

Opening Remarks and Introductions

The members of the Advisory Committee (hereafter “the Committee”) and meeting observers introduced themselves.

Allison Brigati, Associate Administrator of the General Services Administration (GSA) Office of Government-wide Policy (OGP), welcomed the Committee and thanked members for volunteering their time to provide expertise and insight on high-performance buildings. Allison expressed her support for the work of this Committee, the products of which GSA has been sharing with others across the government.

Designated Federal Officer Ken Sandler provided background on the Committee, which was established to provide independent advice and recommendations to the GSA Office of Federal High-Performance Buildings (OFHPB), as required by the Energy Independence and Security Act of 2007 (EISA).

Kevin Kampschroer, Chief Sustainability Officer for GSA, expressed his appreciation for the hard work of the Committee and its Task Groups. He highlighted the example of the Committee’s work on energy use intensity (EUI), leading to DOE-sponsored research that is serving as helpful input to the Federal policy discussion on building consolidation.

Committee Chair Greg Kats thanked Committee members for their continued commitment, with interest in hearing the recommendations of the Committee’s two current Task Groups, on High-Performance Building Adoption and Health & Wellness.

High-Performance Building Adoption: Task Group Update & Discussion

Kent Peterson, P2S Engineering, Task Group Co-Chair

Sarah Slaughter, Built Environment Coalition, Task Group Co-Chair

- Task Group objective:
 - Accelerate the deployment of technologies and practices to upgrade existing Federal facilities towards high-performance levels
- The business case for Federal high-performance building (HPB) retrofit is centered around four principles:
 - Saving money by saving resources
 - Protecting the health & productivity of the Federal workforce
 - Maintaining and enhancing the value of the Federal building portfolio
 - Promoting U.S. economic development
- Presentations and research:
 - Gathered existing information on Federal HPB progress to date
 - Heard presentations from several Federal agencies (DOE, DOD, GSA) on deep energy retrofits and alternative financing for energy projects
- Findings per DOE Federal Energy Management Program (FEMP) data, FY 2007-2016:
 - The government invested \$20.3 billion in facility efficiency over this period
 - An increasing amount, reaching 32%, was financed through performance contracts, mostly Energy Savings Performance Contracts (ESPCs)
 - Significant return on investment
 - Energy savings of \$43.4 billion by 2030, leading to payback before 2020
 - An estimated \$10 billion of cost-effective energy efficiency investment opportunities remain available

- In FY2016, 5.5% of owned, covered buildings (11.4% of gross square feet) were compliant with the Guiding Principles for Sustainable Federal Buildings
- High level recommendation:
 - Double the annual rate of high-performance retrofit of Federal buildings by portfolio square footage over the next five years
- Supporting recommendations include:
 - Expand the use of enhanced financing opportunities to provide necessary capital for building efficiency and high-performance improvements
 - Explore measures for Federal agencies to retain maximum feasible savings from HPB projects, as directed in EISA §436(e)-(f) and §439(d)(3)
 - GSA and DOE should provide guidance to Federal agencies to create more robust datasets on high-performance building retrofit projects to increase confidence in savings and ensure outcomes are delivered
 - Replicate best practices in private and public sectors for high-performance renovation, operations and maintenance across the portfolio, of which the Advice Letter provides numerous examples
- **Committee Comments**
 - Estimate projected return on investment (ROI) of doubling the annual retrofit rate, noting the value of investing today (when interest rates are low) vs. deferring maintenance
 - Consider expanding Federal life cycle analysis, quantifying soft benefits like health impacts per EISA §436(f)(5), and expanding NIST's work to update Federal life cycle costing guidance:
 - The Federal government has looked into the feasibility of developing a revolving fund for high-performance building investments, and encountered various barriers, including the need for seed funding to be appropriated by Congress, and the reluctance of agencies to reduce their flexibility by fencing off such funding. While DOD already has this authority, legislation would be needed for civilian agencies to establish such revolving funds
 - Work with DOE to overcome barriers to alternative financing for efficiency projects
 - Look into examples where local governments and universities (e.g., NY MTA, Georgia Tech) have successfully used revolving funds
 - Reach out to CDC National Health and Nutrition Examination Survey ([NHANES](#)) program for potential research projects related to buildings and health
 - Target a subset of the portfolio for which the agency can determine there is a long-term mission requirement for the asset
 - Also focus on disposal of unnecessary buildings – refer back to previous Committee [Recommendations on Portfolio Prioritization](#): share proceedings from the Federal Facilities Council workshops on "[Strategic Portfolio Planning for Sustainability, Resilience, and Footprint Consolidation](#)" once available
 - Add a timeframe to clarify that the recommendation calls for the rate to double by the end of five years
- The Committee voted to support the following motion:
 - **Motion 1:** The Advisory Committee approves all the recommendations included in the High-Performance Building Adoption Task Group report. The Task Group Co-chairs will take any final comments/edits to incorporate in the report, finalize the Advice Letter with the approved recommendations intact, and formally send the Advice Letter to GSA.

