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Green Building Advisory Committee
Advice Letter:
High-Performance Building Adoption Task Group

October 24, 2017

Kevin Kampschroer
Director, Office of Federal High-Performance Green Buildings
U.S. General Services Administration

RE: Recommendations for Accelerating the Adoption of High-Performance Federal Buildings

Dear Mr. Kampschroer:

The following recommendations were developed by the High-Performance Building Adoption Task Group of GSA's Green Building Advisory Committee (hereafter "the Committee") and accepted by the full Committee at its meeting on October 24, 2017.

INTRODUCTION

The High-Performance Building Adoption Task Group was tasked with accelerating the adoption of high-performance Federal buildings. The Task Group focuses on the opportunity for the GSA and other Federal agencies to increase the rate of upgrade of existing buildings towards high-performance standards. While the government's limited new construction is already expected to meet higher standards, its vast stock of existing buildings provides the greatest possibilities for major performance improvements. Achieving more rapid and extensive progress towards high-performance building (HPB) standards will accelerate the achievement of financial savings for the Federal government, and improve the capability of Federal agencies to accomplish their missions.

Federal agencies have made significant progress in upgrading existing facilities towards high-performance standards since the passing of the Energy Independence and Security Act (EISA) in 2007. Federal agencies reported a 5.3% reduction in energy use intensity in 2016 compared to 2015 (well above the 2.5% annual goal), a 25.1% reduction since 2003 and a 49% reduction since 1975. Federal facilities also exceeded the 18% potable water intensity goal with a 23.6% reduction from 2007. In addition, Federal facilities exceeded the "clean energy" goal of 10% by reaching 14.2% of facility energy use and exceeded the "renewable electricity" goal of 10% by reaching 12.4% of electricity use – including the purchase of renewable energy credits as well as on-site and off-site installations (FEMP, 2017a).

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However, only 11% of existing Federal building square footage meets the high-performance building standards known as the Guiding Principles for Sustainable Federal Buildings. Current Federal building retrofit rates do not allow for significant improvement in these percentages within a meaningful timeframe, e.g., the next decade. Major retrofits are required to meet the Guiding Principles; however, looking at retrofits large enough to require Congressional approval (known as “prospectus level projects”) at GSA in FY2017, they represented only about 2.7% of GSA’s owned square footage. Upgrading Federal facilities at that rate would not allow the government to achieve Guiding Principles compliance at 100% of its portfolio before the year 2050.

The use of Energy Savings Performance Contracts (ESPCs) and Utility Energy Savings Contracts (UESCs) has significantly expanded Federal progress in energy and water upgrades in recent years, particularly where these projects have aimed for deep energy retrofits. At GSA, these projects over the past two years have led to upgrades at an additional 19% of the owned inventory (by square footage) per year (Porst Hydras, 2017). These projects have had to fill the gap of efficiency investments in Federal facilities decreasing 12.4% in FY16 from FY15, with further decreases potentially pending (FEMP, 2017).

The Federal government invested \$20.3 billion in efficiency from 2007 to 2016, 32% of that through performance contracts, specifically ESPCs and UESCs, with the remaining 68% from Direct Obligations, including as part of the American Recovery and Reinvestment Act of 2009 (ARRA). FEMP estimates that an additional \$10 billion in

Definition of High Performance Building

EISA (EISA 2007, Title IV, Section 401):
The term “high-performance green building” means a high-performance building that, during its life-cycle, as compared with similar buildings (as measured by Commercial Buildings Energy Consumption Survey or Residential Energy Consumption Survey data from the Energy Information Agency)—

- (A) reduces energy, water, and material resource use;
- (B) improves indoor environmental quality, including reducing indoor pollution, improving thermal comfort, and improving lighting and acoustic environments that affect occupant health and productivity;
- (C) reduces negative impacts on the environment throughout the life-cycle of the building, including air and water pollution and waste generation;
- (D) increases the use of environmentally preferable products, including bio-based, recycled content, and nontoxic products with lower life-cycle impacts;
- (E) increases reuse and recycling opportunities;
- (F) integrates systems in the building;
- (G) reduces the environmental and energy impacts of transportation through building location and site design that support a full range of transportation choices for users of the building; and
- (H) considers indoor and outdoor effects of the building on human health and the environment, including—
 - (i) improvements in worker productivity;
 - (ii) the life-cycle impacts of building materials and operations; and
 - (iii) other factors that the Federal Director or the Commercial Director consider to be appropriate.

ASHRAE (ASHRAE/ICC/USGBC/IES Standard 189.1-2017) defines a “high performance green buildings” as
A building designed, constructed, and capable of being operated in a manner that increases environmental performance and economic value over time, seeks to establish an indoor environment that supports the health of occupants, and enhances satisfaction and productivity of occupants through integration of environmentally preferable building materials and water-efficient and energy-efficient systems.

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cost-effective investments in Federal facility upgrades remain available (FEMP, 2017).

