information on energy and water usage. Meaningful, reliable and accessible building data can be generated through inexpensive means, but the human systems to track and share this information must be in place for the data to have an impact on how the building is used. Tracking a building's monthly energy and water usage on a simple spreadsheet enables problems to be quickly recognized and investigated. Investigation is facilitated with a toolkit that includes a blower door, infrared camera, air speed velocity meter, ultrasonic water flow meter and talking to building users. The data generated through these tools are best shared in targeted, audience appropriate ways. For instance, when residents regularly receive their usage information, savings of up to 30 percent can be achieved through low or no-cost behavior changes.

CHALLENGES OF DATA

- Basic building data is commonly not tracked.
- Once collected, building data often gets lost.
- There is rarely opportunity to think about the data.
- Energy and water use data are partially a result of behavior, so metrics from past use do not determine future metrics.
- Mass metering can be a barrier to resident engagement.

INSIGHTS ON DATA

- Use high quality information and appropriate communication.
- Compare comparable buildings on operations metrics to inspire better performance.
- Create scorecards to gauge building progress year-to-year.
- Data can empower all building users toward behavior change.

"For multifamily buildings, there are not a lot of monitoring systems in place to capture data to do close monitoring… this technology would enable us to react better and faster."

DOM LEMPEREUR, ENTERPRISE COMMUNITY PARTNERS

Building Awareness

"If you are in the business of changing behavior you are in the business of shifting awareness."

PETER SENGE, SOCIETY FOR ORGANIZATIONAL LEARNING & MIT

Awareness is closely allied with data, but it is much more than data alone. A simple exercise of intentional building observation tells us much about what can be done to create more hospitable indoor environments while minimizing environmental harm. Whether it's carbon monoxide monitors, water flow meters or a Kill-A-Watt, feeding data back to building occupants is crucial for building awareness that can lead to behavior changes. Building awareness also applies to understanding the collaborative relationships that create, operate and occupy buildings. Recognizing these relationships can lead to profound impacts in how we value all of the people that affect a building's performance, from residents to the operations and maintenance staff. This in turn can lead to cultural shifts that enable the emergence of buildings and organizations that 'learn.' Relationships are the foundation of smooth building functioning and ultimately, of the kinds of community and creativity that engender great places to live and work.

"Tracking how a building is performing might clue you in to how human behavior is effecting performance."

REBECCA NELSON, MILEPOST CONSULTING

CHALLENGES OF AWARENESS

• Building users do not typically or intuitively understand their impact on performance.

• People often don't know what's possible: information, ideas and awareness are key.

• Collaborative networks or relationships are invisible.

• Awareness is a state of being that takes time and intention to cultivate.

• This kind of awareness can seem a luxury for certain groups, such as members of low-income communities, or understaffed building operators or managers.

INSIGHTS ON BUILDING AWARENESS

• The condition of the boiler room is symbolic of maintenance throughout a building.

• There can be a huge impact from subtle shifts in awareness.

• People are the best sensors, ask them and learn from them.

• Intentionally understand and appreciate the relationships that create a building or work-team's performance.

Building Community

The people who live, work in, operate and maintain a building comprise a community, they are also part of the larger community outside the building. Extreme weather events like hurricanes awaken many people to their vulnerability and the need to engage with neighbors on issues of environmental sustainability and immediate health, safety and preparedness. Resident engagement can go a long way in enabling behavior change to affect these important issues by building community. Establishing good relationships is the first, critical step to resident engagement: talking face-to-face and not ignoring problems is important. Working to create a healthy building resonates with a wide range of people, but every building is different, so being sensitive to demographics and context is necessary. The effort spent in creating community within a building helps in addressing building performance issues and in enhancing quality of life both in the building and in the greater community outside of that building.

"How do we move a community to be more aware of the shift that's needed?"

JEREMY SHARPE, RANCHO SAHUARITA

CHALLENGES OF BUILDING COMMUNITY

- Ethnographic expertise and willingness to formalize resident engagement is often lacking in real estate firms.
- Residents, managers, and other building staff have different levels of interest in community.
- Deferred maintenance and/or invasive inspections ruin relationships between managers and residents.
- Awareness and concern about environmental issues is often not widespread.

INSIGHTS ON BUILDING COMMUNITY

- Focus on creating a healthy home, building and community.
- Hire local contractors; they often have helpful ties to building occupants.
- Give people a reason to come together, a raffle, pizza, movie etc.
- Make resident engagement part of benchmarking.

"Empower people to feel happy about where they live."

ERICA BRABON, STEVEN WINTERS ASSOCIATES

Forgiving Design

Many people factor into a building's creation and performance. Choosing products and systems that are more intuitive and forgiving gives everyone the best chance of enabling a high performance building. Complex or 'smart' systems offer many benefits to the green builder but the capacity to install and maintain these systems is often lacking. If a complex system is the best fit for a building, then sufficient and ongoing training for users becomes essential. If done well, long-term nuanced training on complex systems can be engaging and rewarding for maintenance staff. While many novel products and systems abound in the green building sector, it is important to remember that it's more often 'caulk, not solar panels,' that will have the greatest impact on a building's performance.

