



Smithsonian Institution

Strategic Sustainability Performance Plan

Office of Facilities Engineering and Operations

06/02/2010

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Section 1: Agency Policy and Strategy, the Smithsonian Institution

I. Agency Policy Statement

Founded in 1846, the Smithsonian Institution (SI) is the world's largest museum and research complex, containing 19 museums and galleries, numerous research centers and supporting facilities, and the National Zoological Park. With permanent locations in 8 states plus Washington, D.C. and Panama, the Institution is active in nearly 100 countries around the world. James Smithson established the Smithsonian Institution as "an Establishment for the increase & diffusion of knowledge..." with a sweeping public mission for learning and teaching. The Smithsonian has been, and must be, sustainable for generations to come.

The Smithsonian is a trust instrumentality of the United States¹, and although not an Executive branch of the U.S. Government, the Smithsonian is committed to the strategic objectives and goals of Executive Order 13514 that sets sustainability goals for federal agencies and focuses on making improvements in environmental, energy, and economic performance. As stated in the current Smithsonian Strategic Plan, one of the four grand challenges the Smithsonian has undertaken is "Understanding and Sustaining a Biodiverse Planet". The goals established by the Executive Order complement and underscore the Smithsonian's mission and values.

The Smithsonian is the steward of the nation's treasures in perpetuity and is much more than a collection of facilities. Through scientific research, education, and access to the visiting public, the Smithsonian is uniquely positioned to study, test, implement and educate the world on actions that will lead us into a sustainable future.

Among the successes achieved to date, are the implementation of significant investments in energy and water efficiency improvements over the last decade; more than a dozen current and planned projects committed to achieving Leadership in Energy and Environmental Design (LEED) certification; the 2009 GSA Achievement Award for Real Property Innovation in Sustainability; the debut of an online Climate Change conference in late 2009, and even the establishment of "bird friendly" coffee certification.

Sustainability challenges faced by the Smithsonian include resource intensive aspects of its unique operations, and major commitments to other Smithsonian critical priorities. Funds and personnel dedicated to improving the condition, appearance and security of Smithsonian facilities cannot be diverted without impacting essential operations. Few, if any priorities, exceed those associated with delivering the new National Museum of African American History and Culture, scheduled to open on the National Mall in November 2015.

Significant sustainability efforts for this fiscal year include our commitment to the following goals: *Leadership in Energy and Environmental Design (LEED) certification, development of a green purchasing policy, fleet management, and the establishment of a formal sustainability-dedicated organizational structure.*

To further these goals, leadership support by key Smithsonian units such as the Office of the Chief Financial Officer (OCFO) and the Office of the Chief Information Officer (OCIO) is essential to the success of our sustainability program.

Nancy Bechtol, Senior Sustainability Officer

Date

¹ Recognized as a tax-exempt organization under Section 501(c)(3) of the Internal Revenue Code

Sustainability and the Agency Mission

Sustainability is a central tenet of the Smithsonian. The Strategic Sustainability Performance Plan complements the Smithsonian's overall Strategic Plan for 2010 – 2015, ***Inspiring Generations Through Knowledge and Discovery*** and the four "Grand Challenges of the plan:"

- Unlocking the Mysteries of the Universe
- Understanding and Sustaining a Biodiverse Planet
- Valuing World Cultures
- Understanding the American Experience



Of these goals, "Understanding and Sustaining a Biodiverse Planet" and "Valuing World Cultures" relate directly to sustainability. As stated in the Strategic Plan, "While Environmental variability has resulted in major changes in biodiversity, it is the activities of man that have greatly accelerated the rate of change, threatening life on the planet...Efforts to address the loss of biodiversity raise a critical issue...in some ways, we know more about the stars in the universe than we know about the biodiversity in our own backyards, or its role in the ecosystems that supply us with clean water and a host of other environmental services." While Smithsonian researchers grapple with these issues, it is critical that Smithsonian sites, facilities, and operational units function in a sustainable and responsible manner, allowing the Smithsonian to truly lead by example. Teaching the value of diversity of human culture -- particularly American culture -- is both a traditional and an increasing SI focus, as the completion of the National Museum of the American Indian and the planning of the National Museum of African American History and Culture, will attest. Social equity -- the third foundation of the sustainable triple bottom line -- is a basic SI value.

Mission

The language of James Smithson's 1826 bequest dictates the SI mission, to be "an establishment for the increase and diffusion of knowledge..."

To support the idea of leading by example, the Smithsonian's Office of Facilities, Engineering, and Operations (OFEO), in its own strategic plan for fiscal years 2009–2013 included the goal "Sparkling Facilities: Through Impassioned Stewardship" with "Go Green" as its final objective, encompassing two actions, both underway:



- Lead sustainability movement throughout the Smithsonian;
- Obtain United States Green Building Council's (USGBC), Leadership in Energy and Environmental Design (LEED) ratings for new construction and existing buildings.

Mission-related Challenges

The Brundtland Report's 1987 definition of sustainability is the ability to meet the needs of the present without compromising the needs of the future. Under this definition, sustainability for the SI means the continuity and preservation of the collections, embodying the history of our shared human culture. It

also means preserving access to those collections by scholars and by the public. With the demands of preservation and of public access in mind, these are the primary challenges to achieving sustainability goals:

- **A “resource-intensive” mission:** in 2009, the SI had a record 30 million visits to SI facilities, exhibits, and lectures. SI cultural and scientific research and astrophysical observatories add to global knowledge. Truly the SI is, in Smithsonian’s words, “an establishment for the increase and diffusion of knowledge.” Yet this public mission includes energy and resource intensive activities such as providing and maintaining environments suitable for storing and preserving collections and historic buildings; operating food service, museum shops, theatres and other services for visitors; hosting hundreds of special events each year; and conducting specialized scientific research. The goals of EO 13514 and the demands of the SI mission may not always coincide.
- **Planning and financing sustainable facilities during periods of rapid growth.** Since 1950 the major facilities of the SI have grown from 2 million square feet to over 12 million (sf). The completion of the National Museum of African American History and Culture will add another 313,000 sf to the SI building inventory. This period of growth in itself represents a challenge to sustainability. Planning for High-Performance Green Buildings requires much time-intensive, front-end planning, and some higher first costs (however rapidly recouped) which need financing.
- **Balancing requirements for historic preservation with the need for sustainable retrofits.** The SI building inventory includes facilities that range in age from several months to more than 150 years old, and includes buildings on or eligible for inclusion on the National Register of Historic Places – the SI must balance the need for the greening of building stock consistent with the demands of historic preservation.
- **The need for a consistent tracking and reporting for a global institution.** The SI facilities are global - from Massachusetts, to the desert Southwest, to tropical Panama, to the mountains of Hawaii; the operations of individual and widely scattered SI facilities are rather autonomous, and management practices vary among geographic locations. Enterprise level tracking and reporting will require additional staff, IT applications, time, and money.

Actions to Address Challenges

Overcoming the challenges noted above will necessitate the following actions:

- **Establishing SI-tailored sustainability benchmarks** for EO 13514’s Goal Areas 1, 2, and 3 in situations where meeting proposed targets would result in the compromise of the mission. For example:
 - Because the collections require constant, 24-hour climate control with narrow or few variations in humidity and temperature, achieving a 30% reduction in energy intensity relative to the FY 2003 baseline, as directed in the Energy Independence and Security Act of 2007, is not practical for SI museums. More modest goals for reduction in energy intensity are achievable without compromising the mission.
- **Taking the first steps to develop a consistent tracking tools** for the Smithsonian, beginning this year with the expansion of current purchasing tracking and inventory tools to include metrics for sustainability.

- **Continuing the development of an integrated management team** to ensure a forum for ideas, alignment and continuity of sustainable efforts, and involvement of all SI stakeholders, including those at the executive level.
- **Finding ways to finance green priorities.** This will involve searching for sources for performance contracting; aligning green priorities with other strategic or required objectives, like historic preservation; and noting and prioritizing, within budgetary limits, line items for sustainable capital expenditures.
- **Redirecting staff efforts or hours towards greening the SI, or prioritizing new hires for such efforts when possible.**
- **Reducing carbon emissions through offsets and actions,** such as the purchase of renewable energy certifications or plans for reforestation of areas near or around SI facilities.