Given the progress achieved to date in market acceptance of high-performance building standards and the lack of major technical barriers to improvements, the Task Group decided to focus primarily on increasing the extent of Federal high-performance building upgrades, specifically moving away from an opportunistic or ad hoc approach towards more extensive and strategic implementation of the upgrades. This will primarily require overcoming financial and process barriers, rather than technical barriers, and making a solid business case for the Federal government to invest more heavily in HPBs. The following findings and recommendations are intended to address these needs and concerns. They are followed by sections providing more details on, and background for, the recommendations, including:

- Recommendations for GSA and Other Federal Agencies
- The Business Case for Federal High-Performance Buildings
- Current State of Practice for Upgrading Federal Facilities Towards High Performance
- Current Challenges to Large-Scale Implementation of Facility Upgrades
- Current Opportunities for Large-Scale Implementation of Facility Upgrades to HPB Standards
- Conclusions
- Appendices: State and Local Programs; Additional Resources

RECOMMENDATIONS FOR GSA AND OTHER FEDERAL AGENCIES

- 1. Overall Recommendation: Double annual rate of high-performance retrofit of Federal buildings by portfolio square footage over the next five years. In order to achieve this ramp-up, the following recommendations can enable this accelerated progress.**
2. Expand the use of enhanced financing opportunities to provide necessary capital for building efficiency and high-performance improvements:
 - a. Expand use of performance contracting mechanisms such as Energy Savings Performance Contracts (ESPCs), Utility Energy Service Contracts (UESCs), and Power Purchasing Agreements (PPAs).
 - b. Consider blending existing agency appropriated funding with performance contracting mechanisms such as those listed above, in order to leverage the most work with the funds available.
 - c. Review utility contracts with agencies, optimize agency rate schedules and identify opportunities for cost reductions resulting from participation in demand response, time-of-use and other incentive programs:
 - i. Proactively develop relationships with utility companies to leverage public building programs, partnerships and incentives.

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- ii. Encourage agencies to take advantage of services such as energy storage or demand flexibility.
 - d. Expedite performance contracting with:
 - i. Simplified contractual arrangements
 - ii. Centralized contract support for high performance building retrofits
 - iii. Leveraging already-required audits to prequalify projects for ESPC/UESC
- 3. The Federal Director of the Office of Federal High-Performance Buildings, in coordination with the Office of Management and Budget, should explore measures for Federal agencies to retain the maximum feasible savings accrued as a result of the use of cost-effective technologies for future high-performance building initiatives, as directed in the Energy Independence and Security Act (EISA 2007), Sec. 436(e) and (f), and Sec. 439(d)(3).
 - a. Many state and local government agencies use retained savings from high-performance upgrades to finance future buildings upgrades. For example, California state agencies use the Energy Efficient State Property Revolving Fund (California Department of General Services, 2017a).
 - b. These internally managed funds may speed development and implementation of high-performance building projects, and may result in greater overall savings to the Federal Government.
 - c. EISA explicitly emphasizes the retention of savings in the annual budgets of Federal agencies as a key incentive to encourage the expedited use of high-performance green buildings and related technology (Sec. 436(e)).
- 4. GSA and DOE should provide guidance to Federal agencies to create more robust datasets on performance of high-performance building retrofit projects and contracts to increase confidence in savings, and ensure outcomes are delivered.
 - a. All Federal agencies should ensure they are complying with the EISA 2007 Section 432 requirement to report on EISA covered facilities.
 - b. Track additional project metadata not covered by EISA 2007 Section 472 including project area, projected and actual cost savings, and measurement and verification (M&V) results.
 - c. Leverage advances in automated M&V.
 - d. Create and publish open datasets, where possible, made available to all parties to support increased investments by both the public and private sector.
- 5. Look at, leverage and broadly replicate best practices in private and public sectors, for high-performance renovation, operations and maintenance across the portfolio, as appropriate.
 - a. Expand Campus/Installation-wide high-performance building upgrades.
 - i. DOD experience demonstrates the range of high-performance improvement options available at the campus/installation scale.

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- ii. Certain objectives, such as Net Zero Water, have increased technical and economic viability at the larger scale, such as captured, treated, stored, and re-used rainwater and greywater.
 - iii. Campus/Installation-wide approaches may more effectively incorporate advanced systems that improve Federal resilience and security, such as energy or water micro-grids.
 - b. Expand aggregation of multiple buildings at various locations for HPB projects at Federal agencies where feasible.
 - i. This provides economies of scale and streamlines processes for contracting, education and training across the portfolio.
 - ii. GSA and US Army both provide centralized contracting support to aid the management and aggregation of similar projects.
 - c. Set aggressive energy and water reduction goals (>35% of existing consumption).
 - i. Previous experience on ESPCs has shown that projects can achieve double the energy savings by setting aggressive energy goals.
 - ii. Analysis of Federal ESPCs found that the level of energy savings is not correlated with such factors as energy cost or initial EUIs: success has been more dependent on the presence of agency goals and champions.
 - d. Adopt national standards for project development and technical due diligence, such as the protocols used by the Investor Confidence Project.
 - e. Expand life cycle cost analysis (LCCA) to determine most effective options.
 - i. 10 CFR 436 Subpart A, Methodology and Procedures for Life Cycle Cost Analyses, requires agencies to employ life cycle cost methodology. EISA further recognizes the need for restructuring budget decision making to incorporate “complete energy and environmental cost accounting,” including health and productivity (EISA Sec. 436, (f)(5)).
 - ii. Consider monetizing “soft benefits” such as productivity and social cost of carbon, to increase return on investment (ROI).
 - f. Use integrated design approaches or integrated project delivery methods to inform the early design with cost, feasibility, and technological input to collaboratively focus energy saving strategies.
 - g. Develop and utilize energy performance targets by building type and climate zone to drive project performance throughout design, construction and operations.
 - h. Analyze options for the integration of energy efficiency, renewable energy systems, and energy storage to take advantage of utility demand response and other programs that will save agency funds to improve grid operation and resilience.
 - i. Bundle energy and water conservation measures into comprehensive packages.
 - j. Explore the potential for zero net energy (ZNE) performance at the outset of the project and achieve ZNE where possible.
 - k. Consider enhanced use leases as an option for agencies with extensive land holdings.

