

Opening Remarks and Introductions

Designated Federal Officer Ken Sandler welcomed the Green Building Advisory Committee (hereafter “the Committee”) and provided background about it, particularly for new members. The Federal Advisory Committee Act (FACA) defines how federal advisory committees operate, based on principles of open meetings, transparency, ethics, independence, and balance.

The Committee was established to provide independent advice and recommendations to the General Services Administration’s (GSA) Office of Federal High-Performance Green Buildings (OFHPGB), as required by the Energy Independence and Security Act of 2007 (EISA). Recommendations of the Committee to date have covered issues including net zero energy buildings, social cost of carbon, and integrative portfolio planning. Today, the Committee will hear reports from two current task groups: High Performance Leasing and Energy Use Intensity (EUI).

Committee members introduced themselves, and Committee Chair Greg Kats expressed his enthusiasm to work with new and returning members to advance the adoption of policies surrounding health, environment, and sustainability.

Kevin Kampschroer, GSA Chief Sustainability Officer, welcomed Committee members and recognized their hard work and dedication. He noted that the Committee’s work and accomplishments have positively influenced the work of the government and he hopes it will continue to do so. In the past decade, the government has made major progress in the building sector, including reducing energy use intensity by nearly 30% since 1985, cutting water consumption, and awarding over \$4 billion in public-private performance contracts since 2011. However, many challenges remain to improve efficiency, reduce risks and leverage innovation. The greater use and improved utilization of federal assets will undoubtedly be a focus for the next decade.

High Performance Leasing: Task Group Report & Discussion

Victor Olgayay, Rocky Mountain Institute, Task Group Chair

- Goals and Products of the High Performance Leasing Task Group
 - The Energy Efficiency Improvement Act of 2015 requires GSA to identify and periodically publish voluntary model high performance leasing provisions to encourage the commercial marketplace to offer greener buildings
 - GSA initially met this requirement by publishing its own long-standing high performance leasing provisions in the August 2015 Federal Register and collecting public comments on them
 - The goal of the Task Group was to develop and recommend to GSA new voluntary model leasing provisions specifically designed for uptake by the commercial market – as distinct from GSA’s own mandatory requirements for its commercial lessors
- Approach
 - The group aimed to develop recommendations that would be broadly applicable – mainly to commercial office buildings – clear, simple, enforceable, practical, and cost effective
 - These provisions are not intended to function as any sort of rating system
 - The Task Group aimed to align the interests of building owners and tenants, and highlight benefits to both, e.g., more productive workplaces and lower utility costs for tenants, marketing benefits and faster lease-up for landlords

- Process
 - The Task Group, including high performance leasing experts, met weekly from March-September 2016
 - The group developed draft criteria and circulated them for commercial leasing industry comment
- High Performance Leasing Document Overview
 - The materials include an introduction, a matrix summarizing proposed provisions, sample lease clauses to employ these provisions, and additional resources
 - Organization of the matrix
 - Organized in three tiers: simple, standard, superstar
 - Simple lease is meant to be applicable to any lease, even partial floor
 - Standard lease is more advanced, but still widely applicable
 - Superstar represents the cutting edge in leasing effort
 - Users can mix and match provisions from the 3 tiers as appropriate

High Performance Leasing Task Group – Committee Comments

- References to ASHRAE standards on indoor environmental quality section need to be updated
- Suggest reviewing EUI Task Group recommendations and seeing if any provisions should be added based on that, e.g., on location efficiency
- Consider adding provisions related to resilience
- Add recommendations for education of brokers and real estate attorneys
- Consider promoting higher impact alternatives to Renewable Energy Credits (RECs), e.g., power purchase agreements and long term contracts for green power
- Include recommendations to update provisions periodically as benchmarks like ENERGY STAR increase in stringency
- Clarify where proposed provisions correspond with current government requirements
- Need more discussion to help landlords and tenants work out issue of who pays for what
- Recommend cost-benefit analysis of using these provisions
- Reach out to state agencies with high performance leasing experience, e.g., California Department of General Services

The Committee voted to support the following motion by a significant majority:

- **Motion 1: The Committee will accept the High Performance Leasing Task Group’s work, with revisions submitted within the next two weeks, for full Committee presentation to GSA**

Energy Use Intensity (EUI): Task Group Report & Discussion

Drake Wauters, Wauters Design Group, Task Group Co-Chair

Abinesh Selvacanabady, Pacific Northwest National Laboratory (PNNL)

Ruth Kroeger, GSA Public Buildings Service, Urban Development/Good Neighbor Program

Drake Wauters briefly summarized the background of the EUI Task Group and its progress to date. Abinesh Selvacanabady (PNNL) and Ruth Kroeger (GSA) were invited to speak on the Occupancy-Adjusted EUI Study and Smart Location Calculator respectively.