II. Greenhouse Gas Reduction Goals

The SI is sensitive to the global impact of greenhouse gases and the direct impact on facilities and missions; from coastal flooding in Maryland and Panama, to astrophysical interference at the observatories. The SI plans to support the GHG reduction goals are:

a. Scope 1 & 2 Reduction Goals

By FY 2020, the SI projects a reduction in Scope 1 and Scope 2 greenhouse gas (GHG) emissions of 32% below an FY 2008 total emissions baseline of 155,764 MTCO₂e. The SI plans to meet these targets through a combination of strategies detailed in Section 2 of this Plan, including:

- Energy- and resource-efficient new construction designed to achieve LEED certification;
- Retrofitting of existing high-profile public facilities to achieve LEED for Existing Buildings: Operations & Maintenance certification;
- The purchase, by 2020, of at least 40% of all SI power through Renewable Energy Certificates;
- Power management and purchasing guidelines for electronics;
- Fleet management – including fleet size optimization, alternative-fuel vehicles, annual reductions in fleet petroleum use, ride sharing, and limits on new parking;
- On-site renewable electricity generation.

b. Scope 3 Reduction Goals

Preliminary findings indicate that for the SI, GHG Scope 3 emissions related to employee travel, contracted waste disposal, and transmission/distribution losses are a small percentage and much less significant than Scope 1 and 2. Difficulties in setting reduction targets for Scope 3 GHG emissions include developing internal methods to collect and measure the SI data, coordinating international, multi-state, and organizational Memorandums of Understanding and Agreements, and the potential lack of alternatives in host nations, states, and local jurisdictions. Particular challenges in each area include:

Employee Travel:

- The need for research related business travel that cannot be significantly reduced;
- Current lack of data accuracy and specifics to separate research related travel from travel for other purposes;
- Significant existing use of mass transit by SI staff in major urban areas such as Washington, DC and New York City, where transit subsidies and limits on employee parking are already in place;
- Significant use of alternative work schedules by SI staff.

Contracted Waste Disposal:

- Global operations requires the SI to use private vendors as well as the services of the GSA; many areas may not have feasible alternatives

Transmission and Distribution Losses:

- Global operations require the SI to use multiple sources of energy providers; many areas may not have feasible alternatives

Although SI will work to improve Scope 3 data collection efforts, the relative impact the SI can have on Scope 1 and 2 versus Scope 3 would indicate that a long-term approach is to address Scope 3 through encouragement of international and bi-lateral agreements for collective reduction, which in turn, reduces the SI impacts.

III. Plan Implementation

The SI is a hierarchal organization under the direction of the Secretary (The Office of the Secretary) that provides oversight in support of decentralized execution by the operating units. This provides the flexibility and adaptability needed to perform the SI mission across the globe, however, also poses significant challenges to consistent policy execution across units and varied geographic locations. The SI will build on the success to date to implement the SSPP by improving existing internal and external communication capabilities with a commitment by leadership across the Smithsonian to lead by example.

a. Internal Coordination and Communication

The SI uses a variety of internal coordination and communication methods that historically have been “grass roots” efforts led by operating units. In support of the SSPP, the existing methods will be used with a new centralized reporting capability. The tools and methods include internal and external websites; Share Point work sites; e-mail, print, public relations channels, and special events such as the Folklife Festival. Sustainability infuses the thinking of SI employees, as evidenced by the numerous programs and initiatives such as



the self-organized Sustainability Committee, the Gardens initiative, and SI Go Green campaign.

b. Coordination and Dissemination of the Plan to the Field

There are multiple offices within SI that will coordinate and disseminate the SSPP to operating units, visitors, vendors and suppliers. Currently, the SI has an informal Sustainability Committee and numerous green teams that will be used to communicate the SSPP while the SI undertakes the creation of a more formalized program. Key offices and goal areas include:

- Office of Facilities Engineering and Operations (OFEO) – Planning, Sustainable Buildings, Energy, Water and Wastewater, Pollution and Waste, Vehicles (also Chairs Sustainability Committee)
- Office of Chief Information Officer (OCIO) – Electronic Product Environmental Assessment Tool (EPEAT)
- Chief Financial Officer (OCFO) – Budget and Reporting
- Office of Contracting and Personal Property Management (OCON & PPM) – Green Acquisition

The plan for dissemination to the field contains the following key elements:

- Deployment of a new web page on the SI external website to highlight Sustainability Initiatives at the SI (for both internal and external communication);
- Use of SI-wide email announcements to communicate and to share progress towards goals;
- Internal educational sessions and workshops for SI staff;
- Establishment of a webpage for reports and notices on the SI Intranet.

c. Leadership and Accountability

The SI is working to develop a formal organized structure for sustainability. It will draw on existing staff who are committed to promoting sustainability and whose efforts have already yielded great progress. It will utilize existing structures such as the Sustainability Committee and numerous green teams. It includes establishment of a new executive committee for sustainability leadership that shall report to the Secretary.

The SI requires evidence of incorporation of sustainable practices in its performance evaluations of senior SI officials and relevant staff, to achieve its level of conformance with EO 13514, including the Senior Sustainability Officer, environmental and energy managers, fleet managers, facility managers and the sustainable design and construction manager. This plan proposes that real property managers, contracting officials, information technology specialists and other relevant positions also have these requirements included in performance evaluations.

For purposes of goal-setting and to initiate data gathering, the SI held two workshops attended by staff from many SI facilities, including SI architects, energy managers, fleet managers, museum exhibit designers, purchasing managers, and information technology (IT) representatives. On April 1, 2010, the Office of Facilities Engineering and Operations (OFEO) coordinated and held the first of these workshops to outline the requirements of EO 13514 and related Federal directives and Acts, such as the Energy Independence and Security Act of 2007. On April 8 the second workshop – attended by 40 persons including the SI Senior Sustainability Officer -- met to give input and ideas and identify

informational gaps. Subsequent follow up meetings and data gathering continued where possible in the limited time frame. Representatives of OFEO coordinated these meetings and will continue to act as facilitators for this data gathering, which will use an internal SI SharePoint site as a digital working archive.

d. Agency Policy and Planning Integration

Policy and planning integration, facilitated through OFEO via existing SI energy management and sustainable design directives, will occur through the work of assigned managers in the operating units. This integration will further occur through an Executive Sustainability Committee of high-level decision makers and SI budget planners.

e. Agency Budget Integration

The challenges to budget integration include funding challenges and competing priorities for funds, such as the need to provide for non-discretionary operating costs and to address significant deferred operations and maintenance backlogs. At present, the Smithsonian budget requests to OMB and Congress do not highlight sustainability principals and practices. Leaving aside the “soft costs” for items such as LEED certification fees and professional services relating to sustainable design or operations, sustainability is embedded in most retrofit and construction efforts at the SI. Because sustainability is difficult to capture as a single budgetary line item, the SI will determine the best means of accounting for and tracking these costs in its financial system. There are existing SI procedures and regulations for designating facilities capital allocations depending on their source. Unrestricted trust funds provide limited resources to support other higher priority operations. Restricted trust funds must be used in accordance with donor guidance or SI Board designated restrictions. SI financial management staff from the Office of Planning, Management and Budget (OPMB) and other SI units will be consulted on green initiatives and the use of financial resources.

f. Methods for Evaluation of Progress

The SI evaluates progress through periodic reviews and reporting mechanisms such as the Office of Management and Budget (OMB) scorecards. As new OMB instructions and guidance are issued, these will be incorporated into a future SI enterprise database with a senior executive reporting dashboard capturing goals, milestones, and timelines providing real time updates on progress.

Internally to the SI, there will need to be a number of programs and metrics developed in conjunction with other federal agencies, in particular, the Environmental Protection Agency and Department of Energy, for the development of new facility categories to include museums, in the EPA Energy Star Portfolio Manager.

Operating unit budgets, staff position descriptions, workforce development, transit and alternative work schedules will be reviewed and updated to incorporate SSPP principals.

g. Metrics for Assessment

Metrics for assessment will initially come from existing tracking and reporting mechanisms, which currently use a number of independent IT applications and systems to provide the data, and must then be manually compiled and analyzed to generate the reports. SI employees perform sustainability related tasks as part of daily activities.

In the next two years, the SI will give priority to executing the Sustainable Buildings Implementation Plan (SBIP) and for developing and deploying an EPEAT program for all IT related equipment to include servers, cell phones, printers, and copiers.

Table 1: Critical Planning Coordination

The relationship between the SI SSPP and other SI planning and reporting efforts is shown in Table 1. The SI will use this table as a guide for ensuring that sustainability programs are supported in future planning processes.