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- I. Consider using contract performance guarantees, such as those structured within the Investor Confidence Project (ICP) model and GSA performance guarantee contracts for contractors (fee held for 12 month proven performance period, as in the Federal Center South, GSA Region 10 project).

THE BUSINESS CASE FOR FEDERAL HIGH PERFORMANCE BUILDINGS

The business case for the Federal government to invest more deeply and systematically in bringing its portfolio up to high performance levels differs in critical ways from the case for the private sector to make such investments. Fundamentally, the government's "business", of course, does not concern selling goods and services for profit, but rather is about accomplishing agreed-upon societal goals as efficiently as possible with public funds, mostly from tax dollars.

Hence, to the government, savings – through efficiency, conservation and innovation – are of paramount importance. In order to accomplish its diverse missions effectively, the government also has to maintain and enhance the value of its assets, including its human resources – the source of both its greatest expenditures and value – and its building portfolio. The final piece of the Federal business case is supporting the crucial governmental goal of advancing economic development for the country.

- Therefore, the business case for Federal high-performance building centers on four principles:
 - Saving money by saving resources;
 - Improving the health & productivity of the Federal workforce;
 - Maintaining and enhancing the value of the Federal building portfolio, particularly through greater Federal building energy and water security and resilience; and
 - Promoting U.S. economic development.

Ways in which high performance buildings help the Federal government to fulfill these principles include the following:

- ***Increased utility cost savings and resource conservation resulting from effective energy and water efficiency strategies***

Investments by Federal agencies in increased energy and water efficiency since 2007 provided cumulative utility cost savings of approximately \$5 billion in 2016. The Federal government will receive cumulative cost savings of \$22.5 billion in 2020, which would pay back the cumulative investment in efficiency from 2007 to 2016. Recent analysis by DOE/FEMP indicates that the Federal government currently saves 4,730 Btu of energy annually for each \$1 invested, and comparing project investment costs with guaranteed savings yields a savings to investment ratio of 2.3.

A recent study by the National Research Council concluded that, in their review of related analyses and references, high-performance buildings can result in significant reductions in

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energy and water use, ranging from 5-30% less site energy than similar conventional buildings, and 8-11% less water, depending on local costs and conditions (NRC, 2013).

Specific Federal agencies have documented more extensive savings from high-performance buildings. GSA's deep energy retrofits achieved 38% savings in Round I and 30% savings in Round II (GSA, 2017). For the US Army, six Deep Energy Retrofit projects provided a range of savings of 30%-72% reduction in energy use (measured by entire installation, not just individual building), and a recent upgrade program at Fort Buchanan achieved 54% energy and 70% water savings (Army, 2017).

- ***Improved workplace environments for occupant performance and agency effectiveness in fulfilling missions***

The National Research Council report found that occupant satisfaction was generally higher in high-performance buildings, although studies were inconclusive on worker productivity or health (NRC, 2013).

The Committee's Health and Wellness Task Group discusses and documents how high-performance buildings support occupant health and wellness, as well as the financial benefits of such improvements. Please see this group's October 2017 Advice Letter for a full discussion of this aspect of the business case.

- ***Maintaining and enhancing the value of the Federal building portfolio, particularly through greater Federal building energy and water security and resilience***

The Federal building portfolio represents a staggering investment; GSA's Public Buildings Service has estimated the replacement value of that agency's owned building stock alone at \$86 billion, while the General Accounting Office (GAO) has estimated the replacement value of the Department of Defense (DOD) infrastructure at around \$850 billion (GAO 2014).

High-performance building can help protect and maintain the value of the Federal portfolio in numerous ways, including by enhancing building, infrastructural and community resilience to disasters and climate extremes, increasing energy and water security, diminishing wear and tear on systems like HVAC through efficiency, and reducing maintenance needs.

High-performance features including renewable energy sources, micro grids and energy storage allow for enhanced energy security, reducing the government's vulnerability to supply disruptions. The US Army has achieved full "islanding" capabilities on some projects through high-performance building upgrades coupled with on-site energy production (Army, 2017). DOD priorities for Installation Energy Security include efficiency, resiliency (available, reliable, quality power to support critical mission loads), and on-site distributed energy (access to on base power when needed) (DOD, 2017). DOD has demonstrated a strong case to pursue efficiency and renewable energy strategies for energy security reasons in recent years. (von Kaenel, 2016).

- ***Enhanced economic development supporting local economies, job creation and workforce development***

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The boom in high-performance building over the past decade and a half has fueled the growth of numerous innovative, job-creating industries. A 2015 study by the U.S. Green Building Council estimates that from 2011-2014, the sustainable construction market generated \$167.4 billion in GDP, supported over 2.1 million jobs and provided \$147.7 billion in labor earnings, and that it will, from 2015 to 2018, generate an additional \$303.4 billion in GDP, supporting 3.9 million jobs and providing \$268.4 billion in labor earnings (USGBC, 2015). Another study estimated that building retrofits and industrial efficiency create 8 direct and indirect jobs per \$1 million invested compared to 3 created by \$1 million invested in traditional energy sources (Garrett-Peltier, 2016).

CURRENT STATE OF PRACTICE FOR UPGRADING FEDERAL FACILITIES TOWARDS HIGH PERFORMANCE

The Federal Government has invested \$20.3 billion in efficiency from 2007 to 2016, 32% of which has been through performance contracts, such as Energy Savings Performance Contracts (ESPCs) (FEMP, 2017a).