"Spray in the insulation- choose systems that are harder to screw up."

Z. SMITH, ESKEW+DUMEZ+RIPPLE

CHALLENGES OF DESIGN

• The knowledge to operate and maintain complex systems is rarely on-site.

• Subsidy money is tempting, but subsidized design components may not be the best fit for a project.

• It is common practice and industry standard to over-spec boilers, pumps, lighting and other components.

• Process changes, rather than product changes, are more difficult to implement because they require behavior change.

INSIGHTS ON DESIGN

• Test building components for ease of use before installing.

• Include those operating and maintaining the building, and occupants if appropriate, in choosing new components or systems.

• Match the system to the capacity of those interacting with it most.

• Train maintenance staff and residents on any novel or complex system that they will be interacting with.

• Reduce ambiguity in product choices by specifying the particular product that will achieve the desired green goal.

• Cost, health and comfort can go hand in hand.

"The challenge is always the instrumentation… there is no substitute for someone who knows what is going on."

MARK ZULUAGA, STEVEN WINTER ASSOCIATES

Working Together

Accomplishments are rarely the work of one person or one team; rather they are the result of a wide network of people in different roles supporting a goal. Yet teams tend to segregate across the building continuum—architects and designers rarely work with insurers or maintenance, and building occupants are commonly left out of the equation all together. Integrating the expertise and lessons-learned across all of these groups has clear benefits for achieving great building performance. From the outset of design, a team can be intentionally populated to represent the span of the building continuum. This team has the best chance of succeeding if a 'green champion,' is identified and responsibilities are clearly defined. Learning to work together across professional boundaries is a long-term strategy to enable great green buildings. Just as sustainable design has allowed architects to see themselves in a new way as world-changers, everyone living or working in a green building can feel like they can change the world, if they learn first to work together.

"Design for the user… the only way to do this is to have everyone sit down together ahead of time."

MARCEL HARMON, ME GROUP

CHALLENGES OF WORKING TOGETHER

• Perceived hierarchy, professional cadres, specialized knowledge and language are all barriers to working together.

• No one has a complete understanding of the building system, yet many believe they do.

• Those in the building day-to-day are often least informed about intentions for building performance.

• Effective communication within and among groups is critical but organizations often won't hire communications professionals.

INSIGHTS ON WORKING TOGETHER

• Recognize that everyone across the building continuum has complementary expertise, including banks, insurers and residents.

• Include commissioning and resident engagement in planning and design.

• Train and regularly engage people who work on site day-to-day.

• Green leadership is necessary, either in a 'green champion' or through a well-defined process.

"The building maintenance staff are the most well informed about the building's performance but the least informed about the intentions for the building's performance."

KRISTA EGGER, ENTERPRISE COMMUNITY PARTNERS

Discovering Allies

"Go where the energy is moving. You don't have to create it, it's there. You can help influence it, shape it."

PETER SENGE, SOCIETY FOR ORGANIZATIONAL LEARNING & MIT

Working on issues of sustainability can often frustrate rather than invigorate due in part to a feeling of ideological isolation and the specter of fatalism. Whether working towards a more sustainable workplace or living environment, finding allies is important both for support and for getting the work done. While mainstream organizational or building culture may seem uninterested in sustainability, there are almost always outliers to the mainstream. Seek out this fringe where people are already engaged and behaving in sustainable ways and then find ways to support them in becoming more mainstream. Working with those already interested in green issues, whether residents in a building or co-workers on a different floor, adds to existing momentum that can generate the widespread changes sought. Allies and support can also often be found in regional green-building networks. In all cases, mentoring the next generation can go a long way in ensuring future co-workers and neighbors have ample support for sustainability projects at home and at work.

CHALLENGES OF DISCOVERING ALLIES

• Culture, especially organizational culture, seems monolithic with no allies in sight.

• Hierarchy, status and mission-driven burnout are common roadblocks to focusing on sustainability issues or creating healthier work places.

• Discovering allies requires time to talk to many people in a building or organization.

• Established groups may be reluctant to push their work further on a particular issue of concern.

INSIGHTS ON DISCOVERING ALLIES

• It is more effective to find allies than to 'make' them by trying to convince.

• Local green building networks and meet-ups are integral in developing and supporting strong green commitments.

• Engage with and mentor the next generation of green champions in your field, organization, neighborhood or building.

• Work through allies to reach a critical mass or cultural shift.

• Ego-less leadership without allies is sometimes necessary.

"Pick up the kids and teach them how to do this stuff."

ANDY PADIAN, COMMUNITY PRESERVATION CORPORATION

Mining Mistakes

"Don't fall into the trap where you have one bad experience and say never again… you can evaluate and get everyone on board."

CATHERINE DANNENBRING, SKANSKA COMMERCIAL DEVELOPMENT

Lessons learned from past mistakes are rich fodder for the future. Yet too few organizations have a plan for eliciting, recording, and sharing these lessons. Lessons-learned are a valuable knowledge tool that deserves systemization. A simple exercise can be developed where stories of lessons-learned are elicited from a project team or across an organization first in a written form that highlights a take-away message and then shared through regular, intentional group discussion. The texts can be collected, collated, shared and mined to enable future organizational learning. This kind of exercise can go beyond learning from mistakes to encourage reflection on accomplishments, including recognition of the relationships that enable those accomplishments. While seemingly simple, such exercises can lead to profound shifts in attention that will enhance project execution, building performance, and workplace satisfaction.