Originating Report / Plan	Scope 1 & 2 GHG Reduction	Scope 3 GHG Reduction	Develop and Maintain Agency Comprehensive GHG Inventory	High-Performance Sustainable Design / Green Buildings	Regional and Local Planning	Water Use Efficiency and Management	Pollution Prevention and Waste Elimination	Sustainable Acquisition	Electronic Stewardship and Data Centers	Agency Specific Innovation
<i>"Sample Plan"</i>	yes	n/a	n/a	n/a	n/a	n/a	n/a	n/a	yes	no
GPRA Strategic Plan										
Agency Capital Plan										
A-11 300s—SI custom version				yes						
Annual Energy Data Report	yes	yes	yes	yes	no	yes	no	no	no	yes
EISA Section 432 Facility Evaluations/Project Reporting	no	no	no	no	no	no	no	no	no	no
Budget										
Asset Management Plan / 3 Year Timeline										
Circular A-11 Exhibit 53s										
OMB Scorecards										
DOE's Annual Federal Fleet Report to Congress and the President	yes		yes							yes
Data Center Consolidation Plan									yes	
Environmental Management System	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Other (reports, policies, plans, etc.)										

Because the SI is such a large institution with a diverse portfolio of facilities that are unique in size, geographic location, and operations, the SI is often used as a benchmark by other museum and educational institutions. The SI planning, engineering, facility management, scientists, directors, and staff are leading the transformation in how facilities can be used as strategic capital assets in support of mission objectives.

IV. Evaluating Return on Investment

SI financial resources are drawn from a number of sources; Congressional Appropriations, trust assets generated by its business and retail operations, charitable contributions, and endowments/grants obtained by researchers and scientists. The SI uses a number of methods to evaluate Return on

Investment (ROI). The SI currently prioritizes projects, initiatives, and efforts using the strategic capital investment plan process. To support SSPP objectives based on lifecycle return on investment, the SI is evaluating other federal agency and industry methods and will update plans, policies and procedures to incorporate new calculation methods to take into account both monetary and non-monetary factors to prioritize projects and initiatives.

a. Economic Lifecycle Cost / Return on Investment

The SI uses the National Institute of Standards and Technology (NIST) Building Life-Cycle Cost (BLCC) methodology for economic analysis of project investment alternatives. The BLCC is a prioritization tool which compares alternative designs in order to understand which have the best life cycle values. Net savings, savings-to-investment ratio, adjusted internal rate of return, and years to simple payback are used to rank proposed energy and water efficiency projects. Overall prioritization of project investment recognizes other factors. The SI often must first satisfy other, more urgent requirements, such as life safety issues; code compliance; repair backlogs; and pressing operations and maintenance concerns.

Energy service companies (ESCOs) engaged by the SI for performance contracting also evaluate projects based on Return on Investment (ROI) and Net Present Value (NPV) consistent with methodology in the OMB Circular A-94 “Guidelines and Discount Rates for Benefits – Cost Analysis of Federal Programs.”

OMB has customized a version of the A-II 300s for the Smithsonian, titled the “Smithsonian Institution Capital Asset Plan (Exhibit 300) for Revitalization and Construction FY20__ Budget Submission”, in which language will be included to reference compliance with Federal Environmental and Energy Management requirements for applicable projects.

b. Social Costs and Benefits

Social Costs and Benefits (SCB) analysis is a challenging calculation for any organization, and the SI is no exception. Specific techniques for calculating social costs and benefits require a subjective interpretation of “well-being” that introduces areas of uncertainty, which include the social rate of return and the correction of market prices in the presence of externalities and distortions. A traditional formula to calculate SCB is:

Net Social Benefit = Social Benefit for Direct Effects + Net Effect of Externalities

For the SI, it is difficult to measure costs and benefits because the choices involve indivisibilities² and inter-industry linkages³. At present the SI has no direct method of evaluating the social costs and benefits of capital projects, yet because of its mission and public outreach, these are embedded in all SI investment decisions, and may outweigh other more quantifiable concerns.

The SI is evaluating the Department of Interior, the US Army Corp of Engineers, and the National Oceanographic and Atmospheric Administration calculation methods, along with industry methods, and will attempt to incorporate SCB into the planning process.

c. Environmental Costs and Benefits

The SI has a well defined program and processes in place to calculate traditional Environmental Cost and Benefits (ECB), which is primarily defined by the National Environmental Policy Act (NEPA) and

² Typically when investment must be of a minimum size or greater

³ When a project harms an industry that is an important supplier to industries

the ISO Standards. However, the global extent of SI facilities and missions, and the recognition that there are larger international environmental costs and benefits such as health impacts, property damage, ecosystem losses, and other welfare effects should be included in ECB. Many of these costs or benefits occur over the long term and/or are irreversible to include global warming and biodiversity losses, which has a direct impact on SI missions. Currently, there are few well developed calculation methods that the SI can use in the current planning processes.

As a longer term goal, the SI will initiate the development of a process and metrics for determining ECB for each EO goal.

d. Mission-Specific Costs and Benefits

The SI has not historically used a formal Mission-Specific Cost and Benefits (MSCB) calculation; however, the SI budget is to some degree developed on the basis of MSCB. Because the operating units (museums, zoo, Tropical Research Institute, etc.) use a combination of public and private funds, each director in essence must balance the operating funds to achieve and maintain mission performance. To support this EO objective, the SI will evaluate other agency and industry MSCB calculation methods and will attempt to incorporate MSCB into the planning process.

e. Operations & Maintenance and Deferred Investments

Reduction of deferred maintenance is a very high priority and a significant challenge. For these reasons, the SI has adopted the Deferred Maintenance (DM) parametric estimating technique to calculate backlog of maintenance and minor repair costs, System Condition Index (SCI), and Facility Condition Index (FCI) as defined by FASAB Standard 6. Designed to be a simplified approach using existing empirical data, the method is based on:

- Condition assessments performed at the system level rather than the component level which is consistent with the Reliability Centered Maintenance (RCM) approach;
- A limited number of systems to assess (eight);
- Facilities classified based upon function and use (35 types);
- Use of generalized condition levels (five); and
- Current replacement values (CRV) of the systems and the facility they support.

This approach gives an overall assessment of condition of both the facilities and systems. The calculated deferred maintenance is a function of the current replacement value which, at minimum, must be updated annually. The resulting Facility Condition Index (FCI) is a function of all these factors.

f. Climate Change Risk and Vulnerability

As a leading research institution, the Smithsonian acknowledges the risk of climate change and the vulnerability associated with rising sea levels, changes in atmospheric composition, and impacts of global weather pattern movement. In 2009, the SI sponsored an online conference on Climate Change. In the Strategic Plan commitment to “Understanding and Sustaining a Biodiverse Planet”, SI pledges to “advance and synthesize knowledge that contributes to the survival of at-risk ecosystems and species”. In addition to leading this effort, SI will continue to apply lessons learned to conservation efforts for its

own sites, facilities, and collections, with the aim of preserving not only for the short term, but for future generations.

V. Transparency

The SI as an educational institution is founded on collaboration to expand the knowledge base of the human experience. The scientific method is based on peer review and requires open debate. However, not all aspects of the Smithsonian can be, or should be, transparent to the public at large. Because the SI operates using a combination of public and private funds in multiple nations, the SI is restricted by law and/or covenants on what information is open to distribution. Specifically to sustainability, the SI is committed to sharing best practices, lessons learned, and collaboration with the local communities to implement the target goals.

a. Communication within the SI

As cited in Plan Implementation (Section 1.II), the SI, through the establishment of an Intranet or SharePoint website with content on the Sustainable SI, through emails to all staff, and through staff workshops intends to be open and transparent.

b. Communication to the Public

The SI will also devote space on its public website and via media campaigns to communicate with the public about SI sustainability efforts, and through public education programs such as the Smithsonian Gardens Public Gardens Day.

c. Communication Methods

The World Wide Web, print, and emerging social media such as Linked In and Twitter are all major SI delivery mechanisms for public education on sustainability. Digital versions of content are preferred; hard copies will be provided only as necessary.

d. Scope of Transparency

Ideally, all content, deliberations, and reports will be captured and published on a SI-wide SharePoint site and on the World Wide Web, except for data sensitive to private donors, which will not be made public.