- Currently, ten (10) Federal agencies account for 95% of all Federal square footage: DOD, USPS, VA, GSA, DOE, DOJ, DOI, USDA, DHS, and NASA.
 - Several of these agencies (DOE, DOJ, VA and NASA) have higher average EUIs due to energy-intensive building types, including hospitals, labs and prisons.
 - DOJ also has unusually high water usage due to prison needs.

Federal agencies can finance efficiency or renewable energy projects through appropriations, alternative financing (ESPCs, UESCs, and ESPC ENABLE), power purchase agreements (PPAs) or real property arrangements (e.g., enhanced use leases).

In addition, Federal agencies can use ESPC Energy Sales Agreements (ESPC ESAs), a long-term contract option under ESPC authority to purchase renewables. Because OMB has a requirement that agencies assume title at the end of the contract, this uncertainty had created concern that companies might not be eligible for renewables tax credits; however, the IRS recently clarified requirements ensuring a “safe harbor” for companies in this situation to alleviate such concerns. (FEMP, 2017b)

Specific Federal agencies have different programs and capabilities. For example, the Department of Defense (DOD) requires bases to provide a business case for every project considered, and DOD Services compete through the Energy Resilience and Conservation Investment Program (ERCIP) for \$150 million available in the military construction budget, including water projects. DOD has purchased renewables through Appropriated Funding, PPAs, Enhanced Use Leasing (EUL), ESPCs, UESCs, and Special Agreement Authority (10 U.S.C. § 2922a). DOD funds HPB initiatives from Operations and Maintenance (O&M) accounts, money that is fungible and can be used for multiple purposes; savings are not held in a special account. DOD manages energy goals at the installation rather than building level; with more than 275,000 buildings, gathering data to determine whether each building is already retrofitted and estimating requirements for achieving zero net energy is too difficult (DOD, 2017).

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Both GSA and the US Army have implemented programs to aggregate individual buildings into an overarching high-performance building (and renewables) contracting platform. Both the GSA and Army provide quasi-centralized contracting and project management expertise. GSA's Capital Solar Challenge is an example where there was one contractor and one PPA price to produce 6 MW of solar power at 18 buildings. GSA's Federal Aggregated Solar Procurement Pilot (FASPP) coordinated 6 MW in PV purchases across 9 locations (8 GSA, 1 USFS). DOD, working with GSA and Georgia Power, used PPAs to procure 30 MW of solar PV each at Forts Benning, Gordon and Stewart (Army, 2017; DOD, 2017; FEMP, 2017b).

CURRENT CHALLENGES TO LARGE-SCALE IMPLEMENTATION OF FACILITY UPGRADES

Two overarching challenges restrict the widespread upgrading of existing Federal buildings towards high-performance standards. The first challenge is the *lack of sufficient funding appropriated by Congress to upgrade existing buildings to meet the high-performance standards, or even, for most Federal agencies, sufficient funding for basic maintenance, repair, restoration, and modernization*. The result is increasing backlogs for most agencies in basic operating investments in their built facilities, limiting opportunities for significant facility improvements.

The second overarching challenge is the *annual uncertainty in funding allocations that requires each Federal agency to consider capital investment in any building on a case-by-case basis, dependent on annual appropriations and authorizations, precluding effective and strategic planning and implementation for Federal facility upgrades towards high performance* (NRC, 2012).

Current Congressional and Executive branch restrictions on alternative funding mechanisms further complicate the activities of Federal agencies in considering full facility lifecycle benefits (such as over 25 or 30 years). For example, for all civilian Federal agencies (i.e., except the Department of Defense), any Power Purchase Agreement (PPA) has a 10-year time limit on contracts, which has hindered agencies from signing potentially financially advantageous deals that have a longer time frame. DOD, by contrast, has the authority to enter into a PPA agreement for up to 30 years. For Federal agencies with facilities in its 15-state Western area service region (see <https://www.wapa.gov/regions/Pages/service-map.aspx>), the Western Area Power Administration (WAPA) has longer term contracting authority for buildings and campuses in the WAPA region (FEMP, 2017b). In addition, while Section 436 of the Energy Independence and Security Act (EISA, 2007) explicitly allows Federal agencies to retain the utility savings to be directly reinvested in HPB initiatives, this capacity has not been allowed by OMB to date.

The ad hoc building-by-building approach utilized by most Federal agencies leads to additional challenges. Since the facility teams in each location may not have significant experience, ESCOs report that the agencies often do not request major upgrades, such as deep energy retrofits, that could provide additional financial savings. In addition, sufficient savings are often not available for a single building to justify an ESPC or ESCO firm to take

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on the risk of identifying potential upgrades without the contractual assurance that it will be able to use that data to invest in the facility and recoup its costs. The design, engineering, procurement, mobilization, and commissioning costs associated with upgrading a building towards high-performance standards are often prohibitively high for a single building, and can lead to duplication (and confusion) within an agency and/or contractor when more than one building is being considered at once.

Administrative barriers also present challenges. These include long and inconsistent contract award processes used with ESCOs on high-performance building retrofit projects. Both GSA and DOD created project management offices as a solution to streamline contract award and management.

CURRENT OPPORTUNITIES FOR LARGE-SCALE IMPLEMENTATION OF FACILITY UPGRADES TO HPB STANDARDS

FEMP estimates that another \$10 billion in cost-effective investment in energy conservation measures (ECMs) is available. FEMP's Government Performance and Results Act (GPRA) Analysis shows \$12.4 billion in potential investment required to meet a 25% energy intensity reduction goal for 2015-2025. With 7 years remaining for investment, that would require \$1.8 Billion per year. (This estimate is similar to what has been spent in recent years on HPB efforts, so continuing efforts at that level seems realistic.)

