

**HEALTH IS A HUMAN RIGHT.**

**GREEN BUILDING CAN HELP.**



A REPORT FROM

**THE SUMMIT ON GREEN BUILDING & HUMAN HEALTH**

*JANUARY 2013*

# FOREWORD

We know these to be simple truths: Where we spend our time matters. Daylight matters. Good acoustics matter. Healthy materials matter. Fresh, clean air and water matter. Design that encourages movement matters. Access to local and healthy food matters.

Every corner of our built environment should provide these things to promote our health and well-being. It should be our baseline, but all too often it's our aspiration.

So how do we change that? How do we more clearly link the market transformation that the green building movement has inspired to its opportunity to create an equally transformational impact on human health?

That was the question that framed the Summit on Green Building & Human Health in January 2013. We knew this conversation was taking place at every point along the built environment continuum. From architects to engineers to product manufacturers to public health practitioners to financial institutions and government agencies-- a lot of people and organizations have been wrestling with this.

But we discovered early on that the conversation wasn't happening **across** the continuum. Architects weren't engaging public health physicians. Insurance companies weren't talking to contractors. Product manufacturers weren't sitting down with their upstream supply chain partners. We were all talking loudly to ourselves.

The U.S. Green Building Council learned a long time ago that there is no such thing as a paradigm baby step. It takes everyone having the same conversation to ignite real change in practice. We need a clear line of sight to what we know and what we need to know, and fundamental to any success is engaging the passion of a movement around an idea so powerful that action is a given and change is the outcome.

In the following pages, we summarize this first conversation, and then suggest a few next steps to keep us moving forward. Because there is one other thing we know to be true: If health is a human right, and green building can help, we've got a lot of work to do.

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President, CEO and Founding Chair  
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# OVERVIEW

Our nation is in the midst of a lively public policy debate on how best to enable individuals and communities to make healthier choices. In recent years, with the rapid advance of green building practices, the connection between green building and its promotion of human health has become increasingly clear: Done right, the built environment can have profound positive effects on health, both human and environmental.

At their worst, our building materials and designs, and our choices about location, building construction, operation and maintenance, contribute to some of the key public health concerns of modern society, from asthma to cancer to obesity. At their best, our buildings and communities can be powerful protectors and promoters of health and well-being.

We must shift practice such that our definitions of sustainable building include the well-being of the people in the buildings and the community around them as a matter of course – not an incidental byproduct. In the new paradigm, human performance must be seen as important as energy performance; health conservation equal to water conservation; health management on par with waste management. And we must ground our choices in data, using research and evidence to inform our approaches to healthy design, construction and maintenance. It's through this holistic approach that green building becomes not just a market transformation tool, but a human transformation tool as well.

As a leader in the green building movement, USGBC is committed to environmental sustainability and economic prosperity. Sharpening our focus on how green building can advance human health and well-being marks an important milestone in the history of our movement.

# USGBC'S SUMMIT ON GREEN BUILDING & HUMAN HEALTH

USGBC initiated the Summit on Green Building & Human Health to assess and advance the state of the green building movement as it relates to human health concerns.

Our buildings and communities are habitat. Shelter. Assembly. Sanctuary. When we think about them this way, their ability to protect, to inspire, to promote health rather than compromise it seems to suggest an obvious need to incorporate this lens in how we plan, design, construct and maintain our built environment.

It is, of course, crucial that high-performing built environments use less energy and water and fewer virgin materials. The Summit sought to raise the intensity of the conversation around how human health factors can be woven into buildings. The meeting made clear that the industry is poised to give equal weight to decisions that are consequential to human health.

## The Summit Process

After two years of consultative planning, led by USGBC, the Summit on Green Building & Human Health brought together thought leaders from diverse sectors to address three overarching goals:

- Assess the state of the green building movement relative to human health concerns, and identify pathways to build and reinforce **programs** in USGBC and across the industry that advance the human health aspects of green building.
- Strengthen and build the **knowledge base** on green building and human health.
- Support the robust international green building **movement** so that it more clearly connects human health to green building practice and promotes the value in doing so.

Participants at this invitational Summit included more than 100 experts from the public, private and NGO sectors in public health, health care delivery, research, architecture, design, construction, facility management, product manufacture, finance and real estate development. Many had never met.

## Summit Organization

The Summit opened with a strong opening plenary laying out the importance of the work, and the equally important work of effectively communicating about this complex subject in a way that not only informs, but also inspires and challenges us to seek solutions and opportunities. The group then spent the next 1.5 days in three charrette sessions, each of which addressed one of the Summit goals. A few of the Summit participants were selected to “ignite” the conversations in the charrettes and introduced the topic for each session.

Each charrette was broken out into six smaller work groups to assure the groups were small enough to have meaningful discussion. All the participants addressed each topic, expanded the discussion and made observations and recommendations within their charrette groups.

The groups reconvened for a short debrief after each charrette before tackling the next topic. The event closed with a final summary session that collapsed 1.5 days of work and dozens of flip chart records into a set of proposed recommendations for further action.

While this white paper cannot reproduce all of the thinking, here is a brief summary of the sessions and their recommendations.

## Opening Plenary

The Opening Plenary gave participants an opportunity to get to know each other a bit, to challenge their thinking for the session and to underscore the importance of the work.

Participants met the members of the USGBC Board Working Group for Green Building & Human Health and were treated to an inspiring call to action from USGBC CEO Rick Fedrizzi.

Communications strategist Kristin Shannon gave a short keynote about the neuroscience of communications and the importance of framing the issue of human health in green building in powerful and meaningful ways to encourage adoption and inspire action.

GB&HH Working Group Chair Dr. Howard Frumkin laid out the Summit work.

## Voices *from the Opening Plenary*

LEED was a way to capture people's energy, imagination and focus. Health has always been there, but it was never in the front seat. It needs to be in an important way.

20 years later, we're convening this group, not because we didn't care over the past 20 years, but because we are now ready for this discussion. We're grown up now.

Health will be the biggest driver in the green building space in the next 20 years.

- Rick Fedrizzi

## **Voices** *from the Opening Plenary*

We all carry around grammars that are unique to us but foreign to everyone else. We need a common grammar about green building and human health.

- Judith Webb

Green building has matured and it's now ready to grow beyond its environmental roots to embrace a human dimension.

