U.S. General Services Administration FY 2013 Climate Change Adaptation Action Plan

June 2012

EXECUTIVE SUMMARY

The U.S. General Services Administration (GSA) understands that potential climate changes could affect our ability to fulfill the agency's mission, operate our facilities, provide products and services, and meet policy and program objectives. As part of the Federal Climate Change Adaptation Strategy, GSA is committed to securing the Federal property investment, which is critical infrastructure supporting the delivery of all government services to the public.

GSA's adaptive capacity is currently defined by its ability to organizationally include climate factors into its management processes. The intent is to make the agency robust and to operationalize adaptation into existing processes, not to institutionalize. By implementing the actions described in this Climate Change Adaptation Plan, GSA will enhance its capacity by laying essential groundwork to incorporate climate change adaptation planning into the agency's strategic approach to enterprise risk management. The results of the planned activities will position GSA to provide customer agencies with innovative, expert solutions to the myriad of challenges posed by climate change adaptation in a dynamic policy and fiscal environment. GSA's national service lines, the Public Buildings Service and the Federal Acquisition Service, offer a unique network to facilitate not only an integrated national strategy for climate change adaptation planning, but also to coordinate the Federal effort with state, local, and regional officials. This network, combined with the lessons and data gained from the fiscal year 2012 (FY12) priority actions and future planned actions, will be invaluable to GSA's success in building a robust capacity to manage risk from climate change. Because it is not possible to predict the precise occurrence of future risks (to foresee highly improbable "black swan" events), positioning GSA with robust, resilient capacity is imperative to successfully manage risks from climate change.

As part of GSA's commitment and responsibilities under Executive Order (EO) 13514; *Federal Leadership in Environmental, Energy, and Economic Performance*,[1] we have taken the following climate change adaptation planning steps:

- Designated the Director of the Office of Federal High Performance Green Buildings as the senior official responsible for agency adaptation planning actions (April 2011).
- Issued a climate change adaptation policy statement (June 2011).
- Completed a final high-level vulnerability assessment (August 2011).
- Issued an instructional letter outlining GSA's priority climate change adaptation actions for 2012 (September 2011).
- Completed the FY12 priority actions (September 2012).
- Issued this *Climate Change Adaptation Plan* (June 2012).

This *Climate Change Adaptation Action Plan* (plan) summarizes GSA's approach, accomplishments, plans, and coordination activities to evaluate the agency's climate change risks and vulnerabilities to manage both the short and long term effects of climate change on the agency's mission and operations.

[1] The White House, "Executive Order 13514," *Federal Energy Management Program*, http://www.whitehouse.gov/assets/documents/2009fedleader_eo_rel.pdf.

GSA will take five actions in FY13 to better understand and address the risks and opportunities brought on by climate change:

1. *Tune business processes*. GSA will integrate baseline due diligence of climate factors into four business process and guidance documents: (1) the agency performance management process (PMP), (2) the feasibility study statement of work, (3) agency risk management documents, and (4) the Capital Investment and Leasing Plan Call at the appropriate time potentially,for the FY 15 Call. We will focus on differentiating acute from chronic conditions to inform real property and supply chain structure investments.
2. *Begin demand planning*. [2] To prepare for initial interface with customers, GSA will deliver two additional climate literacy training sessions to the Federal Acquisition Service and Public Buildings Service National Account Manager (NAM) workforce[3] and will provide technical support to specific NAMs as determined by customer demand. In addition, we will expand FY12 Client Portfolio Planning efforts with the Department of Commerce to identify mission-critical sites leased from GSA and characterize the risk of climate on mission-critical systems and assets.
3. *Repeat and expand regional pilots*. Regions 6 and 11 will repeat and expand the FY12 pilots with actual customers, focusing on mission-critical sites and their supply chains.
4. *Define demand and supply for an integrated service offering*. GSA will co-develop with other federal agencies a Request for Information (RFI) for climate adaptation assistance based on climate risk management, applied climate science, risk communication, and coordination of public and multiagency climate risk activities. Based on federal demand for climate science services, as determined through a series of questions in the FY12 Strategic Sustainability Performance Plan (SSPP), this RFI will help gather information that could streamline the contract process, speed service delivery, and assure quality for the federal community seeking services in this emergent market.
5. *Establish an infrastructure for decision support*. GSA will continue to reach out to other agencies and industry, translate findings from outreach activities to programs, and develop process-based metrics.

A summary of GSA's current understanding of the challenges and opportunities posed by climate change to GSA's mission, program and operations, which is based on GSA's vulnerability assessment, is provided in Appendix A.

This action plan is a living document and will be reviewed annually and updated as needed. GSA's Climate Adaptation and Resiliency Team (Adaptation Team) and senior leadership will review and update the plan in coordination with the SSPP Team. GSA will post a copy of this action plan on InSite (the employee intranet) and make it available to the public as directed by the White House Council on Environmental Quality (CEQ) and the Office of Management and Budget (OMB).

[2] Customer demand planning is a process that allows GSA account representatives and customers to identify needs in advance to ensure GSA is meeting federal agency needs with the most appropriate offerings.

[3] Training and support will also be provided to the FAS Customer Service Directors who plan with customers worldwide.

INTRODUCTION

The many sources that explain climate change cite two fundamental responses to address the issue: mitigation and adaptation. Mitigation, or "turning down the dials," utilizes quantitative baselines and management actions to reduce greenhouse gas (GHG) emissions. Part of the U.S. General Services Administration (GSA) mitigation strategy, for example, focuses on making federal buildings more energy-efficient and procuring energy-efficient products (e.g. ENERGY STAR qualified) as methods to reduce energy consumption, and therefore reduce GHG emissions.