The US Army plans to continue awarding \$135-200M of UESC/ESPC investment annually for the foreseeable future (Army, 2017).

Section 436 of the Energy Independence and Security Act (EISA) of 2007 suggests allowing Federal agency retention of savings to be directly reinvested in HPB initiatives, e.g., a revolving fund; this has not been applied to civilian agencies to date.

Recent experiences of Federal agencies reveal additional opportunities to increase the rate at which Federal buildings are upgraded towards high-performance standards. For example, GSA analyses conclude that major ESPC project goals should include achievement of deep energy savings, as deep retrofit projects need not require fundamentally more work than standard ESPC projects (Shonder, 2014; RMI/GSA, 2013). As mentioned above, both GSA and the Army have created centralized project management offices to streamline contract award and management for ESPCs, and have found that best practices for ESPCs include bundling projects, taking an integrated, whole building approach, and redefining eligible savings to support innovative approaches.

Other state and local government agencies have implemented HPB programs that may be applicable for Federal agencies. The California Department of General Services (DGS) oversees a program to achieve zero net energy (ZNE) at state government buildings. An average energy efficient target for existing buildings was determined for each building type, given 16 different climate zones for the state. CA DGS uses a campus approach to meet efficiency targets by accounting for over-generation of energy on certain sites to offset buildings that don't meet energy efficiency goals. Current sources of alternative financing for upgrading CA DGS buildings include:

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- 1) Revolving fund, through which energy savings repay loan obligations;
- 2) Golden State financial marketplace (GS \$Mart) to encourage low interest rate financing;
- 3) Working with utilities to ensure incentives, including on-bill financing (OBF) with a 10-year term of payment for government agencies for zero interest;
- 4) Using ESCOs to identify and pay for energy improvements; and
- 5) PPAs – now using \$40 million, with goal of \$100 million by 2020 (DGS, 2017).

CONCLUSION

GSA can lead the Federal government and the country as a whole in retrofitting its portfolio to high-performance buildings. Through the use of the strategies recommended within this document and others, the Federal government can increase the rate of upgrade of existing buildings towards high-performance standards. Achieving more rapid and extensive progress towards high-performance building standards will accelerate the achievement of financial savings for the Federal government, and improve the capability of Federal agencies to accomplish their missions. The HPB task group believes strongly that achieving this goal will decrease agency operating costs, provide a number of immeasurable benefits to building occupants, increase the Federal government's energy security, and provide the most economically sound long-term solution for managing the Federal building stock.

Thank you for your careful consideration of this document and for the opportunity to recommend these policies. On behalf of the Advisory Committee and the High-Performance Building Adoption Task Group, we respectfully submit these recommendations for your consideration.

Sincerely,

Greg Kats

Chair

GSA Green Building Advisory Committee

Sarah Slaughter, PhD
Co-Chair
HPB Adoption Task Group

Kent Peterson, PE, FASHRAE
Co-Chair
HPB Adoption Task Group

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TASK GROUP

Co-Chairs: Kent Peterson, P2S Engineering; Sarah Slaughter, Built Environment Coalition

Members or Designees: Ash Awad, McKinstry; Nic Baker, Tracy Niro, Chris Tremper, DOE; Paul Bertram, PRB Connect; Ralph DiNola, NBI; Jennifer Frey, Sellen Construction; David Kaneda, Integral Group; Greg Kats, Capital E; Victor Olgay, RMI; Maureen Sullivan, DOD

GSA OFHPB Attendees: Ken Sandler (Designated Federal Officer), Kevin Kampschroer (Federal Director), Don Horn

Observers: Dan Burgoyne, State of California; Gerry Coons, OPEI; Matt Golden, ICP; Jenna Hamilton & Micah Thomas, GBI; Christopher Lindsay, IAPMO; Cristina Schulingkamp, EPA; Todd Sims, ACC; Dave Walls, ICC

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Appendix I: State and Local Programs to Accelerate High-Performance Building Retrofits

Following are highlights of state and local programs potentially relevant to the work of the Advisory Committee's High-Performance Building Adoption Task Group. Many additional such programs are outlined by the American Council for an Energy Efficiency Economy (ACEEE) at:

- <http://database.aceee.org/state/public-building-requirements>
- <http://database.aceee.org/state/energy-savings-performance>

1. California

Programs & Resources

- [State of California Green Buildings](#)
- Governor's [Executive Order B-18-12](#) and the [Green Building Action Plan](#) require all state agencies to achieve targets and timelines for energy use reductions established in EO B-8-12 and the Green Building Action Plan for buildings they design, build, manage or lease (see [Management Memo](#), May 13, 2015).

Goals

- All new State buildings and major renovations beginning design after 2025 are to be constructed as Zero Net Energy facilities with an interim target for 50% of new facilities beginning design after 2020 to be Zero Net Energy. State agencies shall also take measures toward achieving Zero Net Energy for 50% of the square footage of existing state-owned building area by 2025.
- Any proposed new or major renovation of State buildings larger than 10,000 square feet will use clean, on-site power generation, such as solar photovoltaic, solar thermal and wind power generation, and clean back-up power supplies, if economically feasible.