Section 2: Performance Review & Annual Update

I. Summary of Accomplishments:

Throughout the course of the past year, the SI completed several notable achievements. These achievements spanned the public out-reach mission of the SI and included internal programs that furthered efforts toward compliance with Executive Orders, statutory requirements and internal goals and objectives. Among its achievements are:

- In September 2009, SI sponsored an online Climate Change conference.
- The SI has 17 High-Performance Green Building projects in progress or planned.
- In August 2009, the Office of Facilities Engineering and Operations published the first annual Sustainable Buildings Implementation Plan as required by Executive Order 13423 (Strengthening Federal Environmental, Energy and Transportation Management), identifying a path to greening 15 percent of the eligible Smithsonian building inventory by 2015. The plan focuses on meeting Federal environmental and energy management requirements and earning U.S. Green Building Council Leadership in Energy and Environmental Design (LEED) certifications, not only for new construction and major renovations, but also for existing buildings.
- In October 2009, the Energy Savings Performance Contract project for the National Museum of American History and National Museum of Natural History received the General Services Administration's annual Achievement Award for Real Property Innovation for sustainability.
- In November 2009, the National Zoological Park converted its 2500-gallon diesel fuel pumps to run on a cleaner-burning soy-based bio-diesel blend, which will help reduce hydrocarbon emissions by 20 percent, as well as lowering carbon monoxide and particulate emissions.
- In December 2009, a Smithsonian Mall-wide Water Reclamation Study was completed, using the National Museum of Natural History facility as a pilot to study water conservation and reclamation strategies for Smithsonian museum facilities on the National Mall.
- By January 2010 the Smithsonian developed fiscal year 2020 greenhouse gas emission reduction targets, in response to Executive Order 13514 (Federal Leadership in Environmental, Energy and Economic Performance) issued on October 5, 2009.

II. Goal Performance Review:

The sections that follow present a discussion of each of the goal areas identified in Executive Order 13514. Each section presents specific targets, timelines and milestones, implementation methods, oversight responsibility, and current status of SI efforts related to the goal area.

1. GOAL: Scope 1 & 2 Greenhouse Gas Reduction

Goal Description

In response to the Section 2 of the Executive Order, the Smithsonian Institution reported the following values for Scope 1 and Scope 2 greenhouse gas emissions:

- FY 2008 total emissions baseline = 155,764 MTCO₂e
- FY 2020 reduction target = 32% relative to the FY 2008 total emissions baseline

Agency Lead

The Smithsonian's organizational lead for Scope 1 & 2 Greenhouse Gas Reduction target development, implementation, and oversight is the Office of Facilities Engineering and Operations' Office of Facilities Management and Reliability.

Implementation Methods

The Smithsonian's implementation efforts toward achieving its targets, including existing and planned methods, are:

a. Buildings

- Reduce Facility Energy Intensity
- Increase purchase of renewable electricity
- Increase on-site renewable electricity generation

b. Fleet

- Reduce Petroleum Use in Fleet Vehicles
- Increase Use of Alternative Fuels in Fleet AFVs
- Optimize Use of Vehicles and Right-Size Fleet
- Increase Use of Low Emission and High Fuel Economy Vehicles

Implementation proposals include:

- Improving average energy intensity of SI facilities to 125 thousand British thermal units (kBtu) per square foot by executing energy efficiency projects in eight major facilities where conservation opportunities are greatest.
- Meeting the Executive Order requirement for reducing use of fossil fuel in the fleet, to include a green fleet replacement program.
- Achieving the remainder of SI GHG emission reductions by increasing use of renewable energy, purchasing green power for 40% of SI total electricity use and executing renewable electricity generation projects on SI property to the extent practical.

Positions

The Smithsonian accomplishes the actions related to these initiatives with existing staff located in the Energy Management and Fleet Management units of the Office of Facilities Management and Reliability.

Smithsonian Institution Strategic Sustainability Performance Plan

Planning Table

	SCOPE 1&2 GHG TARGET	Unit	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	....	FY 20
Buildings	Energy Intensity Reduction Goals (BTU/SF reduced from FY03 base year)	%	15%	18%	21%	24%	27%	30%	hold	....	Hold
	Planned Energy Intensity Reduction (BTU/SF reduced from FY03 base year)	%	0	0	0	0	0	2%	hold	...	5%
	Renewable Electricity Goals (Percent of electricity from renewable sources)	%	5%	5%	5%	7.5%	hold	hold	hold	hold	Hold
	Planned Renewable Electricity Use (Percent of electricity from renewable sources)	%	5%	5%	5%	7.5%	hold	hold	hold	hold	40%
Fleet	Petroleum Use Reduction Targets (Percent reduction from FY05 base year)	%	10%	12%	14%	16%	18%	20%	22%	....	30%
	Planned Petroleum Use Reduction (Percent reduction from FY05 base year)	%	10%	12%	14%	16%	18%	20%	22%	....	30%
	Alternative Fuel Use in Fleet AFV Target (Percent increase from FY05 base year)	%	61%	77%	95%	114%	136%	159%	hold	.....	Hold
	Planned Alternative Fuel Use in Fleet AFV (Percent increase from FY05 base year)	%	61%	77%	95%	114%	136%	159%	hold	.....	Hold
	Scope 1 & 2 – Reduction Target (reduced from FY08 base year)	%	2%	2%	2%	4%	4%	6%	6%	.....	32%

Agency Status

Energy Intensity Reduction Goals and Challenges

As reported in Section 1 of this SSPP, achieving a 30% reduction in energy intensity relative to the FY 2003 baseline, as directed in the Energy Independence and Security Act of 2007, is not practical for all Smithsonian facilities. The Smithsonian has special energy management challenges that include co-located concession activities such as IMAX™ theaters, restaurants and shops; highly variable occupancy including up to 30 million museum visits per year; special events in the museums as well as impacts from major events on the National Mall; growth of information technology not only in office areas but also in museum exhibit spaces, and ongoing efforts to maintain optimum environments for the conservation of priceless collections and historic buildings.

Current Smithsonian environmental guidelines for collection space are for a relative humidity of 45% ±8% and a temperature of 70°F ±4°F. In most exhibit and collection storage areas, the objective is to maintain these conditions 24 hours per day, 365 days per year. Often,

renovations of the museums must add significant capacity for de-humidification, humidification, ventilation and filtration in order to meet current conservation standards for temperature, humidity, and contaminant control.

The current Smithsonian target for reduction of building energy intensity is 5% by FY 2020, relative to FY 2003 baseline in British thermal units per square foot. This is a 6% reduction from FY 2008, when Smithsonian energy intensity was slightly higher than FY 2003. Eight major SI facilities had FY 2008 energy intensity exceeding the target levels identified above, and are targeted for increased investment in energy efficiency improvements. Assuming other SI facilities sustain or improve on current energy intensity, the resulting SI average energy intensity will be 125 kBtu per square foot.

**Proposed Reduction of Energy Use and GHG Emissions
Eight Major Smithsonian Facilities (from FY 2008 Baseline)**

	FY 2008 Energy Intensity (kBtu/sq.ft.)	Proposed Energy Use Reduction FY 2009 - FY 2015	Target FY 2015 Energy Intensity (kBtu/sq.ft.)	Annual GHG Emission Reduction (MTCO ₂ e)
Hirshhorn Museum & Sculpture Garden	332	47%	175	4,814
Museum Support Center	271	36%	175	9,167
George Gustav Heye Center	241	28%	175	1,396
Cooper-Hewitt National Design Museum	231	24%	175	1,203
Renwick Gallery	230	24%	175	446
Donald W. Reynolds Center	195	10%	175	1,243
National Museum of the American Indian – Cultural Resources Center	188	34%	125	1,715
National Museum of the American Indian	165	24%	125	3,337
Total				23,320

Reducing GHG Emissions by Increasing Use of Renewable Energy

On-site generation will be utilized to the maximum extent which is cost-effective and practical, and is at present estimated to become 2% of FY 2020 overall total electricity use. Increased use of renewable electricity will be mainly through the purchase of renewable energy certificates, which are estimated to become 40% of FY 2020 total electricity use.

SI properties present some exciting but challenging opportunities for on-site renewable energy generation. For example, a 2007 study by the National Renewable Energy Laboratory identified several candidate projects for National Zoological Park properties in Washington and in Front Royal, VA. A proposed photovoltaic power system would reduce GHG emissions an estimated 620 MTCO₂e per year, due to avoided use of utility electricity, but simple payback is more than 50 years, not considering potential incentives such as tax credits. A proposed biomass-fueled cogeneration power plant could reduce GHG emissions an estimated 5,600 MTCO₂e per year, but requires overcoming substantial technical and regulatory hurdles.