This action plan, however, focuses on "climate change adaptation," a distinctly different concept. The Interagency Climate Change Adaptation Task Force defines adaptation as "adjustment in natural or human systems to a new or changing environment that exploits beneficial opportunities or moderates negative effects."[4] Climate change adaptation is a qualitative, iterative process that addresses risk vulnerability, adaptive capacity, and resiliency.[5] It involves not only coping with immediate problems more efficiently, but also establishing and maintaining a reserve sufficient to cope with multiple stressors in anticipation of future changes. In essence, climate change adaptation requires building a robust capacity to manage risk. As explained by the United Nations Development Program (UNDP), "Adaptation is a process by which individuals, communities and countries seek to cope with the consequences of climate change. The process of adaptation is not new; the idea of incorporating future climate risk into policy making is."[6]

GSA owns or leases 9,624 assets, maintains an inventory of more than 370.2 million square feet of workspace for 1.1 million federal employees, preserves more than 481 historic properties, and procures more than $60 billion in products and services for the federal government. Although predicting the precise occurrence of future risks ("black swan" events) is impossible,[7] potential changes could affect GSA's ability to fulfill our mission, operate our facilities, provide products and services, and meet policy and program objectives. GSA needs the robust, resilient capacity to manage climate change risks and secure the federal real property and supply chain investment, particularly during this era of heightened environmental and fiscal challenges.

Approach—Incremental, Iterative, Integrated

GSA is taking an incremental, iterative, and integrated (I^3) approach to adapting by building capacity through climate literacy and organizational learning into our business model. The intent is to make the

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[4] CEQ, *Progress Report of the Interagency Climate Change Adaptation Task Force: Recommended Actions in Support of a National Climate Change Adaptation Strategy*, October 5, 2010.

[5] National Research Council, *America's Climate Choices*, 2011, www.nap.edu/catalog.php?record_id=12781.

[6] Ian Burton, Bo Lim, Erika Spanger-Siegfried, Elizabeth L. Malone, and Saleemul Huq; Bo Lim and Erika Spanger-Siegfried (eds.), *Adaptation Policy Frameworks for Climate Change: Developing Strategies, Policies and Measures*, Cambridge University Press, 2005.

[7] Nassim Nicholas Taleb, *The Black Swan: The Impact of the Highly Improbable* (Random House: 2007), ISBN 978-1-4000-6351-2.

agency robust and to operationalize adaptation immediately into existing processes, not to institutionalize. Working within an enterprise risk management framework that considers all the risks and opportunities of incremental climate change and variability, we are piloting tailored organizational adaptation and collaboration methods; sharing lessons learned inside and outside GSA; fostering an internal community of practice (COP) that has moved from familiarity to understanding; and refining our adaptation based on experience.

Background

GSA issued this action plan pursuant to Section 8(i) of Executive Order (EO) 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*,[8] and subsequent White House Council on Environmental Quality (CEQ) implementing instructions.[9] This document describes GSA's climate change adaptation approach, accomplishments, planned actions, and coordination activities developed from our evaluation of climate change risks and specific vulnerabilities we must overcome to ensure mission and operational delivery in the short and long term.

Policy Framework for Climate Change Adaptation

In April 2011, GSA designated the Director of the Office of Federal High Performance Green Buildings as the senior official responsible for agency adaptation planning actions. In June 2011, GSA issued a climate change adaptation policy statement, which established an agency-wide directive to integrate climate change adaptation planning and actions into our decision-making processes, programs, policies, and operations. The policy statement also assigned responsibility for implementing the climate change adaptation planning requirements contained in EO 13514. No significant changes to this policy or the designated senior official for agency adaptation planning have been necessitated by subsequent analysis or planning since the policy was issued. GSA's FY11 Climate Change Adaptation Policy Statement is accessible to the public at www.gsa.gov/graphics/admin/200027_Final.pdf

In September 2011, GSA issued an agency instructional letter (ADM IL-11-1 Climate Change Adaptation Planning Actions for FY 2012) outlining priority climate change adaptation actions for FY12 (see Programmatic Efforts) (insite.gsa.gov/portal/content/521942).

FY12 Programmatic Efforts

FY2012 Adaptation Accomplishments

In September 2011, GSA issued an instructional letter describing our five priority climate change adaptation actions for 2012. The following subsections describe our progress on these actions.

[8] See Note 1.

[9] CEQ, *Federal Agency Climate Change Adaptation Planning: Implementing Instructions*, March 4, 2011, www.whitehouse.gov/sites/default/files/microsites/ceq/adaptation_final_implementing_instructions_3_3.pdf.

1. *Pilot adaptation-focused CPP effort.* As part of the CPP effort, GSA piloted a process to explain the facility risks associated with climate change and map one customer agency's organizational approach to climate change adaptation. GSA partnered with the U.S. Department of Commerce (DOC), building on its existing relationship in the Federal Adaptation Sites and Facilities Community of Practice (COP). GSA worked with DOC to develop criteria for assessing the criticality of facilities to its mission, assessing its vulnerability to climate change risks over time.

   Commerce analyzed the risk to its National Oceanic and Atmospheric Administration (NOAA) owned mission-critical sites. From this analysis and customer partnering, GSA identified the need to imbed climate factors into our business processes (see FY13 Actions 1 and 4). In addition, the Public Buildings Service (PBS) and Federal Acquisition Service (FAS) NAMs received initial climate literacy training tailored to their work, with an emphasis on demand planning.