Our goal is a safe, healthy, green, sustainable, economically viable, beautiful, inspiring, great places for people. We'll get there if we blend our individual visions.

- Howard Frumkin



# CHARRETTE 1

## How can we support a robust nationwide movement that promotes green building and human health?

### CHALLENGE:

Industry groups, non-governmental organizations, professional associations representing both design and health professions, community groups, academia and government agencies are among the partners needed for true transformation. Because of the many co-benefits that may flow from green, healthy building, broad-based coalitions are necessary.

### Questions Considered:

- What role should USGBC take in advancing green building and human health?
- Who has the resources to map and publish data on the organizations that are involved in and contributors to the movement?
- Who should take the lead in defining the metrics and standards for a healthy community for people?

### Igniter Panel:

#### MODERATOR:

**Michael McCally, MD, PhD**  
*Clinical Professor of Preventive Medicine  
Mount Sinai School of Medicine*

#### PANELISTS:

**Majora Carter**  
*Founder of Sustainable South Bronx and President  
Majora Carter Group*

*"It's all about the people. Whatever position you have, how can you use your position at the table to help those who are not?"*

**Rachel Gutter**  
*Director  
USGBC's Center for Green Schools*

*"Don't lobby, partner. Partner with people who want most to protect the status quo."*

**Tim Cole**  
*Head of Sustainability  
Forbo Industries*

*"Two things that cause change with product manufacturers: Cost and stakeholder demand."*

**Charlotte Brody**  
*Associate Director, Health Initiatives  
BlueGreen Alliance*

*"We must appeal to the humanity of the people who build and maintain our buildings."*

## Discussion Summary

Panelists stated that a nationwide movement that promotes green building and human health is primarily about people and neighborhoods, not just about the physical structures. They invited Summit conferees to focus less on blueprints and more on the people who use the buildings as homes, schools and workplaces. They emphasized specific communities of interest and recommended that we specifically examine their needs and find ways to measure the impact of improved practice. Groups include: children, the elderly, underserved communities and communities of color. They also noted the importance of partners with a focus on specific kinds of built environments, such as schools, homes and health care institutions.

Panelists also highlighted the impact on the workers who make building products, build and maintain facilities, neighborhoods and communities. There was a focus on fence-line communities (along material supply and disposal chains). Questions were raised about the global community and impact on future generations of today's decisions.

Product manufacturers rely on design standards and building codes as guidelines to develop and promote their products; the session included requests from product manufacturers to make guidelines more explicit and universal – thereby leveling the business playing field.

## Charrette Session Summary

Participants concluded that there is a need to:

- Clearly define healthy communities, buildings and interiors (i.e. places that support healthy children and adults) with metrics, thresholds and applications, and to
  - Inform and inspire in areas where we have choices.
  - Create minimum acceptable standards in areas where we have no choices.
  - Invest in areas where long-standing inequities create health disparities.
- Use digital technology to map the universe of organizations connected to green building and human health. Form a network, find synergies and develop a common vision.
- Develop the language to communicate the message to different communities and interest groups.
- Continue to refine LEED and better communicate its requirements for improved human health.

## CHARRETTE 2

# How can we build the knowledge base on green building and human health?

### CHALLENGES:

Information is one of the limits to realizing green, healthy buildings and communities for all. While we know a lot, there is much that needs to be established based on solid data to enable evidence-based design and valid metric-based measures of progress and success. This will call for research—not highly theoretical research, but “use-driven” research that aims to answer practical, human-oriented questions. It will also require that the information we have be effectively disseminated, from the level of students preparing for the design, construction, business and health professions, to the level of practicing professionals.

## Questions Considered

- What are the most pressing research questions?
- How should research funding be enabled?
- Who should and how best to collect, organize and distribute the relevant research and building-oriented solutions?
- How should health-based design and outcomes information be disseminated?

## Igniter Panel

### MODERATOR:

**Gail Vittori** ● ● ● ● ● ● ● ●

LEED Fellow, Co-Director  
Center for Maximum Potential Building Systems

“Identify the value of health and take the opportunity to take it to scale.”

### PANELISTS:

**Matthew Trowbridge, MD, MPH** ● ● ● ● ● ● ● ●

Assistant Professor and Associate Research Director  
School of Medicine, University of Virginia

USGBC Ginsberg Fellow

“A healthier building, a healthier place has not yet been valued as such in the marketplace and that’s what we need to address.”

**Vivian Loftness** ● ● ● ● ● ● ● ●

FAIA, LEED AP, Professor  
School of Architecture, Carnegie Mellon University

“We’re going to have to sit down as a group and decide: What health factors can we have the biggest impact on?”

**Daniel Friedman, PhD**

*Professor and Former Dean*

*College of Built Environments, University of Washington*

## Discussion Summary

Two competing themes emerged from the presentations. The first was the need for additional research on human health in the built environment. We need examples of healthy environments (buildings and communities) with information on what works that can be translated and applied on future projects. The second theme was the urgent need to design, construct and operate the built environment in the present time—before all the data are in—to support improved human health. To support these research and action needs, there is an additional real-time need to improve the education for design and construction professionals to provide them with sustainable, health-based and action-oriented information and skills to supplement their traditional training.