The SI currently meets Federal requirements for percentage of electricity consumption from renewable sources.

To aid in energy management across its entire facility inventory, the Smithsonian has undertaken an SI-wide metering inventory to verify compliance with EISA metering requirements. The SI drafted an SI Metering Plan “to guide planning and installation of basic and/or advanced meters” with a goal to meter all appropriate facilities for electricity, natural gas, district steam and district chilled water.

The actions taken by the Smithsonian and the successes of last year include:

- The ESPC-financed project for the National Museum of American History and the National Museum of Natural History was selected as the Winner in the Sustainability Category - 13th Annual GSA Achievement Award for Real Property Innovation;
- Participation in energy performance benchmarking with other museum members of the International Association of Museum Facility Administrators (IAMFA);
- Introduction of a new and more comprehensive monthly energy performance report, and new online tools for analysis of electricity, steam and chilled water use at larger facilities, and;
- Continued evaluation of advanced metering vendor products and services in preparation to begin implementation.

The sub-goals of Goal Area 1 and planned actions for next year include:

- Finalizing a metering plan for SI facilities and beginning implementation, and;
- Updating DOE on findings of evaluations in covered facilities ($\geq 50\%$ of covered GSF) conducted under EISA Section 432 by June 30, 2010.

Fleet Management Goals

Fleet management has been a bright spot in scope 1 & 2 GHG reduction efforts, as these charts on SI comparative performance with other Federal agencies will attest. In 2009, the SI exceeded EO 13514’s FY20 petroleum use reduction and alternative fuel use targets. Specific actions and implementation methods from the past year include:

Smithsonian Institution Strategic Sustainability Performance Plan

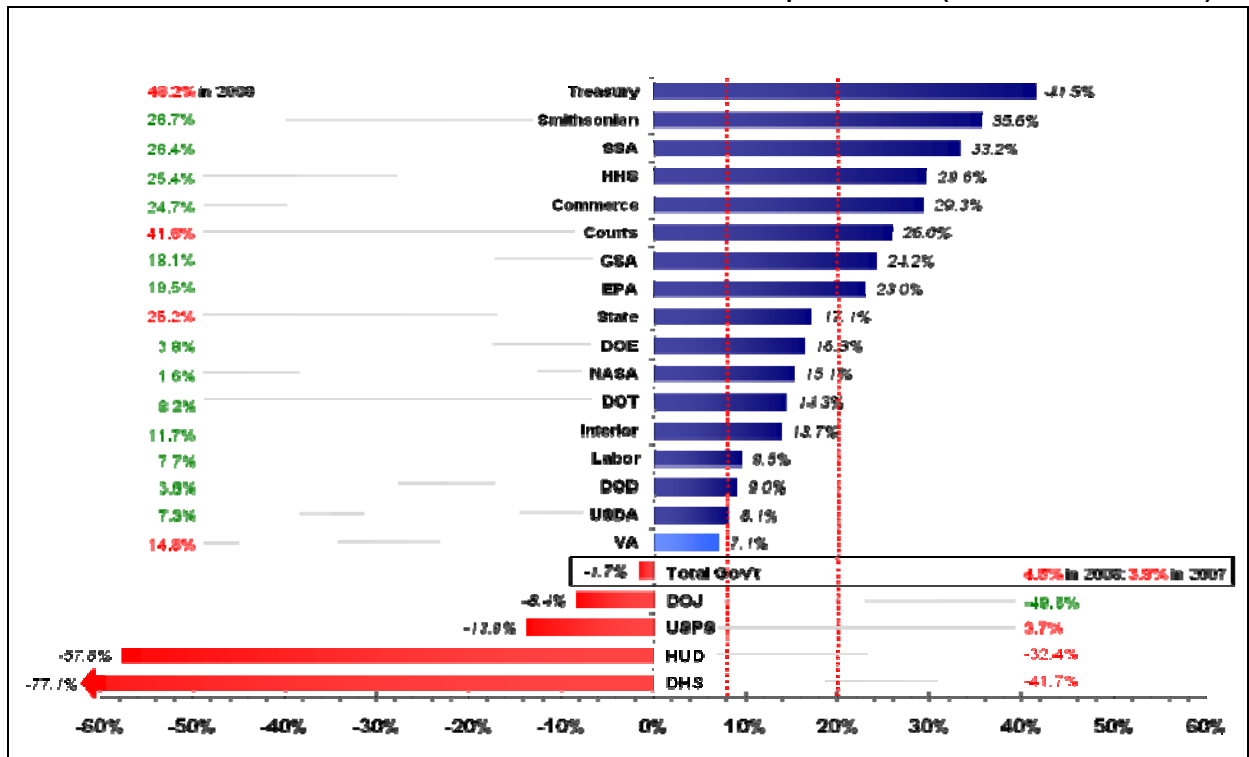
- Completion of FY09-14 green fleet strategic plan, outlining specific annual AFV acquisition, AF increase, and GHG reduction goals;
- Reduction of Smithsonian Fleet by 2.3% through elimination of underutilized fleet vehicles;
- Completion of conversion of National Zoo diesel pump to renewable bio-diesel in November, 2009;
- Successful completion of Fleet-share pilot program. A web based reservation system reduced fleet size and improved AF use;
- Receipt of solar / electric tram at the Smithsonian Environmental Research Center (SERC) and replacement of gas powered campus transportation;
- Purchase of nitrogen inflation equipment. Integration of program into fleet preventive maintenance plan to improve fuel efficiency, handling and fleet safety and;
- Completion of installation of fuel management system and control at SERC, and finalized integration to the Smithsonian's Fleet Management Information System (FMIS).

Sub-goals within the year are to:

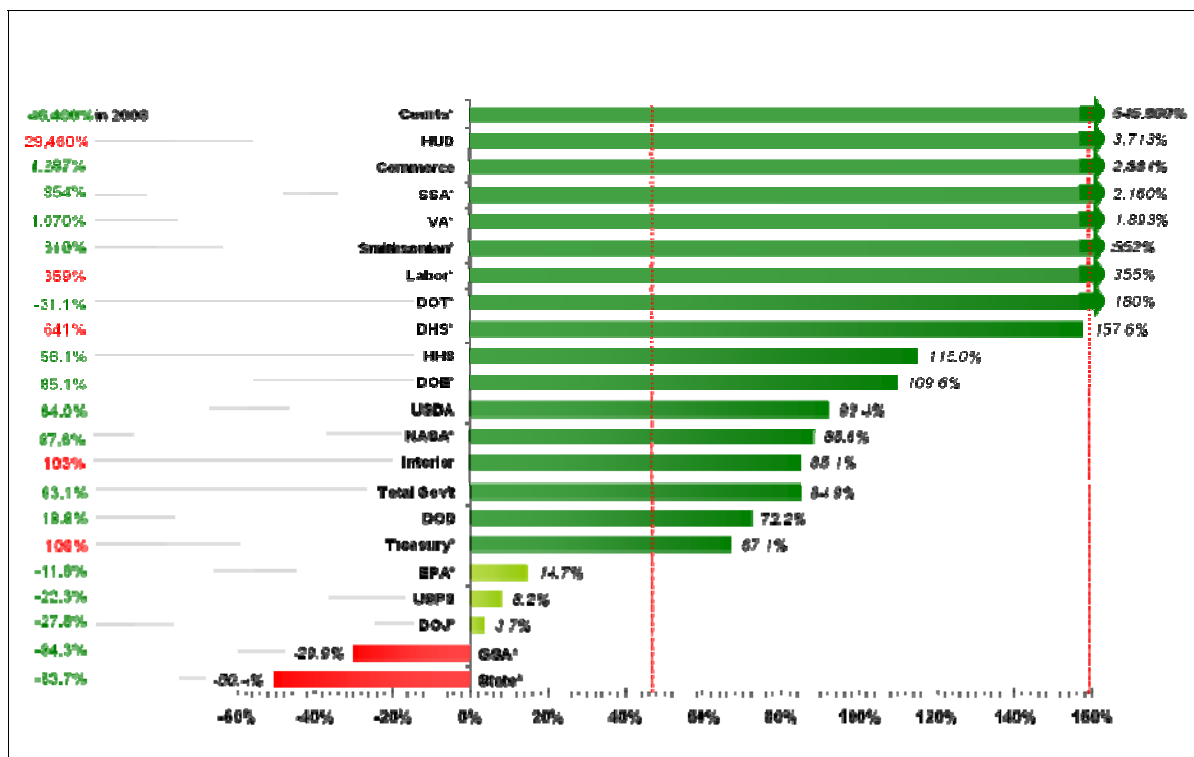
- Install fleet telemetric devices to optimize vehicle routing and utilization with an expected result of reduced miles driven and fuel use;
- Expand the Fleet-Share program to a second site by 03/31/2010, with an expected fleet reduction of 1%;
- Develop a vehicle allocation methodology baseline and survey by 06/30/2010;
- Pilot diesel idle reduction devices in Smithsonian shuttle buses and HD transport vehicles;
- Convert diesel fueling site at the Conservation Research Center to a renewable B-20 bio-diesel by 06/30/2010;
- Install fuel management system at the Conservation Research Center. New controls will improve fuel management and accountability. Fuel records will be integrated into the Smithsonian's Fleet management Information System (FMIS).