Leveraging Power Purchase Agreements (PPAs) – New Proposal

Greg Kats, Capital E, Green Building Advisory Committee Chair

Greg Kats presented a new proposal for the Federal government to more fully employ power purchase agreements (PPAs) to achieve cost savings, reduce risk and enhance resilience.

- **Background:**
 - A PPA is a financial agreement between a property owner and energy developer, whereby the developer installs, owns and operates a renewable energy system on the property, and the property owner agrees to purchase electricity generated
 - The sharp drop in solar and wind prices is making PPAs a more attractive option
 - Many corporations are making big investments in renewable energy via PPAs
- **Current Federal authorities to employ PPAs (per VA):**
 - GSA has authority to enter into 10-year contracts, which it may delegate to other agencies; to date, this time limit has made cost-effective PPAs challenging
 - DOD has authority to enter into contracts for 30 years, making PPAs more viable
 - Agencies also may develop Interagency Agreements with the Western Area Power Administration (WAPA) within its service territory, as WAPA has 40-year contracting authority
 - Agencies may enter into energy sales agreements (ESAs) under energy savings performance contracting (ESPC) authority
- **Recommendations (revised during meeting, following discussion):**
 - Federal agencies should explore and enter into options for PPAs that can save money and enhance resilience
 - Agencies should also explore renting out empty space on roofs, lots, etc. to third-party onsite renewable energy generators as an alternative revenue stream
- **Committee Comments**
 - Any impact of potential tariffs on foreign-made photovoltaic (PV) panels on solar prices should be factored in
- **The Committee voted to support the following motion:**
 - **Motion 2:** The Advisory Committee approves of the final PPA recommendations.

Lunch Presentation & Discussion: GSA Buildings and Health (B+H) Program

Michael Bloom, Brian Gilligan, Bryan Steverson, GSA OFHPB

B+H Program Overview (Michael Bloom)

- **Purpose:** Improve building design and support organizational practices, through evidence-based design, standards and behavior that enhance performance, human health and well-being in buildings
- **Focus:**
 - Move beyond risk elimination to promote health and well-being
 - Collaborate with researchers, “translators” and implementers to make the case and put buildings and health research into practice
 - Leverage GSA’s status as a convener and building owner to develop and share actionable ideas
 - Make a difference for those who work in buildings
- **First Steps:**

- Focus on developing pathways for putting research into practice by drawing from two GSA projects:
 - Wellbuilt for Wellbeing
 - Circadian-Effective Light in Buildings
- Convene B+H Workshops to kick-start high-impact collaboration

Wellbuilt for Wellbeing (Brian Gilligan)