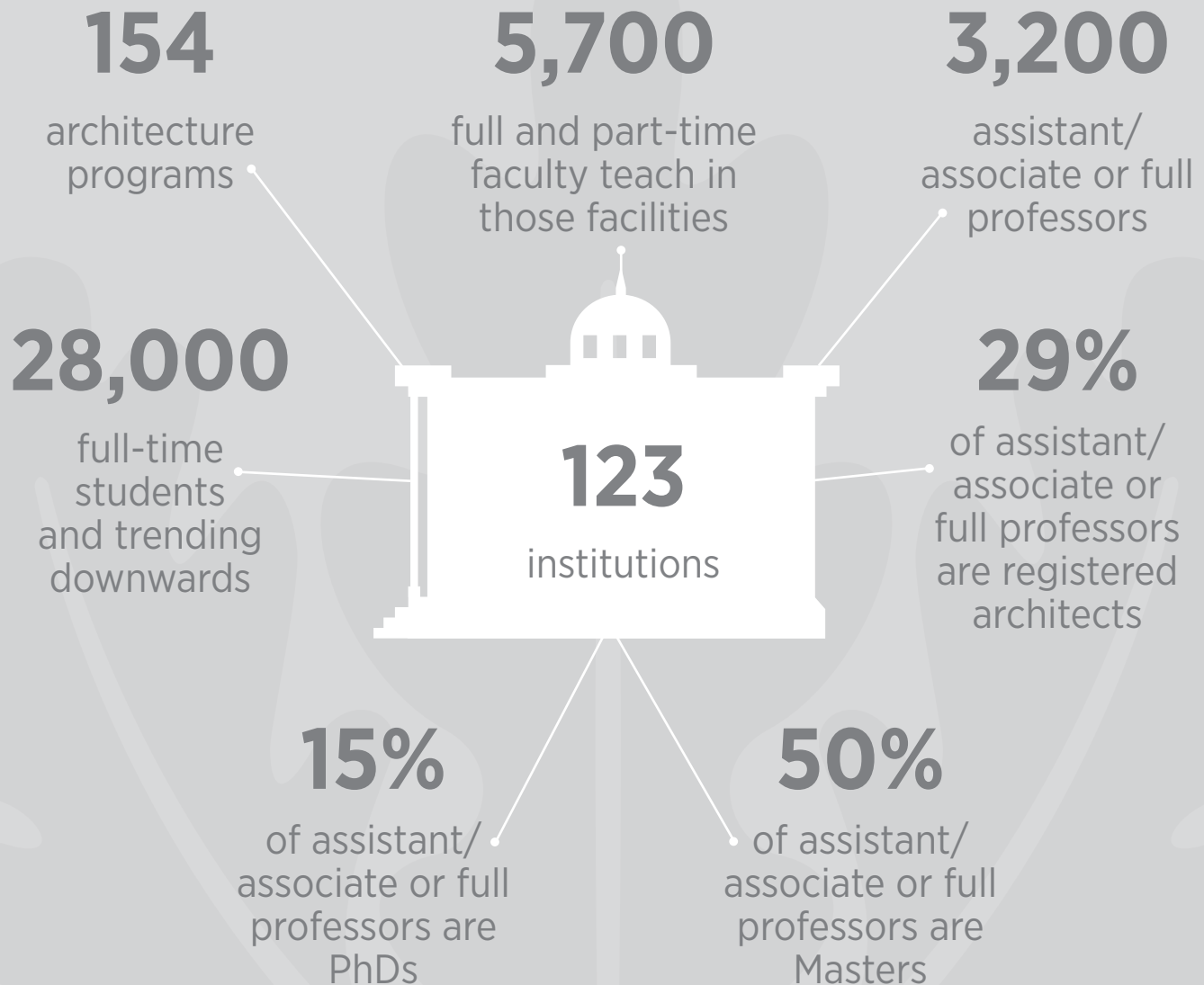
## Charrette Session Summary:

Participants concluded that there is a need to:

- Map the currently available research on health and the built environment.
- Use digital technology and robust data analytics to identify best practices and solutions.
- Disseminate the information in a usable form (i.e. translate the research for lay, academic and professional audiences).
- Identify what additional research is needed, cultivate funding prospects and pursue opportunities to partner/collaborate with other organizations around shared interests.
- Gather data from a wide range of disciplines.
- Provide USGBC support for the issue of green building and human health to spur support for additional research.
- Propose a “Healthy Indoor Air Act” to congressional leaders to spur action by federal agencies. This could also incentivize research funding at such groups as Environmental Protection Agency, National Institutes of Health and National Science Foundation.

# Voices *from the Opening Plenary*

Personalizing knowledge forecloses on common sense.  
Best example is training of architects.



With respect to research: **no measurable, palpable culture of research exists in the architectural curriculum.**

- Daniel Friedman

# Voices *from the Opening Plenary*



**104,301**

registered architects  
in the U.S



**500,000**

construction  
managers in the U.S



**1 MILLION**

carpenters



**5 : 1**

ratio of construction  
managers to  
architects



**5.5 MILLION**

people earn a living  
in the \$1 trillion  
US construction  
industry, down 2.2  
million from 2006

- Daniel Friedman

## CHARRETTE 3

How can we build and reinforce programs in USGBC and across the industry that advance the positive impacts of green building on human health?

### CHALLENGE:

USGBC plays a major role in the green building movement through LEED (Leadership in Energy and Environmental Design) and the corresponding training, credentialing and certification offered by the Green Building Certification Institute (GBCI). In addition, several other initiatives exist including other rating systems (e.g., Living Building Challenge, Earthcraft), voluntary product certifications and disclosures (e.g., the Health Product Declarations, Cradle-to-Cradle) and regulatory approaches. This session considered the way major programmatic initiatives to date have incorporated human health and identify future opportunities to expand their promotion of human health, preparing for the design, construction, business and health professions, to the level of practicing professionals.

## Questions Considered

- Who should collaborate to build such tools as:
  - Health Impact Assessment Tool for buildings
  - Green Building Product Assessment Tool
- How could the USGBC partner with other organizations and the USGBC regional/local chapters to build programs, refine existing programs and deliver the healthy environment message to the community?
- How should USGBC clarify the relationship between LEED and human and environmental health?

## Igniter Panel

### MODERATOR:

**Beth Heider**

AIA, LEED AP, Senior Vice President of Green Markets  
Skanska

### PANELISTS:

**Robin Guenther** ● ● ● ● ● ● ●

FAIA, LEED AP, Principal  
Perkins+Will

“If health is the yang, how does the mindset have to shift to a world of less harm to one of environments that heal?”

**Anthony Bernheim** ● ● ● ● ●

FAIA, LEED Fellow, Principal  
Sustainable Built Environments

“How do we bring human health into the consciousness of the community and design and make human environments that are healthier for all of us?”

“The opportunity to conduct research on buildings that you have certified is a way to research what works.”

● ● ● ● ● **John Wargo**

Tweedy Ordway Professor of Environmental Health and Politics  
Yale University

**Brendan Owens**

LEED Fellow, Vice President for LEED Technical Development  
USGBC ● ● ● ● ● ● ● ●

“We have mechanisms that catalyze significant change. We provide evaluation that gives designers opportunity to make preferential selection. That signals the market. And that leads to innovation.”

## Discussion Summary

Professor David Orr’s definition of sustainability was cited as a compelling touchstone:

“The standard for ecological design is neither efficiency nor productivity but health, beginning with that of the soil and extending upward through plants, animals and people. It is impossible to impair health at any level without affecting it at other levels.”

