

**GSA Green Building Advisory Committee**  
**Thursday, September 12, 2019 Meeting**  
**Meeting Notes**

**Committee Chair**

Projjal Dutta NY State Metropolitan Transportation Authority

**Committee Members**

Ash Awad**	McKinstry
Charlene Bayer	Hygieia Sciences LLC
Chris Castro	City of Orlando
CJ Córdova**	U.S. Department of Veterans Affairs
Ralph DiNola*	New Buildings Institute
Jennifer Frey	Sellen Construction
Dave Gibson	U.S. Environmental Protection Agency
David Kaneda	Integral Group
Yvonne Medina**	U.S. Department of Transportation
Clay Nesler	Johnson Controls
Victor Olgyay	Rocky Mountain Institute
Brendan Owens	U.S. Green Building Council
Andrew Persily	National Institute of Standards and Technology
Kent Peterson*	P2S Engineering
Sonia Punjabi	Pacific Gas & Electric
Jane Rohde	JSR Associates
Sarah Slaughter	Built Environment Coalition
Maureen Sullivan**	U.S. Department of Defense

**GSA Participants**

Jessica Salmoiraghi	Associate Administrator, Office of Government-wide Policy
Kevin Kampschroer	Chief Sustainability Officer and Director, Office of Federal High-Performance Buildings (OFHPB)
Ken Sandler	Designated Federal Officer, OFHPB
Michael Bloom	Group Federal Officer, OFHPB

\* denotes those who attended via web conference

\*\* denotes those not present at the meeting

## Opening Remarks and Introductions

Jessica Salmoiraghi, Associate Administrator, GSA Office of Government-wide Policy, opened the meeting noting the Committee's record of providing substantive advice leading to advancements in federal building practices, and saying that she looks forward to the findings and recommendations of the Data-Integrated Building Systems and Building to Grid Integration Task Groups.

Kevin Kampschroer, Projjal Dutta, Michael Bloom, and Ken Sandler also welcomed Committee members and expressed hopes for a robust and productive discussion.

## Data Integrated Building Systems: Task Group Presentation & Discussion

*Clay Nesler, Johnson Controls, Task Group Chair*

Clay Nesler, assisted by group members including Jane Rohde, Jennifer Frey and Kent Peterson, identified the problem addressed by this Task Group with reference to the challenges of buildings' under-performance, lack of interoperability, and uniqueness as "one offs", making them more expensive to manage.

At the same time, the increasing volumes of data available on building performance present new opportunities, specifically for ***data-integrated building systems (DIBS)***, defined by the group as follows:

Data-integrated building systems improve building performance by providing advanced sensing, monitoring and controls through the automated exchange of data from building automation, energy management, lighting, security, life safety and other building systems, equipment and devices.

A sample use case is that of a smart conference room that adjusts parameters, including ventilation and lighting, based on scheduling and detection of occupant presence or absence. Potential benefits from widespread implementation of DIBS could include improved indoor environmental quality (IEQ), energy savings, productivity, building performance, organizational workflow and collaboration. One report, [Achieving Deeper Energy Savings Through Integrated Building Systems](#), by the American Council for an Energy-Efficient Economy (ACEEE), estimated potential whole building energy savings from the use of integrated systems of 8-18%.

The group's ultimate vision is to leverage best practices and emerging standards to deliver "plug & play" data integration to significantly improve building and organizational performance.

To explore how to achieve this vision in federal buildings, they identified projects that had incorporated DIBS elements, evaluated drivers of these projects' success, and identified organizations driving adoption. While there are limited examples of this vision being realized, health care facilities are currently the most advanced in moving towards it, due to the need to coordinate multiple technologies and ensure occupant health.

GSA currently uses several smart building systems, including smart meters at over 400 buildings and the GSALink system, a continuous commissioning platform, used at around 90 buildings. GSA's Southwest Region (Region 7) integrates these systems into a unified platform. The GSA Proving Ground (GPG) has tested an [integrated wireless sensor and analytics system](#) in its Rocky Mountain Region (Region 8). There is also smart building legislation in Congress, e.g., H.R. 2044, [Smart Building Acceleration Act](#).

There remain many challenges to widely achieving the Task Group's vision in federal buildings. Most fundamentally, building systems are not designed or programmed to communicate with each other, which requires intermediary solutions like "middleware" and manufacturers and operators agreeing on the use of common protocols like BACnet to facilitate interoperability.