- Background:
 - GSA & its research partners used integrated environmental sensing technologies to map temperature, sound, air quality, light and other factors and study their combined effects on human health and work experience in real-time
- Linking buildings to health:
 - Inputs: space planning, building attributes, indoor environmental quality (IEQ)
 - Outputs: sleep quality, stress response, physical activity
 - Impacts: performance, absenteeism, health claims
- Study method:
 - 210 participants at 4 Federal buildings wore a mobile IEQ monitor during work hours and a heart-rate monitor 24 hours/day
 - Every hour, a mobile survey app asked the participant what they were doing, where they were located, and their mood
 - A network of stationary IEQ nodes were installed in the workplace to measure environmental parameters in the background
- Results: The team is identifying reciprocal relationships among physical activity, sleep quality, and stress & relaxation responses

Circadian-Effective Light in Buildings (Bryan Steverson)

- Background:
 - This research explores the extent to which daylight and electric light can provide circadian health benefits and improve sleep quality, daytime alertness and mood
 - More information is available at GSA's [Circadian Light webpage](#)
- Phase 1 of Study:
 - Research question: Can we improve employee health through improved indoor daylight?
 - Performed study with 109 participants from 5 GSA buildings at 2 different times of year, summer and winter
 - Participants wore a daysimeter device to measure circadian stimulus (light received that can activate one's circadian system), activity and rest patterns
 - Surveyed participants about sleep quality, alertness, and mood
 - Lessons Learned
 - Occupant behavior (e.g., closing shades) matters
 - Computers are a key driver of shade use and other daylight-influencing behaviors
 - Daylighting alone is insufficient for circadian stimulus in some spaces due to interior design and difficulty in achieving adequate daylight penetration
- Phase 2 of Study:
 - Test whether additional circadian-effective electrical lighting can increase alertness and improve subjective scores of vitality and energy during the workday
 - Performed study with 60 participants from 2 Federal buildings and 2 U.S. Embassies

- Desktop lamps were given to participants, who wore daysimeters for three days at work and responded to surveys
- Summary:
 - Data show benefits associated with increased circadian stimulus during the day, especially in the morning, including falling asleep faster at night, better sleep quality, better moods, less sleepiness, more alertness and more energy during the day

Inaugural B+H Workshop (Michael Bloom)

- Overview:
 - Invited 46 academics, researchers, designers, architects, etc. to a workshop to review the findings from these two projects
 - Workshop goals:
 - Agree on key findings with the greatest potential to enhance health, well-being and performance if practiced and implemented in Federal buildings
 - Develop specific practices
 - Assess costs and benefits and policies that may aid implementation
 - Establish a basis for continued partnership and collaboration
- Findings:
 - We must:
 - Join building occupants, operators and designers with clear and actionable practices from the best building and health research available
 - Create a convincing business case
 - Develop and share a suite of design solutions that include simplified step-by-step guides for people in the field to execute
 - Work with others to act on and prioritize ideas
 - We should:
 - Develop a baseline for buildings and health performance and a sharable data repository
 - Focus on outcomes rather than technology implementation
 - Add health and wellness initiatives to existing workplace, technology and design engagements
 - Avoid narrow focus on individual solutions and specific environmental variables in favor of identifying interacting and cumulative effects of how the building environment and health impact each other
 - Drive action by organizations with broad constituencies
- **Committee Comments:**
 - Calculate financial benefits of buildings and health best practices
 - Reach out to the National Academy of Medicine, as it has a program focused on the intersection of the built environment and health and well-being
 - Explore opportunities to partner with private sector, compare with their research

Health and Wellness: Task Group Update & Discussion

Jane Rohde, JSR Associates, Task Group Co-Chair

Chris Garvin, Terrapin Bright Green LLC, Task Group Co-Chair

- Task Group background:
 - Motion:
 - Propose evidence-based criteria to integrate health and wellness into all government facilities programs, drawing from approaches including buildings and health rating systems and biophilic design strategies