2. *Identify sources of supply.* To accurately assess increased demand that may result from climate change, GSA sought to identify customer agencies that named us as a source of supply and acquisition services in their climate change adaptation plans. We want to engage those agencies at a strategic level to address the needs identified in their plans. However, few agencies have formally released their climate change adaptation plans at the time this plan was written. GSA will review them once they are publicly available. In the interim, we engaged agencies participating in the various adaptation work groups (see Coordination and Collaboration), discussed their adaptation challenges, and asked how we can support them. To this end, we co-chaired the Facilities Adaptation Subgroup to define ways PBS can support its customer agencies. GSA also began discussions with CEQ, National Aeronautics and Space Administration (NASA), and the United States Global Change Research Program (USGCRP) regarding the potential need for adaptation science services that could be offered through an FAS contract vehicle.

   While awaiting the release of agency climate change adaptation plans, we reviewed agencies' Strategic Sustainability Performance Plans (SSPPs) to identify those that named GSA as a source of supply and acquisition services for climate change adaptation activities. Only one agency, the United States Postal Service, identified GSA as a part of its adaptation strategies, noting an opportunity to "share long-term facility and network planning with Department of Transportation (DOT) and GSA for efficient planning of facilities and transportation management."[10]

   To prepare for future discussions with federal customers that identify GSA as a source of supply and acquisition services in their adaptation plans, we briefed the FAS NAMs on climate adaptation, including why it is important to GSA and our customer agencies.

3. *Plan and conduct awareness training.* GSA launched an awareness-raising program targeted at our employees and those of other agencies, with the goal of strengthening our capacity and that of our client agencies to meet the climate change challenges we all will face. GSA has raised awareness

[10] United States Postal Service, *FY 2011 Strategic Sustainability Performance Plan*, p. 82, about.usps.com/what-we-are-doing/green/sspp/2011/usps_fy2011_sspp.pdf.

through numerous activities internally and throughout the federal government, including the following:

- Briefed the GSA budget planning community on the metrics and progress of the FY12 climate change adaptation actions.
- Briefed FAS and PBS NAMs.
- Held threshing sessions (discussed below).
- Participated in federal adaptation COPs (discussed below).
- Presented on climate adaptation efforts during various meetings, including those for the FAS Program Analysis Division staff, FAS Office of Customer Accounts and Research NAMs, FAS Commissioner's staff, Office of General Supplies and Services' Green Team, Environmental Sustainability Theme Team, Agency Administrator briefing (including agency senior leadership), and PBS Sustainability Governance Board.
- Held an initial climate literacy concept and objective training session for Regions 1 and 7.
- Held a threshing session focused on concepts of resiliency and security with the architectural service provider community at the 2012 Convention of the American Institute of Architects.
- Presented at GreenGov with the Department of Homeland Security (DHS) and Department of Defense (DoD) regarding national security and climate change adaptation.
- Presented a federal sites and facilities white paper at the Interagency Forum on Climate Change Impacts and Adaptation.

4. *Conduct adaptation scenario-planning exercise with two regions.* In February 2012, GSA launched two pilots in Regions 6 and 11 to execute scenario-planning exercises with regional stakeholders, with climate analysis assistance from USGCRP. The GSA Adaptation Team coordinated the two pilots. Each half-day "threshing session" was preceded by two climate literacy concept and objective sessions with Regions 6 and 11. GSA and USGCRP agreed to use these sessions as pilots to integrate climate science into adaptation planning. Session goals were to (1) develop the capacity in the two regions for anticipatory planning and strategy development to determine climate protection levels for assets and integrated customer offerings between PBS and FAS, and (2) provide USGCRP with insights to GSA science information and format needs.

   USGCRP helped with climate analysis in several ways. The National Climate Assessment regional maps allowed GSA to broadly assess our vulnerabilities across the country and focus the threshing sessions on potential futures. For example, the Region 11 session focused on sea-level rise and extreme temperatures, while Region 6 focused on extreme precipitation and extreme temperatures. This climate projection information helped the session participants translate climate science into impacts on infrastructure, real property, occupants, and product and service offerings.

   In addition to the assessment maps and data, USGCRP connected GSA with key federal climate adaptation stakeholders—including scientists from the National Climate Assessment and Regional Integrated Sciences and various experts at NOAA—who helped GSA scope the threshing sessions. USGCRP's efforts guided GSA in refining the sessions to address the core adaptation questions in relationship to our mission. USGCRP and GSA plan to continue their collaboration in the future as we expand our efforts to additional regions and continue our current work.

These pilots furnished valuable data and experience in comprehensive climate adaptation planning and actually started adaptation. Through the pilot approach to facility risk planning, GSA better understands (1) the internal work needed before reaching out to customers and local, state, and regional stakeholders; (2) the science and services needed to manage the impacts of climate change; and (3) the need to define qualitative indicators to include in agency planning processes. The lessons learned in the pilots made science more actionable for GSA, and the pilot findings will be promulgated to all GSA regions.

5. *Conduct outreach to industry and scientific institutions to anticipate the future needs of the real property inventory and supply chain.* GSA reached out to and researched the insurance, accounting, and actuary communities connected to real estate and supply chains. Across the board, these organizations—from the United Nations Environmental Program Financial Initiatives Global Roundtable to entities in U.S. corporate real estate and those working on building codes and standards—are carefully considering the upward trending costs and frequency of extreme events. Interestingly, the costs of incremental climate change and variability (e.g. persistent drought, insect infestation, human health impacts, etc.) are not readily available, perhaps due to the short time frames the investment community addresses and the adoption gap of a robust methodology for the valuation of externalities.