This implies that global and human well-being are fused, and that the built environment should support human thriving, healing and positive emotional being.

Building design decisions should be made with an understanding of integrated systems and building product trade-offs.

There are a number of initiatives and programs that are currently being used to support improved human health in the built environment including the [California Indoor Air Quality Standard](#) (now referenced in the new national green building codes), LEED, the [Health Product Declaration](#), the [Electronic Product Environmental Assessment Tool](#) and others.

A range of environmental conditions, from climate change on a global scale, to air quality at the regional and even building scale, to toxic chemicals at the molecular scale, have implications for human health. Further research is needed both to understand these impacts, and to understand the role of the built environment in either aggravating or mitigating them.

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1 Orr, David W., The Nature of Design, Ecology, Culture and Human Intervention, Oxford University Press, 2002.



LEED has evolved over the years to further recognize the importance of building and community design and operation for improved human health. USGBC seeks to translate research into solutions across the building life cycle, and to encourage the industry to adopt improved standards at a pace that fulfills sustainability objectives and practical business needs.

## Charrette Session Summary:

Participants concluded that there is a need to:

- Develop a Health Impact Assessment tool for buildings.
- Develop a comprehensive explanation of how LEED credits support improved human health and refine future LEED versions based on new research.
- Develop a map of other related organizations and their work in this area and find ways to leverage capacities and expertise
- Build on existing initiatives and tools (e.g. Health Product Declarations, Environmental Product Declarations, Electronic Product Environmental Assessment Tool, California DCPH/EHLB/Standard Method V1.1, February 2010, etc.) based on health indices.
- Encourage product chemical content and volatile organic compound emissions transparency.
- Harness the efforts of USGBC local chapters to work on this issue in their communities. An example is the USGBC Northern California Chapter that has initiated a Healthy Communities Initiative.

# Charrette Results and Themes from all Three Sessions:

## NEW FORMS OF COLLABORATION AND NEW MEASURES OF WELL-BEING

A number of common themes were identified across the three sessions. It is useful to list them as they provide guidance on how the movement might move forward. Cross-cutting themes include:

- Cross-discipline collaboration is needed to facilitate improved health in the built environment.
- Metrics are needed to help establish what is considered a healthy environment for people.
- Mapping and sharing of data is needed. Data should include information on relevant professionals and organizations, currently available and future research needs and currently available healthy building solutions.
- There is a need to connect our understanding about human, physical and emotional health with building design choices.
- There was a concern that human health is a social equity issue and everyone should have access to healthy environments.
- While there needs to be thoughtful planning for the path forward, there is also an urgency to proceed quickly.

## Closing Thoughts FROM THE PARTICIPANTS

Based on the intense conversations during the charrettes, in the regroup sessions, during networking and at the closing event, Summit participants had strong recommendations about work that needs to be undertaken to keep this initiative moving forward. An informal survey of the Summit participants revealed the following list (in priority order)

1. Develop a “trail map” to build the movement and improve human health in the built environment utilizing the collective knowledge of the Summit participants.
2. Develop human health-based benchmarks and metrics for the built environment, and inclusive of the construction process, to help project teams that use LEED, specifically, and other standards, more broadly, to make more informed decisions.
3. Define health in the built environment and establish its value.
4. Develop the message appropriately for different audiences and facilitate a public relations informational campaign.

5. Compile and distribute research related to the built environment and human health; translate research into actionable design solutions that can be applied to city and community planning, and building design by planners and architects using LEED and other standards more broadly.
6. Recognize a shift in the definition of “sustainability” as it moves from Sustainability = energy, to Sustainability = zero net energy, water, & waste + improved human health (buildings and community) as it becomes intrinsic to standard practice.

# WAS THE SUMMIT SUCCESSFUL?

In assessing the Summit's success, the organizing team noted the following outcomes:

- Identified recommendations and resources for continuing to evolve LEED to more fully embrace human health.
- Began to identify the research needed to better target positive building design targets for community health.
- Provided a lively collaborative forum for representatives from diverse sectors to identify issues and develop solutions. The Summit “sparked” a significant dialogue on green building and human health amongst health experts and designers who do not usually meet and collaborate.
- Energized participants to meet again, cooperate and continue collaborating to further develop the movement towards improved voluntary health standards.
- Identified additional people and organizations to contribute to information for standard setting; provided sources for relevant data to be made available through an accessible clearinghouse.
- Strengthened the resolve and enthusiasm within the green building movement and USGBC; in the words of a participant “restored the romance” of the movement for the next stage.
- Provided USGBC staff with resources, both experts and organizations, for future work in the space of human health in the built environment.
- Identified communications forums, processes and technologies (e.g. social media), to better communicate and focus the work going forward.
- Identified other thought leaders and experts who should participate in next steps.
- Generated measures of success and recommendations for next steps. The participants advocated the development of a “trail map” or plan to accelerate and integrate the various pieces that impact green building and human health.

# WHERE DO WE GO FROM HERE?

The USGBC's mission and vision over the last two decades has been to transform the industry (design, construction and building operation) to improve the quality of life in the places where we live, learn, work, heal and play within a generation.

For many, however, "green building" is still translated simply as "energy efficiency." At The Summit on Green Building & Human Health contributors made clear that this is no longer sufficient; that the next stage must emphasize the role of the built environment in supporting human health. They concluded that it's now time to raise the profile of human health concerns as part of our measures of sustainability.

In recognition of its vision, mission, USGBC is committed to further identifying these connections and incorporating well-being into the practices and policies it promotes by incorporating this charge into its [2013-2015 Strategic Plan](#):

*"While green building has strong roots in economic and environmental performance, it offers vitally important benefits for human health and well-being. Designing for these benefits, 'human-based design' can promote health and well-being in many ways, from reduced exposure to toxic chemicals to enhanced access to natural light, from routine physical activity to improved indoor and ambient air quality, from injury prevention to increased mobility."*

*"USGBC will pursue a range of strategies to understand, document, implement and disseminate the health benefits of green building including a healthier climate, healthier environment and healthier individuals."*

*"Strategies:*

- *Continue to evolve the LEED rating system and other certification standards to incorporate health and well-being parameters;*
- *Build the knowledge base on the health benefits of green building, including the health benefits of LEED, by supporting research initiated by USGBC and others;*
- *Educate our communities, the public, and the building professions about the health benefits of green building, including the health benefits of LEED; and*
- *Take a lead role in strengthening the healthy building movement through partnership and collaboration."*

The Summit was one of the key initiatives we teed up as a way to capture community input about what our scope should be in addressing these strategies. Following is a brief synopsis of work that is currently underway to support these strategies<sup>2</sup>.