- Benefits:
 - Enhance employee health and performance and support agency mission achievement through the adoption of health-focused building design and operations strategies
 - Identify a compelling business case for building-owning or managing agencies to adopt such practices
- The Task Group sought to identify relevant provisions & practices of building standards and rating systems to help agencies fulfill health and wellness requirements of the [2016 Guiding Principles for Sustainable Federal Buildings](#)
- The Task Group heard presentations on [Fitwel](#) and the [WELL Building Standard](#) to improve their understanding of these health-focused building rating systems
- The Committee recommends that:
 - The Federal government maintain the health and wellness requirements within the 2016 Guiding Principles and extend them to other Federal design guidelines, and to all Federal buildings where possible and applicable
 - The Federal government use the guidance crosswalk developed by the Task Group to assist in supporting health and wellness goals and requirements
 - Federal building programs expand the integrated design process to include additional consideration of health impacts
 - GSA support additional research into health and wellness related to the built environment and occupant behavior
 - GSA integrate additional health & wellness concepts into the [Model Commercial Leasing Provisions](#) recommended by the Committee on December 12, 2016
- Areas for additional research:
 - Identify links from health outcomes to environmental interventions and subsequent behavioral responses
 - Identify economic links between built environment capital expenditures and return on investment (ROI) based on health outcomes
 - Refine definition and measurement of “presenteeism” in relationship to environmental conditions and productivity
- Guidance Crosswalk:
 - The Task Group developed this tool to help building professionals identify provisions of standards, guidelines, and rating systems with specific criteria for meeting health and wellness goals
- Business case:
 - Federal employees represent an enormous investment, and health and wellness can impact their performance
 - Many factors – including the complex interactions of the indoor environment, individual susceptibility, and many non-IEQ factors – make it difficult to directly associate designed building features with individual health outcomes
 - Hence, investing in workplaces that promote health and wellness is valid and reasonable, even if a precise ROI cannot be calculated at this time
- Measurement and evaluation:
 - While still in its infancy, examples of measurement include the work of the Center for Health Design on improved hospital design, and monitoring undertaken by the American Society of Interior Designers (ASID) in its WELL-certified office space
- Conclusion:
 - By implementing these recommendations, GSA and the Federal government can lead the building sector in promoting workplace health & wellness
- **Committee Comments:**

- Partner with the private sector and insurance companies to build on existing research and cost data
- Reach out to National Academies of Sciences, Engineering, and Medicine, which recently released a “Microbiomes of the Built Environment” [report](#) that examines microbial communities in built environments and their impacts on human health
- The best way to overcome the uncertainties in proving causality among building practices and health impacts is learning by doing – implementing & evaluating best practices in buildings
- The Committee voted to support the following motion:
 - **Motion 3:** The Advisory Committee approves all the recommendations included in the Health and Wellness Task Group report. The Task Group Co-chairs will take any final comments/edits to incorporate in the report, finalize the Advice Letter with the approved recommendations intact, and formally send the Advice Letter to GSA.

Discussion: Future Directions for the Committee

- The Committee expressed an interest in buildings resilience issues:
 - Brainstorm how Federal buildings can become more grid-friendly and integrate renewable energy storage, energy efficiency, and electric vehicles
 - Explore opportunities for public-public partnerships, i.e., Federal-state-local collaboration on community resilience planning and financing
 - Determine how to incorporate results of vulnerability assessments that agencies have been conducting into decision-making
 - Identify inconsistencies and gaps in Federal agency approaches
 - GSA OFHPB agreed to set up a Web meeting to inform Committee members regarding Federal activity to date on building resiliency, and initiate discussions of any ways in which the Committee may constructively address this issue

Public Comment Period

- There were no public comments from visitors.

Closing Comments & Adjournment

- Greg Kats, Kevin Kampschroer and Ken Sandler thanked the Committee and Task Groups for their continued dedication and hard work. GSA will work on the action items arising from the Committee’s recommendations, comments and feedback, and follow up with Committee members on these matters.