Building Type Focus

- New Buildings and Renovations
- Existing Buildings
- Building Leases

Financial Strategies

- State agencies participate in "demand response" programs to obtain financial benefits for reducing peak electrical loads when called upon, to the maximum extent that is cost-effective for each State-owned or leased facility and does not materially adversely affect agency operations
- Current sources of alternative financing include:

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- Energy service companies (ESCOs)
- On-bill financing
- GS-\$Mart
- Power purchase agreements (PPAs)
- Energy Efficient State Property Revolving Fund
 - Report for the California Energy Commission on the [Evaluation of the Energy Efficient State Property Revolving Loan Fund Program](#)

Best Practices and Processes

- DGS defines ZNE policies in management memos, which determine ZNE energy efficiency targets for existing buildings and include tools and resources
- DGS developed policies and guidelines for the operation and maintenance of State buildings to achieve operating efficiency improvements and water and resource conservation, and continually updates and incorporates these into the State Administrative Manual
- State agencies measure, monitor, report, and oversee progress on measures in EO B-18-12

2. City and County of San Francisco

Programs & Resources

- [SF Environment Green Building Resources](#)
 - Municipal Green Building Task Force
 - Advises SF Environment on matters of policy and reviews municipal projects in design and construction to ensure compliance with San Francisco Environment Code Chapter 7 (LEED Gold certification).
 - The Task Force enables communication about green building issues across City Departments and project teams, and provides an educational forum to increase knowledge and share project related successes and lessons learned.
 - [Environment Code Chapter 7 & San Francisco Green Building Code](#)

Building Type Focus

- In city-owned facilities and leaseholds, new construction and major alterations of 5,000 square feet or more are required under San Francisco Environment Code Chapter 7 to obtain LEED Gold certification from GBCI. Various additional requirements stricter than the San Francisco Green Building Code (2013) apply as well.

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Financial Strategies

- [GreenFinanceSF: Commercial PACE program](#)
- [Other Financing](#)
 - Energy Service Agreements
 - “On bill” financing

Best Practices and Processes

- [Green Building Technical Assistance](#)
 - LEED Accredited Staff (City-wide)
 - San Francisco Public Utilities Commission (SFPUC) Design Review, including Energy Efficiency, Renewable Energy, and Water Conservation Design Review

3. Colorado

Programs & Resources

- [Executive Order D 2015-013](#), signed October 28, 2015, established one and five year goals for efficient and sustainable government operations
- The EO establishes the [Greening Government Leadership Council](#)
- The Colorado Energy Office (CEO) Energy Performance Contracting (EPC) Program uses a comprehensive approach to energy efficiency upgrades

Financial Strategies

- Colorado Energy Office [Energy Performance Contracting Standards](#) for State agencies, institutions of higher education or local governments
 - Since Colorado established its [Energy Performance Contracting Program \(EPC\)](#) in the mid-1990s, 143 public jurisdictions have worked with an energy services company (ESCO) to identify \$29 million in annual utility savings through a technical energy audit. Because each technical energy audit is high-quality, “investment-grade,” those guaranteed utility savings have been leveraged to attract \$447 million in capital construction funds. As of June 2014, 182 active and completed projects have improved the performance of public school and university buildings, veterans facilities, libraries, parks, community centers, wastewater treatment plants, prisons and other government buildings in communities across 75% of Colorado’s counties.
- All agencies and department shall include in their capital construction of capital renewal request for new construction and substantial renovations:
 - Funding necessary to meet the State’s High-Performance Certification Program

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- Analysis of on-site renewable energy generation or the purchase of renewable clean energy

Best Practices and Processes

- All agencies must document plans to meet utility data reporting requirements through a national recognized building certification program or other Office of the State Architect (OSA) accepted procedure
- From [Colorado EPC: Designed for Success](#)
 - The program includes an ongoing partnership between the Colorado Energy Office (CEO), Office of the State Architect, Office of the Attorney General, Colorado Chapter of the Energy Services Coalition (ESC) and CEO's program consultant that produces and updates standardized, state-approved contracts and processes. These include ESCO selection guidance (when a bid process is required), the technical energy audit contract, the energy performance contract, the financing bid package, and the measurement and verification protocol. Each document incorporates statutory and regulatory requirements, industry standards, and program standards for success.

4. Denver

Programs & Resources

- Denver [Energy Performance Contract](#)
 - Denver's EPC includes 88 energy efficiency improvements to 14 of the city's most energy intensive buildings, including four recreation centers, four libraries, three fire stations, and the 911 Call Center.
 - Improvements aim to create energy savings averaging 17 percent for all 14 buildings, with four of the buildings expected to cut their energy use by over 30 percent.
 - City expects to save over \$2.4 million in the first 15 years and realize savings within the first year
- [2020 Government Operations Sustainability Goals](#)
 - [2016 Progress Report](#)

5. Hawaii

Programs & Resources

- Hawaii Revised Statute 196-30 requires energy efficiency retrofitting through performance contracting. Hawaii provides a manual that outlines and standardizes how to engage in an ESPC and outlines a list of prequalified ESCOs for state projects. The Energy Services Coalition reports that Hawaii spends more on energy performance contracting per capita than any other state.