Smithsonian Institution Strategic Sustainability Performance Plan

Smithsonian's FY 2009 Reduction in Covered Petroleum Consumption - 35.6% (from FY 2005 Baseline)



Smithsonian's FY 2009 Increase in Alternative Fuel Consumption – 552% (from FY 2005 Baseline)



2. GOAL: Scope 3 Greenhouse Gas Reduction

Goal Description

Preliminary findings indicate that for the SI, GHG Scope 3 emissions related to employee travel, contracted waste disposal, and transmission/distribution losses are a small percentage and much less significant than Scope 1 and 2. Difficulties in setting reduction targets for Scope 3 GHG emissions include developing internal methods to collect and measure the SI data, coordinating international, multi-state, and organizational Memorandums of Understanding and Agreements, and the potential lack of alternatives in host nations, states, and local jurisdictions.

Agency Lead

The Smithsonian's organizational lead for goal area target development, implementation, and oversight is the Office of Facilities Engineering and Operations' Office of Facilities Management and Reliability.

Implementation Methods

The Smithsonian's implementation efforts toward achieving Scope 3 GSG targets, including existing and planned methods, are:

- Creating a baseline for Scope 3 emissions;
- Further increasing alternative fuel use in the fleet;
- Coordinating the GHG reporting tool and data on Federal Employee Travel from various travel contracts for effective data collection, measurement, and verification as well as working with travel contract vendors;
- Gathering and reconciling waste disposal data from GSA and vendor sources;
- Implementing onsite renewable energy sources where possible to reduce transmission and distribution losses;
- Ensuring that energy efficient new construction links to energy and resource efficient operations and maintenance;
- Investigating the use of offsets from reforestation near SI facilities;
- Investigating an education program for SI visitors on green efforts and carbon emissions, thus widening the scope of influence on public carbon reduction;

The longer-term (beyond the current year) approach to its Scope 3 GHG reduction goals involves four specific sub-goals:

- Employee, vendor, and public awareness and behavioral modification. This necessitates education programs internal as well as external to the SI – on commuting and travel habits.
- Development of consistent metrics and an SI-wide framework for the accurate collection of data.
- Improved record keeping at all levels using these consistent metrics and frameworks.

- Innovative solutions, potentially involving new ways of working, new methods of resource conservation and reuse, and engaged carbon offsets where necessary.

Positions

The Smithsonian does not currently have staff dedicated to tracking data and setting reduction targets for this goal. These actions must be accommodated with existing staff from the Travel Management Office in the Office of the Comptroller for Employee Business Travel, from the Office of Human Resources (OHR) for Employee Commuting, and from the Office of Facilities Management and Reliability (OFMR) for the remainder of categories and the overall totals.

Planning Table

It was not possible to accurately quantify all of the interim targets related to this goal in time for this report. However, SI will endeavor to work towards such quantification in future versions of this report.

SCOPE 3 GHG TARGET	Units	FY 10	FY 11	FY 12	FY 13	FY 14	....	FY 20
Overall Agency Scope 3 Reduction Target (reduced from FY08 base year) ¹	%	0	0	1%	3%	5%		10%
Sub-Target for Federal Employee Travel	%	0	0	0	0	0	....	0
Sub-Target for Contracted Waste Disposal	%	0	0	5%	15%	25%	....	42%
Sub-Target for Transmission and Distribution Losses from Purchased Energy	%	0	0	0	0	0	....	3%

Agency Status

In the area of emissions from employee travel, the Smithsonian has two travel contracts with different metrics. One is with Northrop-Grumman and their subcontractor Sato, who is on the GSA Travel Management Information System (TMIS). SI air travel averages 60-70% through use of contracts with Sato. The SI has another contract with Travel Horizons for international travel, booking fewer trips on that system but with more mileage per trip. Travel Horizons has been asked to begin entering their data in the TMIS.

Aside from consistency and collection of the data, there is concern about how to set GHG reduction targets based on reducing employee air travel. Much of the international travel performed by Smithsonian staff is for research and is paid by grant money specifically for this purpose. Travel reductions associated with the Smithsonian's research efforts would compromise its very mission. As a result, the SI proposes to exclude research travel from its reductions projections. At this time, research-related travel is not tracked separately from non-research related travel, however, the Smithsonian already uses video and teleconferencing to supplement travel for meetings, and much of the training and conference attendance is via webinar or done locally.

Related to Employee Travel, difficulties in setting reduction targets for Scope 3 GHG emissions include:

- The need for research related business travel, which will be difficult to impact;

- Current lack of data accuracy and specifics (to separate research related travel from other travel);
- Significant existing use of mass transit at major urban sites, such as in Washington, DC and New York City, where transit subsidies and limits on employee parking are already in place;
- Significant existing use of alternative work schedules.

In the area of emissions from contracted waste disposal, the SI uses private vendors as well as the services of the GSA. As with employee travel, the SI will undertake a review of the data from these for consistency, and to establish a central repository of records.

In summary, it appears that although Smithsonian efforts will improve data collection efforts, preliminary findings indicate that GHG emissions from the Scope 3 categories included in this year's plan are much less significant than from the Scope 1 and 2 categories. Furthermore, difficulties in setting reduction targets for Scope 3 GHG emissions may result from developing internal methods to collect and measure the SI data, coordinating international, multi-state, and organizational Memorandums of Understanding and Agreements, and the potential lack of alternatives in host nations, states, and local jurisdictions – all due to the Smithsonian's global footprint.

3. GOAL: Develop and Maintain Agency Comprehensive Greenhouse Gas Inventory

Goal Description

The Smithsonian is very concerned about the global impact of greenhouse gases and their direct impact on its facilities and missions and is committed to building upon past successes and addressing future challenges associated with the development and management of a comprehensive GHG inventory. The Smithsonian is equally concerned with fulfilling its public service mission, including the important goal of "Understanding and Sustaining a Biodiverse Planet". Thus, future efforts will be aligned toward:

- Introduction of a new and more comprehensive monthly energy performance report, and new online tools for analysis of electricity, steam and chilled water use at larger facilities;
- Continued evaluation of advanced metering products and services in preparation to begin implementation;
- Coordinating the GHG reporting tool and data on Federal Employee Travel from various travel contracts for effective data collection, measurement, and verification as well as working with travel contract vendors;
- Gathering and compiling waste disposal data from GSA and vendor sources, and;
- Development of consistent metrics and an SI-wide framework for the accurate collection of data.

Agency Lead

The Smithsonian's organizational lead for goal area target development, implementation, and oversight is the Office of Facilities Engineering and Operations, Office of Facilities Management and Reliability.

Implementation Methods

The Smithsonian's specific implementation efforts toward achieving a comprehensive GHG inventory are represented above. Internal efforts as well as public service mission accomplishments will serve as the foundation of the Institution's strategy to plan and implement integrated GHG reduction activities.

Agency Status

The efforts targeted by the Smithsonian toward building a comprehensive GHG inventory include participation in energy performance benchmarking with other museum members of IAMFA and introduction of comprehensive monthly energy performance reports as important steps toward broader and more refined reporting. Continued evaluation of similar techniques, combined with an over-arching plan, will ultimately yield the Institution-wide reporting capabilities fundamental to emission reduction efforts.