   This is a challenge for GSA because the development of accounting standards and insurance or valuation methods are not a part of our core mission. GSA, and the federal government as a whole, needs information on how to monetize costs avoided by investing up-front in risk management to avoid the large costs of a risk's negative effect. For example, because the federal government self-insures, setting a value on the avoided costs of ensuring mission continuity and securing federal investments in a changing climate is difficult. Gathering such information is critical to measure the long-term benefits of mainstreaming climate change adaptation to GSA and the nation by reducing risk to life and property, enhancing economic vitality, promoting environmental and infrastructure sustainability, and reducing vulnerability to dynamic processes.[11] GSA has informed CEQ and the U.S. Government Accountability Office (GAO) that an open-source risk model and approach to monetizing the cost and payoff of risk management is needed.

   In addition, GSA has developed strong partnerships with various science agencies and academic institutions to convey the science needs and format of information to make science actionable. This work also highlighted the need for science on the impacts of climate change to demographics, so that GSA can better understand where the federal workforce and customers will be located in the future. As part of the USGCRP Adaptation Science Workgroup, GSA can directly convey science needs (see Appendix B).

[11] U.S. Army Corps of Engineers, *Climate Change Adaptation Plan and Report*, 2011.

Other FY12 Accomplishments

In addition to our accomplishments related to priority actions, GSA accomplished the following climate change adaptation actions:

- *Integrated adaptation into the agency Environmental Impact Assessment (EIA) process*. To assess GSA-specific climate change risks and opportunities over time, and take appropriate adaptation actions, we added climate risk assessment questions to our agency EIA template. All GSA business lines perform EIAs as part of the performance management process. Historically, the template covered only mitigation impacts, such as GHG reductions and other federal sustainability requirements. GSA added the following adaptation-related impact assessment questions in early 2012:
    - Are you aware of climate-related risks that can impact your business activities?
    - Have you identified and assessed climate-related risks to your business activities?
    - Are you implementing risk management strategies related to your climate risks and/or monitoring the risks?

  As adaptation awareness increases over time through employee training, we will add more advanced adaptation questions, such as those on the direct and indirect effects of climate change by business line, to the EIA.

- GSA included climate adaptation considerations in our strategic plan. During the OMB review process, the draft text was removed for reasons unclear at the time of this report. GSA will continue to address this challenge moving forward in FY13.

- *Incorporated adaptation considerations into Statements of Work (SOWs).* To integrate climate change adaptation into appropriate policies, programs, and operations over time, climate change adaptation planning has been factored into several PBS SOWs currently in the agency issuance process.

- *Provided sites and facilities assistance request language for agency adaptation plans.* In March 2012, GSA submitted suggested language to the Facilities Adaptation Subgroup (in the Climate Change Adaptation COP) to be used by other federal agencies in their climate adaptation plans to identify the need for GSA assistance with their sites and facilities. The suggested language identifies whether the agency has sites leased from GSA, whether these sites are mission critical or mission dependent, and whether they will need GSA's assistance to address site or facility vulnerabilities to incremental climate change and variability. Once climate adaptation plans are finalized, GSA will analyze this information to help better understand the scope of this need across the federal community.

Coordination and Collaboration

GSA's Adaptation Team coordinated its efforts with the GSA Budget Planning Office's efforts, including the SSPP, EIAs, and the agency Performance Management Process (PMP). The Team also contributed

climate change adaptation insights to GSA's Environmental Justice Strategy and collaborated and coordinated extensively with industry, scientific institutions, and other federal agencies to develop the necessary networks of people and systems to make science actionable in an integrated, effective way. Table 1 describes some of GSA's major coordination efforts.

Table 1. GSA Collaboration and Coordination Efforts

Agency/Organization	Collaboration/Project
Metropolitan Washington Council of Governments (MWCOG) www.mwcog.org/environment/climate/adaptation.asp	We participated in MWCOG adaptation events, including a climate impact symposium in May 2012. For threshing sessions in R11, we used portions of MWCOG's climate projection analysis of the capital region.
Climate Change Adaptation COP	We are a regular participant in the Federal Climate Change Adaptation COP, assisted in planning and hosting the first meetings of the group, and convened the first meetings of the Sites and Facilities Subgroup. We play a leadership role in this subgroup, which developed a white paper on the adaptation needs of sites and facilities.
Interagency Forum on Climate Change Impacts and Adaptation www.fedcenter.gov/programs/greenhouse/ccforum/	We are an engaged participant at this forum of industry and government. With the U.S. Department of Energy, we presented a white paper on the Sites and Facilities Subgroup's efforts.
Agency Adaptation Planning Subgroup of the Interagency Task Force on Climate Change Adaptation	We are a regular, vocal participant in this group, which focuses on developing the Climate Change Adaptation COP described above. Through relationships built within this workgroup, we have advanced adaptation methods and approaches and gained insight into customer needs.
USGCRP/NOAA	We are piloting with USGCRP and NOAA to integrate climate science into adaptation planning. (See FY12 action 4 for additional information on this important collaboration.)
USGCRP Adaptation Science Workgroup www.globalchange.gov/what-we-do/adaptation-science	We are a member of the USGCRP Adaptation Science Workgroup, which advances foundational science for adaptation decisions. As a non-science agency representative, we articulate science needs to secure investments in real property and supply chain and support mission continuity:
NASA	We have a close relationship with the NASA adaptation planning staff, a pioneer in its approach for mission-critical sites. NASA is working on the challenges of incorporating climate projections into building codes and standards, including American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) climate zones for energy modeling and building enclosure analysis. The GSA Adaptation Team participated in a recent adaptation planning session for the NASA Johnson Space Center.
Industry	We have reached out to the insurance, actuary, and real-estate industries to discuss their approaches on adaptation. In addition, we have held brainstorming sessions with the U.S. Environmental Protection Agency regarding next steps with the insurance industry, sustainable supply chain, and disclosures of climate risks in accounting standards. We have also investigated how Geographic Information Systems can assist with adaptation projects

and the effort required.