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2 A longer list of initiatives underway to address these strategies is attached in Appendix 2: USGBC Initiatives. Many grew out of the work undertaken at the Summit.

## Building the Movement:

- Offering a webcast in August 2013 to brief our community on this report, continue the conversation begun at the Summit and discuss future initiatives.
- Establishing a web-based community via Yammer and usgbc.org that can provide a place for information exchange and collaboration.
- Developing and circulating for community ratification a set of basic guiding principles that can be used as a point of reference by USGBC chapters and members of our extended communities.
- Using Greenbuild 2013 as a platform by:
  - Identifying key health-related education programs so attendees can build a track that focuses on green building and human health.
  - Convening a two-hour Master Speaker and Panel Session, featuring Dr. Dick Jackson, UCLA.
  - Considering a Materials and Human Health pre-event Summit that includes convening product manufacturers and designers to learn about LEED and the Materials credits.
- Partnering with key organizations in various sectors to leverage strengths and build the movement by continuing to convene a dialogue around green building and human health, act as a broker for establishing partnerships that advance this work and facilitate communications between and across our diverse communities.

## Building the Knowledge Base:

- **Green Building & Public Health Metrics** development across LEED rating systems is underway (supported by a 2-year, \$300K grant from Robert Wood Johnson Foundation. The metrics will become part of the Green Building Information Gateway platform (GBIG).
- **Health-related Resilience Research (on-going through academic collaborations), including** temperature impacts on vulnerable populations; a case study for resilient health care facilities and the development of a LEED credit screening tool.
- Several additional written resources to address various points of intersection between green buildings and human health with partners including the McGraw Hill Research Foundation, the Center for the Built Environment at Colorado State University and the National Collaborative on Childhood Obesity Research (NCCOR).
- **Materials in LEED (supported by a grant from Google):**
  - Engaging three Senior Research Fellows.
  - Working on creating a harmonized approach to hazard assessment across the globally harmonized system (GHS), Cradle to Cradle (C2C), Health Product Declarations (HPDs) and GreenScreen.

- Identifying research opportunities through the building materials research heat map (supported by BuildingGreen and Cradle to Cradle).
- Preparing communications calendar for USGBC.gov and GBIG Insight, to include technical social media, white papers and peer-reviewed analysis and synthesis.
- Reducing barriers to reporting and disclosure around building materials by supporting the Health Product Declaration Collaborative (HPDC).
- Leveraging the grant work to increase the availability of products compliant with Health Product Declaration, GreenScreen and Cradle to Cradle requirements to scale up the market by working directly with manufacturers to speed adoption of the programs referenced in the LEED v4 Material Ingredients credit.

## Programmatic Initiatives:

- **LEED**

- A number of changes made to **LEED v4** reflect an enhanced focus on human health. Our Technical Advisory Groups worked across BD&C and O&M credit categories to make the health impacts of v4 more specific.
- Use of the Pilot Credit library has been a helpful way to advance the consideration of new credit language that has health impact, including Walkable project sites; Clean Construction; Ergonomics strategy; Enhanced acoustical performance – exterior noise control; Indoor air quality procedure(s) – alternative compliance path; and Design for Active Occupants.
- A key Summit outcome has been to start working with the National Institute of Occupational Safety and Health (NIOSH) on the development of a Worker Safety pilot credit as well.

# CLOSING THOUGHTS

## **“When in doubt, do something.”**

In many ways, our inspiration for convening this Summit was just that simple. We knew if our next effort to change the world was to be successful, we needed to use the power of USGBC’s big tent to gather the passion around our core idea and focus our collective energy into a framework for action.

The Summit report has been drafted concurrent to a number of initiatives that are already underway. Others were in response to Summit ideas. But it’s just a first step.

In a separate email to be sent, we’re providing for your consideration the first draft of some proposed Statement of Principles for human health in the built environment<sup>3</sup>. We need your help to refine, finalize and ratify these principles. You’ll find in the email a link to the Green Building & Human Health Yammer Community, where the principles are posted individually for your comment. Our goal is to get input from our Summit participants on this first draft by July 30, 2013. We’ll use your comments to refine, and then repost for input from others who have expressed interest in being part of this initiative. We’ll also host a Webex Town Hall to offer an additional venue for keeping the conversation going and reporting on our progress to date.

We’re grateful beyond measure for the time and effort of every individual who has lent his or her time and thinking to this effort.

But the time for talking is done.

If human health needs to be a much stronger outcome of green building, we need to get to work.

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3 Special thanks to Tom Lent, of the Healthy Building Network, for inspiring our initial thoughts.



# SUMMIT ORGANIZERS AND ACKNOWLEDGEMENTS

## Summit Organizers

### **USGBC Board of Directors Working Group on Green Building and Human Health:**

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Anthony Bernheim, FAIA, LEED Fellow

Michael McCally, MD PhD.

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## Keynote Speaker and Event support:

**Kristen Shannon**, Chair CIAO: *“Minds, Memes & Smart Messages”*

**Adrian Segar**, Facilitator

## Summit Moderators:

**Charrette 1:** Michael McCally, MD, PhD.

**Charrette 2:** Gail Vittori, LEED Fellow

**Charrette 3:** Elizabeth Heider, AIA, LEED AP

## Summit Igniter Panelists:

### Charrette 1

Majora Carter, Founder of Sustainable South Bronx and President, Majora Carter Group

Rachel Gutter, Director, USGBC's Center for Green Schools

Tim Cole, Head of Sustainability, Forbo Industries

Charlotte Brody, Associate Director, Health Initiatives, BlueGreen Alliance

### Charrette 2

Matthew Trowbridge, MD, MPH, Assistant Professor and Associate, Research Director, School of Medicine, University of Virginia

Vivian Loftness, FAIA, LEED AP, Professor, School of Architecture, Carnegie Mellon University

Daniel Friedman, PhD, FAIA, Professor and Former Dean, College of Built Environments, University of Washington

### Charrette 3

Robin Guenther, FAIA, LEED AP, Principal, Perkins+Will

Anthony Bernheim, FAIA, LEED Fellow, Principal, Sustainable Built Environments

John Wargo, Tweedy Ordway Professor of Environmental Health and Politics, Yale University