4. GOAL: High-Performance Sustainable Design / Green Buildings

Goal Description

The goals outlined in Executive Order 13514 for this category include:

- Beginning in FY 2020, all new Federal buildings are designed to achieve zero-net energy by FY 2030;
- All new construction, major renovation or repair and alteration of federal buildings complies with, "Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings (Guiding Principles)";
- At least 15% of agency's applicable existing owned and leased building inventory meet guiding principles by FY 2015;
- Demonstration of annual progress toward 100% conformance with Guiding Principles for entire building inventory;
- Demonstration of the use of cost-effective, innovative building strategies to minimize energy, water and materials consumption;
- Management of existing building systems to reduce energy, water and materials consumption in a manner that achieves a net reduction in agency deferred maintenance costs;
- Optimization of performance of the agency's real property portfolio – examine opportunities to decrease environmental impact through consolidation, reuse and disposal of existing assets prior to adding new assets and;
- Use of best practices and technology in rehabilitation of historic Federal properties.

Agency Lead

The Smithsonian's organizational lead for further goal area target development, implementation, and oversight is the Office of Facilities Engineering and Operations', Office of Engineering Design and Construction (OEDC).

Implementation Methods

The Smithsonian's efforts toward achieving its targets, including existing and planned implementation methods, are:

- To achieve increased peer agreement and management approval through wider reviews of Smithsonian sustainable buildings policies in the SSPP, SBIP, and internal policy documents such as the Sustainable Design of Smithsonian Facilities directive (SD 422) and the OEDC Design Standards (currently in development);
- To designate and agree on responsible persons in the Office of Planning and Project Management (OPPM), OEDC and OFMR for these initiatives;
- To update baseline building inventory information;
- To re-visit how projects pursuing LEED certification are progressing;
- To institute a more consistent tracking mechanism to measure interim progress on sustainability projects (SI uses LEED certifications as a validation system and as a means to track implementation of sustainability in design and construction projects);
- To consider using EPA's Portfolio Manager to track the 5 Guiding Principles;
- To continue to explore, with EPA, the inclusion of a comparative museum building type for energy benchmarking, and;
- To educate SI visitors on SI green building goals, to promote their responsible use of SI resources.

High-profile SI museums (such as the upcoming Museum of African-American History and Culture) for cultural, intellectual, and political reasons deserve new, unique, and LEED certified buildings. Otherwise, the SI will continue to reuse or reconfigure existing space as the first resort, followed by new construction or expansion only as necessary.

Positions

The SI has one FTE in the Office of Engineering Design and Construction to organize efforts to manage and track Goal 4 efforts.

Planning Table

SUSTAINABLE HIGH PERFORMANCE BUILDINGS (Buildings Meeting Guiding Principles 1)	Units	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15
Owned Facilities Targets (INCLUDED IN 2009 SBIP)	%	0	6%	6%	10%	12%	15%

Smithsonian Institution Strategic Sustainability Performance Plan

SUSTAINABLE HIGH PERFORMANCE BUILDINGS (Buildings Meeting Guiding Principles 1)	Units	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15
Leased Facilities Targets	%	0	0	0	0	0	0
Total Facility Targets	%	0	6%	6%	10%	12%	15%

Agency Status

On August 15, 2009, OFEO completed the first Smithsonian Sustainable Buildings Implementation Plan (SBIP) officially affirming its commitment to the Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings. The SBIP included a “Baseline Building Inventory for Sustainable Building Implementation,” listing FY 2008 gross square feet (sf) of candidate property as well as their current replacement value.

The 2009 SI SBIP states that as of the end of FY 2015, at least 15% of the SI’s existing applicable capital asset building inventory as measured in square feet will incorporate the sustainable practices of the Guiding Principles. After the publication of EO 13514 in October 2009, the Council of Environmental Quality (CEQ) guidelines were updated to prescribe the 15% to be by number of buildings and to include all buildings in an organization’s inventory that are over 5000 square feet. The 2010 SI SBIP will require a re-evaluation of the building inventory to accommodate these new requirements.

LEED Certification at the SI

The Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings are closely aligned with the content and goals of the US Green Building Council’s LEED Rating Systems. As outlined in Section 1, Subsection I of this SSPP, the SI commits to achieving LEED certified or above in all new facilities under the LEED for New Construction Rating System. The SI also intends to pursue LEED for Existing Buildings: Operations & Maintenance for its high-profile existing buildings, beginning with the National Museum of the American Indian in FY 2011, and LEED for Commercial Interiors for high-profile space in existing SI owned and leased facilities. Several new construction, major renovation projects and one existing building are currently registered and pursuing certification under the LEED rating system. As of 2009, the SI had 29 LEED APs on staff and provided LEED Green Associates exam preparation classes for approximately 40 additional staff in 2010, with the aim of increasing LEED accredited professional staff. The SI also typically funds an intern architect position to support the LEED certification process for SI projects and maintain the Sustainability Committee Library.

OFEO-OPPM will broaden the scope of this inventory for future LEED certification annually, so as to demonstrate annual progress toward 100% conformance with Guiding Principles for its entire building inventory.

The LEED rating system requires implementation of a wide range of sustainable building-level practices, many of them working in an interdependent way. The components of LEED for Building Design and Construction (BD+C) and Existing Building: Operations and Maintenance

(EB:O&M) point system are presented in the table below. There are numerous categories that must be fulfilled, including requirements for pollution prevention; minimum water and energy efficiency; minimum indoor air quality; recycling; and systems commissioning.

LEED New Construction and Existing Buildings, Operations and Maintenance Credit Categories and Available Points

LEED Categories	Building Design and Construction Points	Existing Building, Operations and Maintenance Points	Description
Sustainable Sites	26	26	A building's impact on waterways, ecosystems, undeveloped sites; transportation choices; storm water runoff; reduction of erosion, light pollution, heat island effect and construction-related pollution.
Water Efficiency	10	14	Encourages smarter use of water, through more efficient fixtures, water-wise landscaping outside, wastewater recycling, and water harvesting.
Energy & Atmosphere	35	35	Encourages a wide variety of energy strategies: commissioning; energy use monitoring; efficient design and construction; use of renewable & clean sources of energy, generated on or off-site.
Materials & Resources	14	10	Encourages the reduction of waste, resource reuse, recycling, the selection of sustainably grown, harvested, produced and transported products and materials.
Indoor Environmental Quality	15	15	Promotes strategies that can improve indoor air quality as well as providing access to natural daylight and views.
Innovation in Design	6	6	Provides additional points for projects that use innovative technologies and strategies beyond what is required by LEED credits or which achieve exemplary performance; one point for involving a LEED Accredited Professional on the team.
Regional Priority	4	4	Additional points for achieving LEED credits deemed most important to the distinct region of the project
Total	110	110	Minimum 40 points for Certification; 50 points for Silver; 60 points for Gold; 80 points Platinum

As an example of our efforts, the National Zoological Park has begun to implement a series of efforts in sustainable design and high performance buildings in accordance with the Guiding Principles. The results of the Zoo's efforts include:

- Many new buildings with sustainable features such as green roofs to reduce storm-water runoff;
- Some pathways that are paved with eco-friendly tree resin-based products instead of petroleum-based asphalt;

- Incorporating sustainable materials like rapidly renewable bamboo, recycled rubber mats, and wood that is certified as sustainably harvested into exhibits and pathways;
- Construction on a new Elephant House that incorporates:
 - Forty geothermal wells which will be used to aid in heating and cooling the building with radiant floor heating and heat pumps for cooling;
 - Super-insulated building envelope, including the massive steel and concrete elephant doors which must withstand 15-kip lateral loads 6 feet above grade;
 - Daylight harvesting and related controls of the lighting system to help optimize energy performance;
 - Natural ventilation strategies for the building, including operable skylights that have retractable shades to optimize energy performance and animal containment doors which allow natural ventilation;
 - Outdoor air economizer ventilation system and CO₂ occupancy sensors for the mechanical system;
 - Concrete that is high in fly-ash content;
 - Structural steel that is high in recycled content;
 - Management of construction waste and construction waste recycling programs;
 - A green roof system to reduce storm water runoff, provide additional insulation, and create habitat for local birds, butterflies, and other fauna, and ;
 - Use of recycled materials such as sand, wood chips, stone, and demolished concrete.