CHALLENGES OF MINING MISTAKES

• Our culture is not conducive to acknowledging or openly sharing mistakes.

• Stringent hierarchy and poor existing communication is common in organizations.

• Systems to share, store and retrieve lessons-learned are not in place.

• Colleagues are already taxed, this can appear as an additional burden.

INSIGHTS ON MINING MISTAKES

• Intentionally create an organizational culture of learning where mistakes are valued and can be offered without blame, shame or fear of reprisal.

• Mine accomplishments by recognizing the many relationships that enabled these accomplishments.

• Interview project teams to discern intentions, what they did well and what could have been improved.

• Create a simple lessons-learned form and means of collating and sharing these, preferably through open group discussion.

"How do you create a more cooperative atmosphere where mistakes are tolerated?"

JO COHEN, YALE UNIVERSITY

Selected Symposium Presentations

The following presentations from the 2013 Climate, Buildings and Behavior Symposium are available to watch online at:

www.garrisoninstitute.org/cbbvideos2013

SETTING THE STAGE - FEEDBACK LOOPS & LESSONS-LEARNED | *Andrew Padian, Community Preservation Corporation*

You've done a building analysis, audit, or survey of some level for energy, sustainability, health, safety, and/or durability; now the question is, did you get results? How do you know, and what results? And, most importantly, why or why not? This session talks about mistakes that were and were not made over the years, how to get a near-perfect survey of your facilities, and shows examples of real results.

SYSTEMS THINKING AND THE GAP BETWEEN ASPIRATIONS AND PERFORMANCE | *Peter Senge, Society for Organizational Learning*

In his keynote presentation, leading organizational thinker Peter Senge offers a distillation of his insights into the most important factors in achieving meaningful change for the environment or in any sphere of life. They include positive aspirations instead of negative admonitions ("the power of aspiration is much greater than the power of desperation"), the desire and vision to bring into being and develop something new (like building a cathedral, or raising a child) and networks of relationships with collaborators engaged in "collective, creative process." Whatever kind of personal or social change work you're engaged in, you will take away actionable insights from this accessible and profound talk.

IMPROVING ENERGY EFFICIENCY IN AFFORDABLE MULTIFAMILY BUILDINGS | *Steve Bluestone, Bluestone Organization, Henry Gifford, Gifford Fuel Saving, Inc.*

Affordable multifamily rental housing units in cold climates are often heated by large, central boiler systems that make it difficult to directly meter individual apartment heating energy use. While some tenants might do the right thing by keeping windows closed and lowering thermostats in winter, others do the opposite, resulting in energy inefficiencies and increased heating costs for landlords. At the same time, builders are not incentivized to build more energy-efficient buildings; the result is that there is no motivation for either the builder or the residents to save energy. However, the technology exists to overcome these disincentives to change. In the past decade, significant advances have been made in building envelopes and HVAC equipment—particularly in the technology of air-source heat pumps, which has improved to such an extent that they are now widely used by leading practitioners in the "Net Zero Energy" and "Passive House" movements. In this session Henry Gifford and Steve Bluestone share the results of a three-year laboratory-style study that measured the efficiency of an electric air-source mini-split heat pump system which could be used in multifamily units to effect significant energy savings. The presenters provide detail about a 101-unit affordable rental building under construction in New York City which will be heated and cooled by electric air-source heat pumps connected to each apartment's electricity panel. The goal is to have the tenants pay for their own heat, which would give them an incentive to keep their apartment windows closed throughout the heating season; rents will be lowered by a fair value based upon the realities of the design and equipment being used. The session will also explore legal issues relating to electricity sub-metering and the complications raised in dealing with regulatory bodies such as the New York State Public Service Commission.

SEEK COMFORT, ACHIEVE PERFORMANCE | *Z Smith, Eskew+Dumez+Ripple*

It's not uncommon to hear energy use and comfort discussed as a trade-off, with the implication that we need to promote a little discomfort in the name of protecting the climate. However, there are many cases where buildings that are poor at providing comfort are in fact energy hogs, and steps that improve comfort reduce energy use. Focusing on occupant comfort puts people at the center of the building performance issue. Z Smith suggests using humans as sensors and sources of feedback in conjunction with other building data to inform decisions and boost building performance. He advises a large shift in building industry behavior: designers and operators making sure to include observation and monitoring to gauge how the actual performance of a structure compares to what is designed and expected. In addition to utility bills and building management systems, we can utilize occupants as building sensors to make the changes necessary to increase occupant comfort and control, ultimately leading to decreased energy use. Likening a new building's operations to how a newborn baby needs to be raised over time, Smith describes the necessity of noting how it actually performs and operates. This information can be used to correct problems and to prevent old issues when designing new buildings. This talk features a number of examples where providing greater individual control and feedback has helped diagnose problems, improve comfort, and reduce energy.

Sponsors

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