- EUI Task Group Background

- Formed to recommend new energy intensity metrics that factor in (1) building occupancy and (2) commuter energy use, to add greater transparency to workplace decision making and reduce overall energy use

Presentation by PNNL: Influence of Occupancy on Building Energy Use and Use of an Occupancy-Adjusted Performance Metric

- In response to previous Committee input, DOE’s Federal Energy Management Program (FEMP) funded this study, conducted by the Pacific Northwest National Lab (PNNL)
- Study Objectives
 - Assess the influence of occupancy on building energy use and EUI in office buildings, where occupancy is based on concept of full time equivalent occupancy (FTEO: total annual occupied person hours divided by annual hours in a typical work schedule)
- Ken Sandler and PNNL obtained occupancy and energy use data for two GSA buildings: the Washington, DC HQ building and the Byron Rogers Federal Building in Denver, CO
- PNNL sought to validate findings by also estimating impacts of reported occupancy in DOE’s Building Performance Database and by summing estimated plug load energy use
- Findings: Impact of Occupancy
 - Occupancy levels appear to have relatively minor impacts on energy use based on regression analyses in these two office buildings
 - Estimates of per occupant impact were within the same general range

Analysis	Estimated Impact on Building Energy Use
GSA HQ building data	2.28 kWh/day-FTEO
Byron Rogers building data	2.41 kWh/day-FTEO
DOE Building Performance Database	1.93 kWh/day-FTEO
Bottom-up analysis	0.43 to 0.94 kWh/day-occupant (plug loads only)

- Conclusions
 - Based on the analysis of occupancy influence on building energy from two office buildings (the total number of buildings we could find with relevant data), plus estimated impacts using broader data:
 - Each FTEO appears to contribute **~2kWh/day** to building loads
 - Influence was small compared to weather, but statistically significant
 - Occupancy-adjusted EUI may be helpful to use as a supplemental metric to improve knowledge of:
 - Actual energy use, and hence efficiency, per occupant
 - Impacts of building utilization and consolidation, and changes in shifts or telework schedules, on whole building energy use
 - Calculating occupancy-adjusted EUI would require significant data gathering and processing to ensure accurate occupancy estimates
- Further Research
 - PNNL recommends expanding this study to a larger number and selection of buildings to validate results

- Adapt ENERGY STAR Portfolio Manager regression curve to develop an adjustment factor to traditional EUI based on occupancy, as an alternative to gathering occupancy data
- PNNL will publish its findings in a few months

PNNL Occupancy-Adjusted EUI Study – Committee Comments

- Worth further research to see if added plug loads for additional occupants are a minor factor even in ultra- efficient buildings
- Important for recommendations to consider the lack of data to apply new metrics: specifically that occupancy data is not readily available for many Federal buildings, and metering not consistent
- These findings indicate that fears that large energy use increases due to higher occupant density are unwarranted. The metric may be helpful to aid implementation of the Reduce the Footprint policy

Presentation: GSA and EPA Smart Growth Smart Location Calculator (SLC)

- GSA's Urban Development/Good Neighbor Program and EPA's Smart Growth Program developed the Smart Location Calculator (SLC) (www.slc.gsa.gov) to guide federal facility siting and location policy to reduce occupant vehicle miles traveled (VMT).
- The SLC is a free, publically available tool employing data from EPA's Smart Location Database:
 - The Database summarizes over 90 different indicators associated with the built environment and location efficiency
 - Indicators include development density, diversity of land use, street network design, and accessibility to destinations as well as various demographic and employment statistics
- The SLC model predicts average VMT per worker, including commuting trips to or from work and mid-day errands
- The SLC model converts VMT to a 0-100 index and normalizes it to a metropolitan area
 - The SLC enables comparison *among* parts of a single metropolitan area rather than *across* metropolitan areas
- For each block group around a specific location, the user may view data and charts summarizing:
 - VMT (low, average, and high of block group)
 - Emissions
 - Access to transit
 - Low wage access
 - Mode split (drive alone, carpool, active, transit)
 - *And now, thanks to the Task Group's work, Transportation Energy Use Intensity (T-EUI) from travel to and from the building in kBtu per person per day
- T-EUI Approach and Methodology
 - Created a version of EUI that covers transportation energy to and from a building
 - Aid decision-making by comparing actual energy impact of building operations vs. commute
 - Conversion to Btus to aid comparison between building & commute energy use