Financial Strategies

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- Department of Business, Economic Development, and Tourism houses the ESPC program
- Last year, [Hawaii awarded the single largest ESPC](#) in the United States to date, a \$158 million contract to retrofit 12 of the state's airports, with 49% annual energy savings expected
- Hawaii partnered with DOE's Better Buildings [ESPC Accelerator](#), which catalyzed public-sector energy efficiency investments of more than \$2 billion and left a legacy of valuable tools and resources behind

6. Illinois and City of Chicago

Programs & Resources

- [Illinois' Green Buildings Act](#) (20 ILCS 3130) requires that all new state-funded construction or major renovation of buildings seek LEED, Green Globes, or similar green building certification.
- [Retrofit Chicago](#): Chicago's cross-sector effort to drive energy efficiency in municipal, commercial, and residential buildings across the city, saving money, reducing carbon emissions, and creating jobs
 - [Retrofit Chicago Summary August 2014](#)
 - [Municipal Buildings Retrofit Initiative](#)

Retrofit Chicago Goals

- [Retrofit Chicago Energy Challenge](#):
 - Reduce energy use by at least 20% within five years of joining the program
 - Track and share energy efficiency progress through ENERGY STAR Portfolio Manager

Building Type Focus

- 60 municipal buildings are being retrofit through Retrofit 1, including:
 - Libraries, police stations, and community centers
 - Unique city properties such as City Hall, the 911 center, the Fire Training Academy and the Cultural Center
 - Impact (upon completion): ~\$1.4 million in savings, 18% energy reduction

Municipal Financial Strategies

- In 2012, the Chicago City Council passed an ordinance to create the [Chicago Infrastructure Trust](#), an innovative way to leverage private investment for transformative infrastructure projects

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- By aggregating energy efficiency projects across the City and its sister agencies and tapping into private investment, the Trust accelerates retrofit projects that would otherwise not have been possible.
- The Trust provides advantaged financing, enabling each project to customize a financing structure using taxable or tax-exempt, equity investment and other forms of support.
- The Trust, on behalf of the Department of Fleet and Facility Management, secured off-book, off-credit financing of \$12.8 million to retrofit 60 buildings covering 4.9 million square feet.
- [Energy Services Agreement Structure](#)

Best Practices and Processes

- [Retrofit Chicago Engineer Roundtables](#) provide critical peer-to-peer learning opportunities

7. Massachusetts

Programs & Resources

- [Leading by Example \(LBE\) Program](#)
 - Created by [Executive Order No. 484](#) in April 2007
 - Sets aggressive targets for facilities owned and operated by the Commonwealth of Massachusetts regarding greenhouse gas emission reductions, energy conservation and efficiency, renewable energy, green buildings, and water conservation
 - Includes collaboration with [DCAMM](#) and other state construction agencies, which have designed and constructed dozens of LEED certified buildings
 - Supports zero net energy buildings (ZNEBs), with two buildings built to this standard and several others at various stages of design and construction
 - Provides technical assistance tracking energy projects and building performance for LEED buildings, ZNEBs, and other targeted buildings
- [Accelerated Energy Program](#)
 - Launched in December 2011 to accelerate the implementation of energy and water projects across the Commonwealth and help meet the goals of Executive Order 484
 - AEP Phase I was a three-year initiative from January 2012 through December 31, 2015
 - AEP 2.0, the second phase of the program, was started in January 2015

Building Type Focus

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- DCAMM initiated work at 700 sites during Phase I of the AEP
- Project sites include a variety of government buildings such as courthouses, armories, state park facilities, university and college facilities, and pools

Financial Strategies

- AEP projects are funded by a combination of Clean Energy Investment Program (CEIP) (“off cap”) Bonds, G.O. Bonds, utility incentives and other funding sources
- The Division of Capital Asset Management and Maintenance (DCAMM) created an innovative contracting solution with utilities to retrofit hundreds of small and occasional use sites across the Commonwealth (direct contracting with utility-approved vendors)

Best Practices and Processes

- DCAMM published the AEP Plan Outline in November 2011, which identified three key elements:
 - People: Strategic utilization of resources and regular, substantive communication between all stakeholders.
 - Process: Identification of high potential improvement areas and development of an alternative procurement plan.
 - Tracking & reporting: Improved and standardized metrics for tracking and for strategic reporting to various audiences.
- In 2013, DCAMM released a Simple Fix Toolkit that included all required documents for implementing vendor utility projects
- AEP established a centralized quality management team and hired a resident engineer to ensure utility vendor projects were executed in a consistent manner with regard to quality and cost effectiveness across all sites by various vendors
- The AEP team partnered with DOER and the Operational Services Division to develop a process for vetting, evaluating, piloting and procuring innovative, clean energy technologies

8. New York

Programs & Resources

- Executive Order (EO) 88, issued December 28, 2012, mandates a 20 percent improvement in the energy efficiency performance of state government buildings by April 2020
- [Guidelines](#) for implementing EO88 under the program [BuildSmart NY](#)
- The New York Power Authority (NYPA) has been offering its [Energy Services Program](#) for 25 years

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Building Type Focus

- New York State governmental entities, municipalities, school districts, public housing authorities, wastewater treatment plants, prisons, hospitals, museums, zoos, and public colleges are all continuing participants in the NYPA program
- In 2014, NYPA initiated approximately \$240 million in energy efficiency projects across over 260 public buildings statewide

Financial Strategies

- [NYPA Energy Project Financing](#): NYPA can provide low-cost financing for energy efficiency and other energy projects for any public entity in the state of NY, not-for-profit colleges and universities, and recipients of NYPA's economic development-related power, including ReCharge NY companies
- Between 1987 and 2015, NYPA financed and invested over \$2 billion across 3,900 state facilities

Best Practices and Processes

- NYPA provides services that include developing feasibility studies, engineering design, life-cycle cost analyses, procuring equipment, contractor labor, hazardous waste disposal, managing projects/construction and financing projects