More specifically, the group identified four areas of needs for DIBS solutions to be successfully achieved in federal facilities:

- Employee education
- Standards & guidance
- Effective data analysis and application
- Determination of return on investment (ROI), including life cycle costs

In order to test and implement the most useful DIBS concepts, the Task Group proposed the following recommendations:

1. Initiate DIBS demonstration projects in federal buildings and quantify the costs and benefits of these installations.
2. Prepare DIBS specification, implementation and procurement guidelines, leveraging industry efforts from ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers), National Electrical Manufacturers Association (NEMA) and others.
3. Define the required skills and competencies for federal building development and operations personnel to support DIBS facilities. (Example: the [Energy Controls Management Curriculum](#) at Valencia College in Orlando, Florida.)
4. Support systems interoperability standards development and testing in federal facilities and laboratories.
5. Develop guidance for including DIBS in ESPC/UESC contracts taking advantage of energy and non-energy benefits.
6. Investigate cybersecurity concerns specific to DIBS and provide guidance for system specification, maintenance and security.

## **Comments on Data Integrated Buildings**

- Potential case studies and pilots:
  - GSA's Central Office building, particularly as it is further renovated to increase density by an additional 1,000 occupants, creating opportunities for improvements.
  - Orlando, Florida municipal buildings, improved through their in-house ESCO, including with some centralized building systems.
- Among the potential benefits of DIBS, some analysis is needed on tradeoffs and prioritizing among them, e.g., energy savings and occupant comfort.
- Need to build in fail-safes, like manual overrides, for resilience.
- Keep systems simple, and ensure someone is responsible for avoiding failures.
- Need a clear business case and incentives, leaving on-the-ground solutions to implementers.
- Add DIBS core competencies to the [FEDSAT](#) building personnel training gateway on SFTool.gov.
- In addition to pilots, GSA or other agencies may benefit from participating in DIBS standards development efforts.

**\*\* Approved motion:** The Committee agreed to provide further review and comments on the recommendations (Executive Summary) by September 30 and upon receiving the final version, take a vote over email on approval of the Advice Letter. The Committee further requests GSA to pilot recommendations of the DIBS Task Group as soon as possible and report back in six months.

### **Lunch Presentation: DOE Building Technologies Office's Commercial Buildings Research & Deployment**

*Tony Bouza, Technical Manager, DOE Building Technologies Office*

Tony Bouza provided an overview of the work of DOE's Building Technologies Office (BTO), specifically on commercial buildings. BTO's goal is: *to lead R&D on technologies that make our homes and buildings more affordable and comfortable, and make America more sustainable, secure, and prosperous.* BTO-funded research, standards and deployment work have helped transform the market for energy-efficient technologies including lighting, refrigerators and windows.

The BTO teams of most relevance to the work of the Committee are Emerging Technologies and Commercial Building Integration. In addition to its research, validation and tools development, BTO accelerates deployment of energy efficient technologies and strategies through the Better Buildings partnership program. Grid-Interactive Efficient Buildings (GEBs) are an increasingly high priority for the Office.

The buildings industry funds R&D at only 0.3%, a rate one-tenth of the industry average. It is also typically conservative and slow to adopt innovations, e.g., the transition from wood to plywood took about 20 years. Another example of risk avoidance in the industry

is the tendency to wastefully oversize HVAC systems. The lack of standardization in the industry also presents many challenges, as opposed to motor vehicles for example.

An example of the technical challenges that BTO is exploring is how to separate humidification from cooling so that buildings do not have to drop temperatures to the dew point in order to relieve occupant discomfort associated with high humidity. Another example is finding ways to recycle and reuse waste heat from building systems, such as by applying it to water heating.

### **Grid Integrated Buildings Task Group Presentation**

*Ralph DiNola, NBI and Sonia Punjabi, PG&E, Task Group Co-Chairs; plus Victor Olgyay, RMI*

The first phase of this Task Group developed an [Advice Letter](#) with findings and recommendations for GSA and other agencies to integrate their buildings with the electric grid to achieve cost savings, advance adoption of clean energy sources and strategies, and enhance resilience. This second phase of the group focused on developing a proposed roadmap to help agencies figure out how best to operationalize the highest priority recommendations, on the topics of:

- **Building & grid interaction policies for all federal buildings:** Review and modify federal energy policy goals.
- **Grid and rate analysis:** Work with utilities and grid operators to analyze the grid system and understand and take advantage of flexible rate structures.
- **Planning and design for new and existing federal buildings:** Provide planning and design guidance to enable grid integration.
- **Energy savings performance contracts and utility energy service contracts:** Investigate & pilot how ESPCs and UESCs can incorporate demand savings.
- **Pilot to practice:** Use pilot programs to establish criteria and develop practices to integrate into standard procedure.