- For siting decisions, sufficient to have *relative* rather than *absolute* accuracy
- Converted VMT to BTU
 - $\text{BTU per person per day} = \frac{\text{VMT}}{22.1\text{mpg}} \times 120,476 \text{ btu}$
 - Based on average mpg & BTU content of gasoline

Smart Location Calculator – Committee Comments

- An employer may be most interested in knowing energy cost savings per employee as a basis to compare locations.
- Suggest the SLC be used a predictive model, potentially driving agencies toward obtaining and tracking more accurate vehicle use data

Overall Energy Use Intensity Task Group – Committee Comments

- Suggest further research to validate these findings, and to identify alternative methods to determine building occupancy – e.g., using RFID, cell phones, or CO₂ measurement
- Need more analysis regarding how to apply these metrics to policy and planning, including how the three versions of EUI (traditional EUI, occupancy-based EUI, and transportation-based EUI) should be used in conjunction with each other
- Suggest adding discussion of ways T-EUI metric and SLC tool may spur users to improve location, transportation and energy policies
- For commutes, consider if time spent in minutes matter more than miles

The Committee initially voted unanimously to support the following motion:

- **Motion 2: The EUI Task Group will continue its work and seek additional sources of building data and funding for further research and analysis**
 - **Note:* later in the meeting, during the Planning Exercise, the Committee revised this motion to ask the EUI Task Group to complete its recommendations instead and share them with the full Committee for final review and submission to GSA

Following up on Committee Recommendations (Social Cost of Carbon, Net Zero Energy, Portfolio): Updates

Update on Social Cost of Carbon

Rebecca Stevens, GSA Public Buildings Service

- Background
 - Executive Order 13693 Section 15 requires GSA to identify five or more contracts annually that may include consideration of contractor emissions and greenhouse gas (GHG) management practices
 - GSA has identified five FY17 pilot contracts, including three building projects:
 - Alexandria Bay Border Station: The contractor was provided free training on how to use the Athena lifecycle analysis tool and will estimate GHG emissions from major materials in updating the design
 - Toledo Courthouse, new annex: includes contract provision to compare GHG emissions for three designs provided to peer review group
 - Los Angeles Courthouse: Built by Clark Construction and recently opened. Clark performed a study of construction site GHG emissions: details below

Presentation: Clark Construction Carbon Disclosure Project Study

- For the past two years, Clark Construction has been participating in a carbon disclosure project of its construction GHG emissions, including at GSA's Los Angeles Courthouse
 - Footprint calculations considered three different categories of emissions:
 - Scope 1 – direct GHG emissions: e.g., trucks and cranes on site
 - Scope 2 – indirect emissions of electricity used on site
 - Scope 3 – other indirect emissions, including materials use
- What did we learn from this effort?
 - Huge variability in emissions based on the project and the location
 - Every project requires different strategies
 - Generally, construction operations is the best place to reduce emissions
 - Project design and operations have biggest impact
 - Defining goals and metrics early is critical to success
 - Owners and contractors affect different emissions sources
- Clark Construction is not currently factoring the social cost of carbon into its work
 - Limited push from clients for that metric to date
 - Easier to do with design-build methods than traditional design-bid-build

Update on Net Zero Energy

- GSA PBS is continuing to work towards its “25 by 25” goal. The goal is to have 25 individual, existing buildings be net zero energy, water, and waste by 2025, representing 2% of existing GSA buildings of 5,000 square feet or larger.