Monitoring and Evaluation

GSA understands the importance of using appropriate metrics to assess the productivity and efficiency of climate adaptation planning. Therefore, developing and implementing metrics for the climate change adaptation process is a key action for FY13 (Action 5). Federal metrics are still under discussion, so GSA's approach is based on the National Research Council discussion of metrics for the Climate Change Science Program (now named the US Global Change Research Program).[12]

With this approach as a guide, GSA plans to use qualitative, process-based metrics (which are not "outcome based" and quantitative, like most metrics) to evaluate and monitor climate adaptation planning, recognizing that our understanding of the adaptation agenda is not yet sufficient to specify outcomes. Further, climate impacts are local, and generic outcome indicators that apply to all geographic locations are not feasible. For additional information, see Appendix C Resources.

FY13 Climate Change Adaptation Actions

GSA's planned adaptation actions are flexible and designed to respond to the emergent nature of this risk management effort. The flexibility allows the agency to include the evolving science and demographics information in various time and spatial scales, adjustments in the overall federal government response, and agency leadership and process changes. Using the outcomes of the FY12 priority actions, GSA will implement the following five priority actions in FY13 to better understand and address climate change risks and opportunities:

1. *Tune business processes*. GSA will integrate baseline due diligence of climate factors into four business process and guidance documents: (1) the agency PMP, (2) the feasibility study statement of work, (3) agency risk management documents, and (4) the Capital Investment and Leasing Plan Call at the appropriate time potentially,for the FY 15 Call. We will focus on differentiating acute from chronic conditions to inform real property and supply chain structure investments.
2. *Begin demand planning*.[13] To prepare for initial interface with customers, GSA will deliver two additional climate literacy training sessions to the Federal Acquisition Service and Public Buildings Service National Account Manager (NAM) workforce[14] and will provide technical support to specific NAMs as determined by customer demand. In addition, we will expand FY12 Client Portfolio Planning efforts with the Department of Commerce to identify mission-critical sites leased from GSA and characterize the risk of climate on mission-critical systems and assets.

[12] National Research Council, *Thinking Strategically: The Appropriate Use of Metrics for the Climate Change Science Program* (Washington, DC: The National Academies Press, 2005).

[13] Customer demand planning is a process that allows GSA account representatives and customers to identify needs in advance to ensure GSA is meeting federal agency needs with the most appropriate offerings.

[14] Training and support will also be provided to the FAS Customer Service Directors who plan with customers worldwide.

3. *Repeat and expand regional pilots*. Regions 6 and 11 will repeat and expand the FY12 pilots with actual customers, focusing on mission-critical sites and their supply chains.

   Each region will continue to adapt by understanding the range of possible futures and acting to stay robust across them. The core question for every transaction is, "How will the environment affect the project, customer, asset, and business in the future?" These next pilots will make science actionable for GSA *and* our federal agency, local, state, and regional climate adaptation planning partners. In these pilots, GSA will continue to consider interacting prerequisites and variables that will influence the pilots for each real property and supply chain asset strategy by following these steps:

   - Identify the most vulnerable assets informed by the customer need and site.
   - Define the climate protection level (CPL) criteria informed by risk probability, consequence, and vulnerability.
   - Determine the value (market and operational) of providing a robust site or facility.

   These enhanced pilots may elicit a range of responses: resistance, resilience, or retreat. Resistance is mitigation, resilience is investing in preparation, and retreat is moving away from hazards (such as the coasts, riparian flood plains, or flammable forests and grasslands). GSA will ensure that stakeholders discuss, choose, and document a reasonable and prudent climate-ready response. For more information on specific regional actions, please see Appendix C.

4. *Define demand and supply for an integrated service offering*. GSA will co-develop with other federal agencies a Request for Information (RFI) for climate adaptation assistance based on climate risk management, applied climate science, risk communication, and coordination of public and multiagency climate risk activities. Based on federal demand for climate science services, as determined through a series of questions in the FY12 SSPP, this RFI will help gather information that could streamline the contract process, speed service delivery, and assure quality for the federal community seeking services in this emergent market.

5. *Establish an infrastructure for decision support.* GSA will continue to engage with federal agencies, the Climate Change Adaptation COP, the Agency Adaptation Planning Subgroup, and others to obtain information on climate science, demographic change, mission valuation, and emergent adaptation approaches. We will translate pertinent findings to support agency programs most relevant to demand planning and supporting GSA's business model and processes. We will develop process-based metrics to monitor and evaluate the implementation and success of climate adaptation actions (see Monitoring and Evaluation).

Future Climate Change Adaptation Actions

GSA is actively planning for adaptation actions and strategies beyond FY13. The FY13 Climate Change Adaptation Actions will serve as foundation upon which future actions are built. The Action Planning section of Appendix B Resource Plan outlines the expansion of the foundational FY13 actions into the

short and medium term future, through FY18. GSA will continually monitor and evaluate progress towards implementing the actions outlined in this plan and will make adjustments as necessary.

APPENDIX A. VULNERABILITY ANALYSIS

CEQ's flexible framework approach and climate change adaptation guiding principles require federal agencies to adapt to climate impacts by identifying key threats, prioritizing activities that reduce vulnerabilities, setting strategic priorities for ensuring resilience, and building preparedness capabilities.[15] GSA's Adaptation Team broadly assessed the agency's vulnerability using a method tailored to our mission.