The original recommendations led GSA to commission a [cost-benefit analysis](#), conducted by RMI, to examine the value of incorporating load flexibility, peak load reduction, and demand response capabilities at GSA buildings at 6 different parts of the country. This report identified the potential for savings of 180 GWh/y of energy and \$50 million across the GSA's owned office portfolio. Year-round demand management and flexibility in most cases delivered greater value than demand response.

Clay discussed the group's findings on the incorporation of demand savings into ESPCs and UESCs. In fact, this practice is currently allowable but neither encouraged nor common. Policy, guidance and training on how to do so effectively is needed, e.g., avoiding use of blended electricity rates and being appropriately conservative in estimating savings.

## **Comments on Grid-Integrated Buildings**

- As rates are very diverse and likely to evolve significantly, analysis should focus on general rate attributes and trends, and how to advance building flexibility to take advantage of them, rather than on current rates per se.
- GSA can play a key role as a large customer working with utilities to help shape rates.
- Recommendations should focus on role of buildings, while issues of the future of the grid itself are too broad to fit within this scope.
- Federal campuses, especially ones with greater resilience needs, could be good candidates for pilots.

**\*\*Approved motion:** The Committee agreed to provide further review and comments by September 30 and upon receiving the final version, take a vote over email on approval of the Advice Letter.

## **New Motions Discussion**

- Projjal gave a presentation on a recently established New York Metropolitan Transportation Authority (MTA) program to lease underutilized spaces, including roofs and parking lots, for third party providers to build and operate distributed generation assets, particularly photovoltaic (PV) sources, on them.
  - **Discussion:**
    - MTA has no involvement in these projects other than leasing out the space, which allows it to gain revenue while advancing clean energy objectives without additional costs.
    - This may not be allowed in other jurisdictions (e.g., Florida per energy market rules), but the proposed motion is for the federal government to investigate this model and pilot it where appropriate.
    - The leases transfer liability to the third party developer, although sufficient structural support for the uses proposed, particularly on roofs, must be demonstrated.
    - Greater use of electric vehicles in the near future will increase demand for new clean power sources.
- Victor discussed a proposed motion that he submitted to the group prior to the meeting, to study potential federal energy, pollution and cost savings from reducing the energy embodied in building construction.
  - **Discussion:**
    - As building operating energy is reduced, the relative share of energy used in the extraction, manufacture, transportation, etc. of building materials and products becomes more important.
    - Cost savings may be possible, e.g., from locally produced and recycled materials.
    - GSA could send a strong signal to manufacturers if it adopted a low embodied energy materials policy.
    - Market leaders including American Institute of Architects (AIA) are proposing embodied carbon rather than embodied energy goals.

- A lifecycle analysis (LCA) that looks at multiple product attributes is preferable to a single attribute analysis which could lead to unintended consequences.
  - LCA tools exist but need to be improved. NIST has a history in this area with its BEES and BIRDS tools. Other tools mentioned include ATHENA and Tally.
- Although a daunting task, the recommendation would be to study the issue, not necessarily to identify the solution in the short term.
- Increasing disclosure of material properties is an alternative to regulating those properties per se.
- Other proposed motions discussed:
  - *Evaluate the current effectiveness of current energy metrics like energy use intensity (EUI).*
    - The Committee did issue an [Advice Letter](#) on this topic in 2016, recommending that federal agencies update the EUI metric to incorporate building occupant density as well as location efficiency.
      - In response to this Advice Letter, DOE and GSA also supported the Pacific Northwest National Lab (PNNL) to study the [impact of occupant density on building use](#), finding the energy impact per added occupant to be modest.
  - *Resiliency, including adapting to climate change and other emergency preparedness, of federal buildings.*
    - A broad topic on which the federal government has some current authorities and programs.
    - In 2016, the Committee posted an Advice Letter on the topic of strategic portfolio planning that combines goals for resilience, footprint reduction and sustainability.
  - *Sustainable leasing.*
    - From a leasing perspective, study the cost and benefit of sustainable lease provisions at the scale of a federal tenant within a multi-tenanted building.
- There was also discussion of: *evaluating the impact of new technologies on the grid like bidirectional charging using electric vehicles; and municipal cooperation with the federal government, as on pilot projects.*
- Based on an initial vote, the motions on embodied energy, distributed generation and resiliency received the most votes and number of Committee members willing to work on Task Groups on these topics. The Committee asked all who had submitted proposed motions to refine and resubmit them within two weeks for a subsequent vote over email.

## Closing Comments

Kevin Kampschroer thanked the Committee for its many contributions. He noted the Committee's recommendations last year on building to grid integration, which a subsequent analysis found could save \$50 billion a year – an example of how much benefit GSA and other agencies can gain from the Committee's work.