Update on Portfolio Prioritization

- The Office of Federal High-Performance Green Buildings:
 - Has addressed several key audiences regarding this topic to date, including the Federal Real Property Council, and the 2016 DOE Energy Exchange
 - Is working with GSA's Office of Evidence and Analysis to incorporate sustainability data and factors into tools that office is developing to improve analysis of Federal Real Property Profile (FRPP) data
 - Is coordinating with GSA's Real Property Policy Division on the revision of Federal Management Regulations (FMRs) to better incorporate sustainability factors
 - Is in discussions with GSA's Portfolio Analysis Division on proposed development of a new asset repositioning tool using key performance indicators
- The National Academies proceedings of the two workshops on portfolio prioritization conducted with the Committee are expected to be published around New Years' 2017

Working Lunch with Presentation: Transforming America's Cities

Greg Kats, Capital E

Greg Kats presented his recent work related to the benefits of smart surface technologies and their impacts on urban quality of life.

- This program analyzes how cities should respond to the acceleration of climate change

- The number of extreme heat events are predicted to spike, creating health hazards, particularly for disadvantaged areas that lack green infrastructure
- The study looked at deployment of several technologies in response to this threat:
 - Green roofs, solar panels, reflective pavement, and urban trees
 - How best to combine these technologies for optimal savings and performance
 - Areas studied include Washington, DC, Baltimore, Philadelphia, and Los Angeles
 - Study quantifies \$/square foot net present value for 14 metrics
- The two phases of the project focused on:
 - Smart roofs for affordable housing
 - Smart surfaces for low income urban areas
- The research identified and quantified significant benefits in:
 - Urban heat island-related energy savings
 - Reduced ozone and particulate pollution
 - Reduced heat-related mortality
 - Global cooling and reduced greenhouse gas emissions
 - Reduced stormwater runoff
 - Increased employment
- Additional benefits come from stemming potential losses in summertime tourism
- The full report will be available by the end of January

Election of Green Building Advisory Committee Chair, 2017-2019

Motion 3: The Committee voted to re-elect Greg Kats as the Committee Chair for another two-year term.

Committee Planning Exercise

Angela Chiarenza, Noblis (facilitator)

The purpose of this exercise was to discuss, evaluate, and select topics that the Committee would like to pursue in the coming year. The Committee discussed three motions submitted in advance, additional motions proposed during the planning exercise, and the Committee's earlier motion for continuing the EUI Task Group. All motions considered, with those adopted shown in boldface, included:

- Propose a process and/or recommendations for the disposal of federal real property assets that enables the upgrading of those assets to conform to current federal standards for sustainability and resilience
 - Consider impact on local communities when federal assets are transitioned back to them
- **Develop guidelines to integrate health and wellness features into all government facilities sustainability efforts, including programs such as Fitwel and biophilic design strategies**
 - Potential areas to explore: indoor air quality, building materials, designing to encourage change in behavior, human health & wellness, circadian lighting, acoustics, employee satisfaction and productivity
- Integrate the online Federal Resource Management and Ecosystem Services Guidebook (FRMES) Guidebook into federal facilities operations and renovation efforts
 - Potential areas to explore: ecosystem services, pollination, and migratory birds

- Investigate the potential of the “internet of things” to reduce energy use, increase sustainability in buildings, provide building data for the development of models, and enhance building interaction with the smart grid and utility purchase
 - Emphasis on building data and sustainability efforts as opposed to cyber security-related matters
- **Accelerate the adoption of high -performance green buildings**
 - Committee supporting GSA in net zero policies
 - Retrofits: how do we get buildings to adopt deep retrofits? Analyze where net zero is feasible and connect to the retrofit criteria
 - Look at financing vehicles and how the federal government can accelerate financing these projects (referencing FEMP renewable energy projects), including energy efficiency PPAs
- Analyze market failure between design-build process and operating performance
- The EUI Task Group will continue its work and seek additional sources of building data and funding for further research and analysis

The following two motions were voted as the top motions to pursue by the Committee:

- **Motion 4: Develop guidelines to integrate health and wellness features into all government facilities sustainability efforts, including programs such as Fitwel and biophilic design strategies**
- **Motion 5: Accelerate the adoption of high performance green buildings**

Public Comment Period

There were no public comments from visitors.

Closing Comments & Adjournment

Greg Kats acknowledged the great work of the Committee and Task Groups, and looks forward to working with the Committee in this upcoming year. Kevin Kampschroer also thanked all of the Committee chairs, members, and participants for their continued dedication and hard work.