Vulnerability Assessment Process

We assessed our vulnerability by examining FAS and PBS exposure, sensitivity, and adaptive capacity. To do so, we relied on USGCRP climate projection information.[16] This approach is consistent with the capability-level analysis approach of the Homeland Security Exercise and Evaluation Program,[17] which is currently used for extreme weather event situations.

SCOPE/RESOLUTION

Some aspects of vulnerability and adaptive capacity must be determined on a regional or site basis with a higher resolution at each facility or specific site. These tiers of resolution will require significant collaboration and coordination. GSA has partnerships with science agencies to develop the necessary networks of people and systems to make science actionable in an integrated, effective way. We are also partners with numerous federal landholding agencies working on climate change adaptation for sites and facilities. Continued partnerships with local, state, and regional adaptation planning officials will be essential.

Adapting the methods of other federal agencies, GSA developed a process to assess the nexus of climate factors and facility or site criticality. This model now needs to be implemented in actual projects and embedded into existing business processes with an emphasis on a collaborative decision-making model, fostering effective risk management by stakeholders who are vested owners in the process and results.[18]

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[15] National Research Council, *America's Climate Choices* (Washington, DC: The National Academies Press, 2010).

[16] Thomas R. Karl, Jerry M. Melillo, and Thomas C. Peterson (eds.), *Global Climate Change Impacts in the United States* (Cambridge University Press, 2009).

[17] Department of Homeland Security, *Homeland Security Exercise and Evaluation Program*, Volume III: Exercise and Improvement Planning, February 2007, hseep.dhs.gov/support/VolumeIII.pdf.

[18] T. R. Carter, R. N. Jones, X. Lu, S. Bhadwal, C. Conde, L. O. Mearns, B. C. O'Neill, M. D. A. Rounsevell, and M. B. Zurek, "New Assessment Methods and the Characterization of Future Conditions," *Climate Change 2007: Impacts, Adaptation and Vulnerability*, Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M. L. Parry, O. F. Canziani, J. P. Palutikof, P. J. van der Linden, and C. E. Hanson (eds.) (Cambridge University Press, 2007), p. 133–171.

Adaptation and Resiliency Development Team

The Team consists of a small core that interfaces with a diverse mix of agency and cross-disciplinary members who coordinate with many stakeholders, both internal and external to GSA.

GSA-Wide

Mission

The GSA mission is to use expertise to provide innovative solutions for our customers in support of their missions, and by so doing, foster an effective, sustainable, and transparent government for the American people. GSA delivers products, services, and policies to our federal customers through FAS, PBS, 12 staff offices, and the independent Office of the Inspector General and Civilian Board of Contract Appeals. GSA interacts directly with customers through 11 Regional Offices and the Central Office in Washington, DC.

As part of the federal climate change adaptation strategy, GSA is committed to securing federal property and investments, which are critical infrastructure supporting the delivery of government services to the public. Therefore, much of the priority climate risks and opportunities are within the FAS and PBS organizations, but some vulnerabilities impact the agency as a whole.

Risks and Opportunities

Health and Safety

Indoor environmental quality (IEQ) and site access are the biggest health and safety risks to the GSA workforce that occupies agency office space. All GSA regions are impacted by this risk. We have already begun to address issues with site access through the rollout of an expansive, agency-wide telework policy,[19] [20]which positions GSA as a leader in using mobility to effectively accomplish the agency goals and mission. The GSA workforce is now largely able to work from various off-site locations without disruption. Monitoring known vulnerable sites, better understanding the sources of indoor environmental contaminants, and controlling them as risks emerge are all opportunities to address IEQ issues.

Infrastructure and Support Systems

As agency workplaces become increasingly flexible and mobile, their dependency on GSA IT infrastructure, building systems and workplace strategies and design that support mobility are becoming more mission critical. For example, with GSA's own recent move to the cloud and leadership's support of telework, both data centers and (implemented) workplace strategies allow employees the ability work anyplace/anytime while effectively accomplish our goals and meet our mission. Currently, GSA has 15

[19] GSA, GSA Order, "GSA Mobility and Telework Policy," Update HCO 6040.1, www.gsa.gov/graphics/staffoffices/GSAteleworkpolicy.pdf.

20 Telework Enhancement Act of 2010 (H.R. 722) http://www.gpo.gov/fdsys/pkg/BILLS-111hr1722enr/pdf/BILLS-111hr1722enr.pdf

data centers located in regional office buildings and other locations. Through the Federal Data Center Consolidation Initiative (FDCCI), we established a goal to consolidate these 15 into three major data centers located in Chantilly, VA, Fort Worth, TX, and Kansas City, MO.[21] All three locations are particularly vulnerable in terms of the infrastructure that supports real property, such as transit, utilities (electric, gas, and telecommunications), water and wastewater, and business and commerce. All have a medium to high sensitivity in their ability to accommodate the projected climate impacts through 2100 with minimal disruption or costs. GSA has opportunities to ensure the major data centers are not in particularly vulnerable locations or the facilities are equipped to accommodate projected climate impacts with minimal consequences.

Social Resiliency

GSA will need to cultivate social resiliency as part of preparing all service lines for climate change adaptation. All people, including Federal employees, will be vulnerable to the effects of climate change. Thus, there exists a need to plan for behavioral change and adaptation among people, who are critical to securing the Federal investment while delivering service to the public. The Federal workforce will need an increased capacity to cope with and adapt to changes within workplace and building design/ operations, as well as business operations. By addressing behavioral changes, GSA's climate change adaptation planning can build and foster social resilience among the Federal workforce, thereby bolstering the critical resource of human capital.