Brendan Owens, LEED Fellow, Vice President for LEED Technical Development, USGBC

## USGBC Summit Facilitator and Recording Teams

[Kristin Ritchie](#) and [Sara Cederberg](#)

Whitney Austin Gray and [Mika Kania/Jeremy Sigmon](#)

[Chris Pyke](#) and [Casey Studhalter](#)

[Dan Geiger](#) and Asa Foss

Lindsay Baker and [Elle Olszewski/Melissa Gallagher-Rogers](#)

[Brendan Owens](#) and Emily Alvarez

[Mara Baum](#) and [Emily Loquidis/Nate Allen](#)

For more information:

U.S. Green Building Council

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# APPENDIX I: SUMMIT ATTENDEES

First Name	Last Name	Company Name
Paula	Olsiewski Miller	Alfred P Sloan Foundation
Kristin	Durazo	American Heart Association
Nick	Kushner	American Planning Association
Anna	Ricklin	American Planning Association
Douglas	Brown	BASF
Adele	Houghton	Biositu, LLC
Charlotte	Brody	BlueGreen Alliance
Emily	Naden	BOMA International
Naday	Malin	BuildingGreen
Elizabeth	Whalen	CalAg
Vivian	Loftness	Carnegie Mellon University
Arthur	Wendell	Center for Disease Control & Pervation
Mark	Rossi	Clean Production Action
Lauren	Heine	Clean Production Action, Lauren Heine Group LLC
Gail V	Vittori	CMPBS
Eden	Brukman	Concenter Solutions, LLC
Sarah	Lewis	Congress for New Urbanism
Howard	Williams	Construction Specialties
Whitney	Gray	Consultant
Carmen	Brick	Council of Large Public Housing Authorities
Sunia	Zaterman	Council of Large Public Housing Authorities
Stacy	Glass	Cradle to Cradle Products Innovation Institute
Lorraine	Doo	DooConsulting
Peter	Doo	DooConsulting
Penny	Bonda	Ecoimpact Consulting
Robert	Watson	EcoTech International
Thomas	Osdoba	Enterprise Community Partners, Inc.
Yianice	Hernandez	Enterprise Community Partners, Inc.
Tim	Cole	Forbo Flooring Systems
Kristen	Ritchie	Gensler
Charlene	Bayer	Georgia Institute of Technology
Nisha	Botchwey	Georgia Institute of Technology
Jean	Carroon	Goody Clancy
Michelle	Hatzis	Google, Inc.

## Summit Attendees (continued)

First Name	Last Name	Company Name
Lacy	Caruthers	Google, Inc.
Anthony	Ravitz	Google, Inc.
Veena	Singla	Green Science Policy Institute
Aaron (Ari)	Bernstein	Harvard School of Public Health, Center for Health and the Global Environment
Robert	Phinney	HDR Architecture, Inc.
Jean	Hansen	HDR Architecture, Inc.
Tom	Lent	Healthy Building Network
Bill	Walsh	Healthy Building Network
Claire	Barnett	Healthy Schools Network
Ihab	Elzevadi	High Performance Environments Lab, University of Oregon
Mara	Baum	HOK
Mary Ann	Lazarus	HOK
Mikhail	Davis	Interface
Richard	Graves	International Living Future Institute
Amanda	Sturgeon	International Living Future Institute
Joel	Todd	Joel Ann Todd Consulting
Joyce	Lee	Joyce Lee, FAIA, LEED AP
Dana	Bourland	JPB Foundation
Travis	English	Kaiser Permanente
Majora	Carter	Majora Carter Group
Lindsay	Baker	Mary Davidge Associates
Anne	Less	Mary Davidge Associates
Michael	McCally	Mt. Sinai School of Medicine
Rebecca	Morley	National Center for Healthy Housing
Christine	Branche	National Institute for Occupational Safety and Health
Charles	Blumberg	National Institutes of Health
Susan	Hinton	National Institutes of Health
Kenny	Floyd	National Institutes of Health
Matt	Gillen	NIOSH/CDC
Carlos	Santos-Burgoa	Pan American Health Organization/World Health Organization
Robin	Guenther	Perkins+Will
Elaine	Arkin	Robert Wood Johnson Foundation
Vikas	Ahuia	SCS Global Services

## Summit Attendees (continued)

First Name	Last Name	Company Name
Beth	Heider	Skanska
Geoff	Anderson	Smart Growth America
Russell	Perry	SmithGroup
Jennifer	Foskey	Social Green
Randal	Carter	Steelcase
Anthony	Bernheim	Sustainable Built Environments
William	Browning	Terrapin Bright Green
Suzanna	Wight Kelley	American Institute of Architects
Brooks	Rainwater	American Institute of Architects
Amanda	Kaminsky	The Durst Organization
Margaret	Whittaker	ToxServices LLC
Jonathan	Herz	U.S. Department of Health & Human Services
Kevin	Teichman	U.S. Environmental Protection Agency
Bob	Thompson	U.S. Environmental Protection Agency
Tracy	Enger	U.S. Environmental Protection Agency
Michele	Curreri	U.S. EPA Indoor Environments Division
Emily	Alvarez	U.S. Green Building Council
Sarah	Buffaloe	U.S. Green Building Council
Sara	Cederberg	U.S. Green Building Council
Rick	Fedrizzi	U.S. Green Building Council
Asa	Foss	U.S. Green Building Council
Melissa	Gallagher-Rogers	U.S. Green Building Council
Selina	Holmes	U.S. Green Building Council
Scot	Horst	U.S. Green Building Council
Mahesh	Ramanujam	U.S. Green Building Council
Casey	Studhalter	U.S. Green Building Council
Judith	Webb	U.S. Green Building Council
Rachel	Gutter	U.S. Green Building Council
Brendan	Owens	U.S. Green Building Council
Chris	Pyke	U.S. Green Building Council
Mark	Rossolo	UL
Tony	Worthan	UL
Eve	Edelstein	University of Arizona, College of Architecture, Planning & Landscape Architecture

# Summit Attendees (continued)

First Name	Last Name	Company Name
Esther	Sternberg	University of Arizona College of Medicine
Rachel	Ballard-Barbas	NIH - National Cancer Institute
Matthew	Trowbridge	University of Virginia School of Medicine
Daniel	Friedman	University of Washington
Andrea	Falken	U.S. Department of Education
Judith	Heerwagen	U.S. General Services Administration
Dan	Geiger	USGBC - Northern California Chapter
Howard	Frumkin	University of Washington School of Public Health
Steven	Davis	WMDO Architects
Pauline	Souza	WRNS Studio
John	Wargo	Yale University

# APPENDIX II: USGBC INITIATIVES

The following provides additional detail about some initiatives underway and planned across USGBC.