9. Oregon

Programs & Resources

- The [State Energy Efficiency Design Program \(SEED\)](#)
 - Requires that all state facilities constructed on or after June 30, 2001 exceed the energy conservation provisions of the Oregon State Building Code by at least 20 percent
 - All public buildings are required to invest 1.5 percent of project cost in solar PV or approved green energy technology. In 2013, the Governor's 10-Year Energy Action Plan set an additional target of 20 percent reduction by 2023

10. Washington

Programs & Resources

- Since 2005, the Washington State High-Performance Public Building Law, [RCW 39.35D](#) has directed the [Department of Enterprise Services \(DES\)](#) to [report](#) on the benefits and challenges of high-performance designs
- [Washington State Executive Order 12-06](#) established new targets for energy savings in state buildings. State agencies are required to achieve a 20% reduction in building energy use by 2020, compared to their 2009 energy consumption.

Building Type Focus

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- Universities, colleges and state agencies construction projects, both new and existing facilities

Financial Strategies

- Major facility projects are funded in the state capital budget or projects paid for through state financing contracts
- The Washington State DES administers an extensive energy performance contracting program, which is available to state agencies, colleges, universities, cities and towns, counties, school districts, hospital districts, library districts, port districts and other local governments
 - Since the program was started in 1986, the program has completed more than \$350 million in public facility efficiency projects, received \$442 million in utility rebates and now saves \$22 million in annual energy costs
 - In the last 5 years alone, the program has implemented \$288 million in public building energy efficiency upgrades
- Projects can be financed using:
 - Tax-exempt municipal leases
 - [Utility grants and/or rebates](#)
 - State Treasurer's [Local Option Capital Asset Lending Program](#)
 - Capital budgets
 - A combination of sources

Best Practices and Processes

- The use of performance-based contracting and performance expectations have become standard practice in contracting for design and construction of state facilities
- Planning early in the pre-design phase to establish the sustainability goals and LEED tracking early in the pre-design process
- Planning for a greater investment in heating, ventilating and air-conditioning (HVAC) systems

11. Seattle

Programs & Resources

- Seattle's [Office of Sustainability and Environment](#) maintains information on the implementation of the [Seattle Buildings and Sites Policy](#), effective August 19, 2011, which builds on the city's previous green building policy adopted in 2000

Building Type Focus

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- All City departments and offices, and their contractors, responsible for planning, financing, designing, developing, constructing, occupying, or managing buildings and sites shall meet the requirements of the Seattle Buildings and Sites Policy
- All non-City entities receiving more than 50% of their total funding for building construction, additions, renovations, and tenant improvements from the City of Seattle shall meet the requirements of this policy or an alternative standard approved by the Sustainable Buildings and Sites Steering Committee

Financial Strategies

- Life Cycle Cost: the total cost of ownership over the life of an asset. Life cycle cost assessment often utilizes the concept of net present value where the incremental costs and the associated savings are calculated over the life of the asset and identified as the current financial cost or savings. The [King County Life Cycle Cost Analysis \(LCCA\) Guide](#) provides additional information.

Best Practices and Processes

- The [Mayor's recommendations](#) on the Sustainable Buildings and Sites Policy include the establishment of a Sustainable Buildings and Sites Steering Committee and annual reporting
 - The steering committee would monitor participation, act as a venue for sharing best practices, identify and assist in developing training and tools needed by project managers and provide ongoing evaluation of the policy
 - Evaluation of the policy requires that adequate data is available to properly evaluate the effectiveness of the policy, identify environmental benefits, and understand costs and savings associated with the policy

12. Northeast Energy Efficiency Partnerships (NEEP)

- [High-Performance Public Buildings](#)
 - One of six Regional Energy Efficiency Organizations (REEOs) funded in-part by U.S. DOE to support state and local efficiency policies and programs
 - NEEP has produced various resources in support of energy efficiency in the public sector, including the Guide to Greening the Public Sector and [Operation and Maintenance Guide for Schools and Public Buildings](#)
 - Public sector entities can engage their utilities and seek streamlined data access options that would facilitate automated upload to Portfolio Manager, or other energy management suites

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Appendix II: Additional Resources

1. Green Business Certification Inc. (2017). *Investor Confidence Project*.
 - a. The Investor Confidence Project (part of GBCI) was developed to standardize the process of evaluating the quality of building retrofits as investments. (<http://www.eepformance.org/>)
 - i. “ICP reduces transaction costs by assembling existing standards and practices into a consistent and transparent process that promotes efficient markets by increasing confidence in energy efficiency as a demand-side resource.”
2. Oak Ridge National Laboratory. (2017). *Annex 61 Business and Technical Concepts for Deep Energy Retrofits of Public Buildings*. (<http://iea-annex61.org/>).

“Objectives:

 - a. To provide a framework along with selected tools and guidelines to significantly reduce energy use (by more than 50%) in *public buildings undergoing major renovation*
 - b. To gather and, in some cases, research, develop, and demonstrate *innovative and highly effective bundled packages of Energy Conservation Measures* for selected building types and climatic conditions
 - c. To develop and demonstrate *innovative, highly resource-efficient business models for retrofitting buildings* using appropriate combinations of public and private funding.”
3. Rocky Mountain Institute. (2017). *Deep Retrofit Tools and Resources*. (<https://rmi.org/our-work/buildings/pathways-to-zero/deep-retrofit-tools-resources/>).
 - a. “To support the industry’s continued progress forward, RMI has developed a list of useful tools available, both those developed by RMI, and ones publicly available.”