Public Building Service

The PBS mission is to provide superior workplaces for federal customer agencies at good economies to the American taxpayer. All PBS resources are deployed in two fundamental activities. The first is project management, which translates a customer agency's space needs into discrete requirements, marshals the resources necessary to fulfill them, and manages the execution of the project, resulting in the delivery of workspace through new construction or leasing. The second is the asset management of the workspace, which includes the physical supervision of the buildings in the portfolio, fulfillment of contractual obligations to customer agencies, ensuring continuity of operations, determining prudent investment in maintaining a property, and handling disposal at the end of useful life.

PBS Climate-Ready Outcome

PBS seeks to provide robust, climate-ready workplaces for our federal customer agencies and to secure the federal real property investment.

PBS Assessment Approach

The assessment addresses existing assets in GSA's real property portfolio (owned and leased). These assets are the federal investment to be secured—real property and the customer's mission executed

[21] GSA, *Federal Data Center Consolidation Initiative: 2011 Data Center Consolidation Plan & Progress Report*, September 30, 2011, www.gsa.gov/graphics/staffoffices/dcciplan.docx.

from a mission-critical, climate-vulnerable site. Going forward, as new capital becomes available or significant reimbursable work is received from customers that need new mission-critical sites, GSA will conduct technical and feasibility studies, including climate risk factors in the pre-project formulation phase. In addition, climate risk factors should also inform decisions of any forthcoming civilian property realignment actions.

PBS Adaptive Capacity

Currently, PBS's adaptive capacity is determined by its ability to organizationally factor climate readiness into its management and business processes, on the basis of its understanding of climate projections and existing site-specific climate impacts. This capacity contributes to GSA's interagency effort to plan for climate change adaptation because climate-ready real property will be essential to ensure continuous support of all customer missions, however they may evolve to adapt to climate changes. Mission delivery is affected by federal policy, variable funding levels, increasing temperatures, changing precipitation patterns, devastating storms, and rising sea levels. In ensuring customer resiliency to climate change and other challenges, PBS will draw on analysis of many sectors and scales of infrastructure connected to real property, including transit/transportation, utilities (power, gas, electric, water, and wastewater), telecommunications, business and commerce to support operations, food, and material supply.

PBS will partner with customer agencies to determine Climate Protection Levels (CPLs) at the specific site and facility scale for mission-critical sites. CPLs are climate-based, expert-determined benchmarks achieved through the implementation of design and performance standards with the express purpose of limiting the climate change risk exposure.[22] PBS will adopt CPLs to address factors such as higher summer design temperatures (and the associated need to minimize cooling loads), lower and longer-lasting winter design temperatures, and higher flood elevations . Building operating plans, alternative workplaces, and mobility strategies must follow through to support the CPLs. In addition, contingency plans for funding resources must address building enclosure maintenance, including requirements to retune, calibrate, or repair complex building control systems.

Depending on the customer mission, GSA may need to provide buildings that maintain livable conditions in the event of extended power outages, interruptions in heating fuel, and shortages of water to ensure resilience and survivability. Widespread adoption of CPLs may require GSA to further interface with pertinent code-making bodies to develop new standards, codes, and regulations to better equip sites and facilities to adapt to extreme climate conditions, comply with rigorous storm standards (such as those required by the Miami Dade County hurricane code), and incorporate resiliency as a life-safety issue.

For mission-dependent sites where the mission will be impeded but not fail or currently non-vulnerable sites, PBS will build climate factor monitoring into existing asset management methods—building evaluation reports and physical condition surveys—at the specific site and facility scale.

[22] William Solecki, Lesley Patrick, Michael Brady, Kristen Grady, and Andrew Maroko, Appendix C, Climate Protections Levels—Incorporating Climate Change into Design and Performance Standards, May 18, 2010, DOI: 10.1111/j.1749-6632.2010.05325.x.

Federal Acquisition Service

FAS Mission

FAS's mission is to make federal agencies more effective at what they do by providing expertise, management, and optimal acquisition solutions. FAS is a key stakeholder in providing innovative acquisition solutions to federal agencies, including products and services to support the implementation of agency climate change adaptation plans. FAS recognizes that in order to accomplish its mission, find opportunities to support its customer agencies, and integrate climate risk management into its business decisions and processes, it must engage in active demand planning with its customer agencies and begin to evaluate climate risks to its business operations and within its supply chain. This is especially important because FAS is a non-mandatory source of supply for the majority of federal markets it serves. FAS operates on a fee-for-service model and recovers all of its operating costs through fees assessed on the goods and services provided to customers, so alignment with federal needs is critical in supporting its customers and sustaining the organization in the future. This poses risks (the inability to meet customer demand) and opportunities (the ability to prepare hand in hand with federal customers).

FAS, headed by a Commissioner, comprises a Deputy Commissioner, a Chief of Staff, six integrator offices, four business portfolios, and 11 regions. The business portfolios manage a set of product or service offerings, and the integrator offices provide services internally to the FAS business portfolios. Components of the business portfolios also reside in each of the 11 FAS regions. The business portfolios and integrator offices across the country are vulnerable to climate.

FAS Risks and Opportunities

Assets

GSA Global Supply

Products acquired through FAS are mostly ordered directly by customer agencies through contracted vendors. However, to meet the needs of some customers, especially DoD, GSA Global Supply has four physical walk-in stores that carry and stock 200 to 5,000 items at any given time, as well as two distribution centers that store approximately 5,000 items each. The stores operate in leased space in Elmendorf Air Force Base (AFB) in Alaska, San Francisco, California, and Honolulu and Schofield Barracks, HI. The distribution centers are located in French Camp, CA, and Burlington, NJ.