## BUILDING THE MOVEMENT

### Currently Underway:

- Offering a webcast to brief our community on this report and future initiatives.
- Establishing a web-based community via Yammer that can provide a place for information exchange and collaboration.
- Developing and circulating for community ratification via Yammer a set of basic guiding principles that can be used as a point of reference by any member of our extended communities.
- Setting up a GB&HH digest that can be subscribed to via usgbc.org that provides periodic email summaries of initiatives and activities.
- Using Greenbuild as a platform by:
  - Identifying key health-related education programs so attendees can build a track.
  - Convening a two-hour Master Speaker and Panel Session.
  - Organizing the Women in Green Power Breakfast around a green building and human health theme.
  - Supporting the Materials and Human Health pre-event Summit which includes Convening product manufacturers and designers to learn about LEED and the Materials credits.
  - Expo Hall program: Building Products and LEED v4 – Session highlighting product manufacturers with products that can qualify for LEED v4 points in the Material Ingredients credit.
  - USGBC Update session: Optimization Through Life Cycle Analysis and Environmental Product Declarations – Session about how life cycle analysis has informed optimization of manufacturing practices and how to apply this practice to analyzing an entire building.

### Under Planning and Review

- Centralize information about green building and human health at usgbc.org that allows for community

- Develop a robust plan for media outreach to help raise awareness of USGBC activities as well as draw attention to key efforts being undertaken by other partners.
- Establish a Center for Health and the Built Environment @ USGBC with appropriate staffing and resource support.
- Provide annual progress reporting to the community.
- Continue to partner with key organizations in various sectors to leverage strengths and build the movement. Some key examples include:

- **Schools:**

- Convened Research Summit on Childhood Health and School Buildings.
- Published “The Impact of School Buildings on Student Health and Performance” with McGraw Hill Research Foundation.
- Partnered with National Collaborative on Childhood Obesity Research (NCCOR) to host Green Health: Building Sustainable Schools for Healthy Kids Summit; Co-published summary report, “Green Health: Building Sustainable Schools for Healthy Kids.”
- Recruited leading children’s health organizations to participate on the Executive Committee of the Coalition for Green Schools including the American Lung Association, the Healthy Schools Campaign and the National Association for School Nurses.
- Provided start-up funding to Ohio Facilities Commission and USGBC Ohio chapters for the creation of a Green Schools Compendium. The Compendium will quantitatively define the economic and occupant-related impacts of LEED certification for school facilities. The Central Ohio Chapter has hired a Green Schools Research Fellow to compile data including test scores and attendance records on the more than 300 LEED registered and more than 60 LEED Certified schools, as well as non-LEED schools across the state.
- Hosting regular opportunities for key stakeholders to convene on the theme of LEED v4 Occupant Health & Schools (to date this includes one in-person meeting and 3 webcasts.
- In partnership with the Healthy Schools Campaign, currently developing resources and trainings on improving healthy food options and food service efficiency in schools.
- Collaborated with leading school health organizations including the National Association of School Nurses, Asthma and Allergy Foundation of America, the Merck Childhood Asthma Network and the American Lung Association to develop a joint-statement outlining best practices and proven, effective strategies for a comprehensive approach to asthma management in schools.
- Explore more substantive, long-term opportunities for collaboration with NCCOR.



- **Professional and Trade Organizations**

- Working with American Institute of Architects (AIA) to complete an environmental scan especially related to the Design + Health leadership group and other activities especially related to the Design + Health leadership group and other activities.
- Working with International Interior Design Association (IIDA) to find ways to more closely align Commercial Interiors community with health.
- Working with International Living Future Institute (ILFI) to collaborate on ways to further the green building and human health conversation.
- Working with National Institute for Occupational Safety and Health (NIOSH) to begin to raise awareness of worker safety as part of the green building and human health conversation.

- **Affordable Housing**

- Working with the Council of Large Public Housing Authorities (CLPHA) to find ways to advance policies that align green affordable housing and its human health impacts.
- Working with the National Healthy Housing Network to potentially convene affordable housing developers on green building and human health.

## BUILDING THE KNOWLEDGE BASE

### Currently Underway:

- Green Building & Public Health Metrics (supported by a 2-year, \$300K grant from Robert Wood Johnson Foundation)
  - Health metrics across existing LEED rating systems.
  - Identify opportunities to align green building credits with public health metrics and surveillance systems.
  - Display existing and new health metrics in GBIG.
- Health-Related Resilience Research (on-going through academic collaborations)
  - Temperature impacts on vulnerable populations (intern: Adele Houghton, John Hopkins School of Public Health).
  - Case study for resilient health care facilities (intern: Aubrey Chamberlain, Tulane University).
  - LEED credit screening tool, a Microsoft Excel workbook (intern: JP Jaudel, George Washington University, Sustainable Urban Planning Program).

## Under Planning and Review:

- **Schools**

- Produce several additional written resources to address various points of intersection between green buildings and human health with partners including the McGraw Hill Research Foundation, the Center for the Built Environment at Colorado State University and the National Collaborative on Childhood Obesity Research (NCCOR) Identify opportunities to align green building credits with public health metrics and surveillance systems.
- Advance new research efforts to qualify and quantify the health-related benefits of green schools.

## SIGNIFICANT INITIATIVE

- **Materials in LEED (supported by a grant from Google)**

- Objectives

- Improve the indoor environment from a human health perspective.
- Reduce barriers to materials transparency.
- Improve the understanding of health impacts of building materials.
- Bring materials transparency and product optimization into the mainstream.

- Key Outcomes

- Harmonization of product transparency and optimization programs: emphasis will be placed upon increased collaboration between USGBC, Healthy Building Network, Cradle to Cradle Products Innovation Institute and Clean Production Action.
- Greater industry and public understanding of the importance of materials transparency and product optimization.
- Increased availability of products with publicly disclosed ingredient profiles and demonstrated track records of product improvement. This outcome will be verified by tracking product specification statistics and LEED credit achievement.
- Market-based tools that dramatically streamline the process of specifying healthy building products.

## Currently Underway

- Engage experienced thought leaders in the material science and public health realm as Senior Research Fellows. Two fellows (three individuals) secured, with contract negotiations in progress with selection of third and final fellow (for 2103) in progress.

- Hire a post doctorate in material science to expand USGBC in-house capacity.
- Create a harmonized approach to hazard assessment across the globally harmonized system (GHS), Cradle to Cradle, HPDs and GreenScreen.
- Identify the top research opportunities for funding through the building materials research heat map (supported by BuildingGreen and Cradle to Cradle). Final design of “beta” survey to identify research gaps will be followed by survey test run.
- Translate current material science and green chemistry to lay people through the Insight series and our Senior Research Fellows. Preparing communications calendar for USGBC.gov and GBIG Insight, to include technical social media, white papers and peer-reviewed analysis and synthesis.
- Streamline the material design and selection process with market-based tools.
- Reduce barriers to reporting and disclosure around building materials by supporting the Health Product Declaration Collaborative (HPDC).

## In Planning and Review

- In the future, work directly with manufacturers to speed adoption of the programs referenced in the LEED v4 Material Ingredients credit to hasten the availability of products. That is, leveraging the grant work to increase the availability of products compliant with Health Product Declaration, GreenScreen and Cradle to Cradle requirements to scale up the market.
- Preparing scope of work for an information strategies “back-casting” workshop (in collaboration with SERA Architects).
- Materials Data Hackathon: Evaluating “Data Jam+Data Palooza” strategy, potentially with White House/Office of Science and Technology Policy (OSTP) engagement.

## PROGRAMMATIC INITIATIVES

### LEED

- Part of our long term plan has been to use research work to directly impact how we prioritize issues for emphasis in LEED, and how we structure measurement and verification protocols for the ideas we develop.
- Changes made to **LEED v4** relative to health indicate that the system goals were effective in getting the Technical Advisory Groups to focus their proposed changes to LEED:
  - **BD+C**
    - **Bicycle facilities (LTc6)** – Includes a new requirement to connect to a bicycle network.

- Open space (SSc3) – New credit – “To create exterior open space that encourages interaction with the environment, social interaction, passive recreation and physical activities.”
- **Minimum energy performance (EAp2)** – Higher thresholds = more efficient buildings = less coal burning and less climate change.
- **Demand response (EAc4)** – New concept in LEED – More efficient energy generation and distribution systems = less coal burning and less climate change.
- **Building product disclosure and optimization – material ingredients (MRc4)** – new concept in LEED. Intent:
  - To encourage the use of products and materials for which life-cycle information is available and that have environmentally, economically and socially preferable life-cycle impacts. To reward project teams for selecting products for which the chemical ingredients in the product are inventoried using an accepted methodology and for selecting products verified to minimize the use and generation of harmful substances. To reward raw material manufacturers who produce products verified to have improved life-cycle impacts.
- **Minimum indoor air quality performance (EQp1)** – Major update to natural ventilation requirements: climate and regional air quality taken into account.
- **Environmental tobacco smoke control (EQp2)** – No smoking in any LEED building except for private residences, where smoking areas must be compartmentalized.
- **Low-emitting materials (EQc2)** – Shift from content to emissions testing requirements means more accurate prediction and understanding all of the off-gassing from a product, not just regulated VOC content.
- **Indoor air quality assessment (EQc4)** – Higher weighting for air quality testing, and expanded scope of testing that is closely tied to the low emitting material requirements.
- **Interior lighting (EQc6)** – New concept in LEED – “To promote occupants’ productivity, comfort and well-being by providing high-quality lighting.”
- **Quality views (EQc8)** – A view of a brick wall no longer counts as an exterior view; you have to be able to see flora, fauna or sky, movement, and/or objects at least 25’ from the building exterior.
- **Acoustic performance (EQc9)** – New concept in more D+C rating systems; the only Indoor Environmental Quality (IEQ) category where green buildings underperform when compared to standard office design. “To provide workspaces and classrooms that promote occupants’ well-being, productivity, and communications through effective acoustic design.”

- **O+M**

- **Demand Response (EAc6)** – New concept in LEED – More efficient energy generation and distribution systems = less coal burning and less climate change.
- **Minimum indoor air quality performance (EQp1)** – Added section 4 from ASHRAE 62.1 requirements (outdoor air quality).
- **Environmental tobacco smoke control (EQp2)** – No smoking in any LEED building except for private residences, where smoking areas must be compartmentalized.
- **Green cleaning policy (EQp3)** – Prerequisite to implement your green cleaning policy.
- **Interior lighting (EQc4)** – New concept in LEED – “To promote occupants’ productivity, comfort, and well-being by providing high-quality lighting.”

- **PILOT CREDITS**

- Existing:

- **Walkable project site (SSpc14)** – “To promote walking, biking, and other non-motorized transportation that results in reduced vehicle miles traveled (VMT), increased public health, and enhanced community participation.”
- **Clean Construction (SSpc75)** – “To minimize the health and climate impacts to local communities from diesel engine emissions associated with construction activities.”
- **Ergonomics strategy (EQpc44)** – “To promote healthy, comfortable, and productive work by designing the workplace to accommodate its users.”
- **Enhanced acoustical performance – exterior noise control (EQpc57)** – “Improve or have no negative impacts on the outdoor acoustical environment as a result of new or major renovation building construction.”
- **Indoor air quality procedure – alternative compliance path (EQpc68):** A performance path to the minimum indoor air quality prerequisite for rating systems prior to LEED v4.
- **Design for Active Occupants (EQpc78)** – “Improve the health of building users through physical activity while reducing environmental impacts.”

- In Development:

- **NIOSH -- Worker Safety** (due in June).
  - Discussions with the Occupational Safety and Health Administration (OSHA) progressing – outcomes unclear at the moment.
- **Indoor Plants**

- **SUPPLY CHAIN OPTIMIZATION WORKING GROUP**

- Standing up a working group (to report to the Materials and Resources Technical Advisory Group) tasked with figuring out if/how we can operationalize the supply chain optimization path in the **Building product disclosure and optimization – material ingredients (MRc4)** credit. Applicants received in April; vetting/selection in progress.