Alaska, California, Hawaii, and New Jersey are particularly vulnerable locations. Infrastructure that supports real property—such as transit, utilities (electric, gas, and telecommunications), water and wastewater, and business and commerce—all have a medium to high sensitivity in accommodating the projected climate impacts through the year 2100 with minimal disruption or costs. Global Supply has opportunities to coordinate with its building lessors to ensure the stores are not located in particularly vulnerable locations or are equipped to accommodate projected climate impacts with minimal consequences and to identify and stock products that might help its federal customers in address climate change impacts.

GSA Global Supply also supports military base supply stores in Asia, Europe, the Middle East, and the United States. In these stores, GSA manages the inventory for the customer, while base personnel oversee daily store operations.[23]

GSA Fleet

GSA Fleet leases vehicles to federal agencies located across the United States, as well as to agencies operating overseas.[24,25] While the vehicles are leased to and operated by customer agencies, GSA Fleet owns and resells them at established replacement intervals dependent on age and mileage to maintain capital to replace vehicles in the future. Vehicle assets are particularly vulnerable to extreme temperatures, extreme weather events, and flooding. Extreme heat can cause a number of operational problems, including overheating, changes in the stability of certain fuels (algae blooms in biodiesel), and increased incidents of tire failures, such as blowouts. Extreme heat and precipitation changes can also damage crops used in the formulation of biofuels like ethanol and virgin oil biodiesel, leading to an increase in fuel costs for the federal fleet. Hybrid and dedicated electric vehicles (HEVs and EVs) can suffer from poor performance in cold or hot environments. HEVs may suffer from reduced fuel efficiency, and EV battery life is shortened in extreme cold and heat, leading to reduced vehicle range. Vehicle damage and loss could also increase due to changes in the intensity, timing, and location of extreme events, such as hail and flooding. However, GSA Fleet has the opportunity to reduce these risks by coordinating closely with its customer agencies to ensure proper geographical placement of vehicles and operation and maintenance procedures.

Operations

Since it operates on a fee-for-service model and is not a mandatory source in a majority of the markets it serves, FAS must work closely with customer agencies and industry partners to ensure the appropriate products and services are available to sustain mission-critical federal operations. The Office of Customer Accounts and Research—which enables FAS's understanding of customer requirements for the range of acquisition solutions and becoming a strategic partner in helping customers select the best value solution for their needs—will be a critical source of this information. Working closely with customers provides insight to the prospective adaptation needs of the customer agencies and enables FAS to ensure these needs are met through its offerings.

Security and External Coordination

FAS has close working relationships with the Federal Emergency Management Agency (FEMA) and the Defense Logistics Agency (DLA). FAS supports FEMA's role as the designated national logistics coordinator in disaster response and recovery. DLA is FAS's partner in primary supply requisitioning under the

[23] With supply support spanning the globe, GSA Global Supply will need climate change projections for locations outside of the United States.

[24] With an inventory spanning the globe, GSA Fleet will need climate change projections for locations outside of the United States.

[25] As of May 2012, the GSA Fleet inventory consists of 204,048 vehicles in CONUS and 5,542 vehicles OCONUS.

National Supply System with assigned product responsibilities for civilian and military supply support by agreement between the Office of the Secretary of Defense and the GSA Administrator. Both FAS and DLA work closely in support of FEMA-directed disaster response and recovery activities. State and local governments, as well as the American Red Cross, have the authority to purchase items from FAS for disaster response and recovery. FAS has significant opportunities to continue close coordination with disaster response and national security organizations to ensure they are equipped with acquisition solutions that prevent, protect against, and assist in the response and recovery from climate change impacts. This could include communications support for disaster response and recovery efforts.

Economic Activities and Federal Supply Chain

FAS performs acquisition activities on behalf of the federal government, including the establishment of federal strategic sourcing initiatives, network services contracts, government-wide acquisition contracts, blanket purchase agreements, GSA multiple award schedules, and the GSA Global Supply system. As a significant source of federal supply for products and services, FAS is a key component of the federal product and service supply chain and depends on the larger global supply chain.

Generally, FAS is vulnerable to fluctuations in demand that exceed our contractors' ability to deliver in a timely manner, as well as supply chain disruptions in manufacturing, transportation, or other capacities.[26] Climate change could substantially increase these vulnerabilities, posing risks to the FAS mission, with cascading impacts to customer agencies. FAS has opportunities to address these concerns in advance of climate change impacts. They include identifying mission-critical product and service needs of customer agencies to ensure they have the products and services to meet their mission and unique adaptation goals and identification of high-risk offerings, such as products in high demand that contain materials manufactured in vulnerable locations.

THESE ARE COMPLEX ISSUES THAT CROSS GOVERNMENT AND INDUSTRY AND MUST BE INVESTIGATED AND UNDERSTOOD TO ENSURE ADAPTIVE CAPACITY IN THE FEDERAL SUPPLY CHAIN. THIS WILL REQUIRE A BETTER UNDERSTANDING OF CURRENT AND EXPECTED DEMANDS OF CUSTOMER AGENCIES AND INDUSTRY CAPACITY IN MANUFACTURING, LOGISTICS, AND OTHER COMPETENCIES CRITICAL TO ITS ABILITY TO DELIVER PRODUCTS.

[26] With supply support spanning the globe, GSA Global Supply will need climate change projections for locations outside of the United States.