Beyond our successes, the challenges for the SI are:

- The difficulties in showing incremental progress if only tracking implementation of sustainability principles in buildings by LEED certifications.
- Maximizing implementation of sustainable design and operations strategies in its facilities with the existing capital program budget.
- Evaluating where to get the best return on investment for sustainability initiatives.

5. GOAL: Regional and Local Planning

Goal Description

The Smithsonian is the steward of the nation's treasures in perpetuity and is much more than a collection of facilities. Through scientific research, education, and especially important to its mission - access to the visiting public - the Smithsonian embraces its planning and siting decisions. To that end, we note the important objectives of Goal Area 5 – Regional and Local Planning, but apply it globally in host nations and communities.

- Incorporate participation in regional transportation planning (recognition and use of existing community transportation infrastructure) into existing policy and guidance;
- Align SI policies to increase effectiveness of local energy planning;

- Incorporate sustainable building location into policy and planning for new Federal facilities and leases;
- Update agency policy and guidance to ensure that all Environmental Impact Statements and Environmental Assessments required under the National Environmental Policy Act (NEPA) for proposed new or expanded Federal facilities identify and analyze impacts associated with energy usage and alternative energy sources;
- Update agency policy and guidance to ensure coordination and (where appropriate) consultation with Federal, State, Tribal and local management authorities regarding impacts to local ecosystems, watersheds and environmental management associated with proposed new or expanded Federal facilities.

Agency Lead

The Smithsonian's organizational lead for further goal area target development, implementation, and oversight is the Office of Facilities Engineering and Operations', Office of Planning and Project Management (OPPM).

Implementation Methods

The unique public-facing mission necessitates special implementation methods associated with local and regional planning efforts:

- The SI collaborates with local governmental authorities and decision makers through outreach to the National Capital Planning Commission (NCPC).
- OFEO, OPPM has a designated NEPA coordinator.
- SI participates in the interagency Federal Triangle Stormwater Management Study.
- SI Master Plans include a sustainability component.
- SI builds very few new construction projects. Most projects are renovations or reconfigurations of existing buildings. However, where possible in the few cases where new sites will be pursued under leases or new construction, SI policies will state preferences for siting that meets the requirements of LEED Sustainable Sites credit 2, Community Connectivity. For example, this may include terms of adjacency to subway routeS or within one-quarter mile of two separate and distinct bus lines and to 10 basic services as defined by LEED.

Positions

The Smithsonian currently employs planners and real estate specialists in the Office of Planning and Project Management.

Planning Table

The actions listed in this goal are related to SI Planning efforts are embedded in the Goal 4 Planning table for Sustainable High Performance Buildings.

Agency Status

SI-specific challenges related to regional and local planning include the following:

- Siting decisions for new museums are often political.
- Siting decisions for research and back-of-house facilities are often operational (observatories must be in remote areas; ancillary and support functions, like Suitland warehouse and Herndon data necessary for collection storage and administrative or technological support, are usually sited outside dense, spatially constrained urban areas).

To incorporate sustainable building location into policy and planning, SI requests for proposals for leased facilities will state a preference for siting which meets the requirements of LEED Sustainable Sites credit 2, Community Connectivity, where practical. These preferences, for example, would contain terms of adjacency to subway routes, or within one-quarter mile of two separate and distinct bus lines, and to 10 basic services as defined by LEED. The SI office responsible for Real Estate and the OPPM will recommend siting policies and encourage their adoption for new construction.

On the issue of NEPA compliance and impacts analysis, new facilities under the purview of the National Capital Planning Commission (NCPC) must comply with NCPC NEPA path. SI facilities outside NCPC purview will also follow NEPA guidelines for other agencies if required by those agencies with jurisdiction over the property. Impacts analysis associated with energy usage and alternative energy sources further relate to commuting habits and GHG inventories.

Consultation with Federal, State, Tribal, and local management authorities regarding impacts associated with proposed new or expanded Federal facilities is conducted consistent with NEPA.

For purposes of measurement and verifications related to local and regional planning, the SI will:

- Consolidate NEPA records and efforts in one shared network location.

6. GOAL: Water Use Efficiency and Management

Goal Description

The Smithsonian has achieved notable accomplishments in the area of water use efficiency and management – many of which are discussed in this section. These accomplishments are sound evidence of our ability to meet the goals outlined in Executive Order 13514, as noted:

- a. Reduce potable water use intensity by at least 26% by FY 2020
- b. Reduce industrial, landscaping, and agricultural water use by at least 20% by FY 2020
- c. Identify and implement water reuse strategies
- d. Achieve objectives established by EPA in Storm Water Guidance for Federal Facilities

The SI seeks to reduce potable water use and reduce total water across a range of activities which use industrial, landscaping, and agricultural processes. SI is committed to innovation in water efficiency and will pursue water reuse strategies where possible. With a significant footprint in the nation's capital including a symbolic presence on the National Mall, SI intends to set a leadership example in storm water management by responding to site-specific topography and hydrology with appropriate best practices. As a precursor to responsible water management, SI must continue to build capacity for measurement and verification throughout its facilities.

Agency Lead

The Smithsonian's organizational lead for goal area target development, implementation, and oversight is the Office of Facilities Engineering and Operations, Office of Facilities Management and Reliability

Implementation Methods

SI will use a comprehensive approach to improving water use efficiency and management. The following actions seek to reduce total water use while furthering knowledge of consumption trends:

- Conduct studies similar to the NMNH water reclamation study at other SI sites to better understand challenges and opportunities associated with each facility and its location.
- Systematically identify sourcing, use, and discharge alternatives at each SI facility.
- Install metering for sub-systems and individual use-level where possible.
- Assess alternatives for capture and reuse, rainwater harvest, on-site infiltration and/or treatment, non-potable sourcing, and other innovative approaches with quantifiable return on investment.
- Investigate how to finance smart monitoring systems with powerful reporting and analysis capabilities.
- Improve fixture and fitting efficiency within existing timeframes for the replacement and upgrade of current equipment.
- Educate visitors through visible, on-site signage and other media.

In the near term, SI will continue to identify easily attainable goals to improve efficiency while installing monitoring devices. In the coming months, SI will also determine budgetary needs for additional water use studies and metering infrastructure in various facilities. Concurrently, various implementing units within SI will assess a menu of options for improving performance.

Positions

The Smithsonian does not specifically dedicate staff for activities related to this goal. These activities are generally handled by facility managers and new projects are implemented by facility management or design and construction staff, depending on whether projects are ongoing maintenance or new capital improvements.

Planning Table

The information shown below is based on the implementation of specific water conservation and reclamation projects at the National Museum of Natural History (NMNH), stemming from a Mall-Wide Water Reclamation study piloted at this museum and intended for future replication across other Smithsonian facilities located on the National Mall.

Beyond the projects planned for the NMNH, it was not possible to accurately quantify interim targets and investments related to this goal at this time. However, SI will endeavor to work towards such quantification in future versions of this report.

WATER USE EFFICIENCY & MGMT	Units	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	....	FY 20
Potable Water Reduction Targets (gal/SF reduced from FY07 base year)	%	6%	8%	10%	12%	14%	16%	....	26%
Planned Potable Water Reduction (gal/SF reduced from FY07 base year)	%	6%	8%	10%	12%	14%	16%	....	26%
Industrial, Landscaping, and Agricultural Water Reduction Targets (gal reduced from FY10 base year)	%	0	2%	4%	6%	8%	10%	....	20%
Planned Industrial, Landscaping, and Agricultural Water Reduction (gal reduced from FY10 base year)	%	0	2%	4%	6%	8%	10%	....	20%

Agency Status

For 2009, the SI reports a reduction in water intensity compared with 2007 of at least 4 percent and is on track for 16 percent in 2015.

The SI had two notable achievements in water management during this last year:

- The SERC Advanced Wastewater Treatment Plant, completed in March 2009, replaced conventional septic treatment of waste with state-of-the-art aerobic digestion and filtration resulting in very clean, high quality, tertiary-treated effluent that will ultimately be recaptured and reused.
- The initiation of a comprehensive Mall-Wide Water Reclamation Initiative, a pilot project started with research at the National Museum of Natural History with the purpose of identifying the immediate and future potential of water reclamation.

The comprehensive report from this pilot project examined many water management strategies, and recommended that SI conduct the following at facilities in the National capitol region:

- Collect and treat rooftop rainfall and surface runoff for use to meet irrigation demand and cooling tower make-up water;
- Collect and treat air conditioning condensate for use to meet irrigation demand;

- Replace existing plumbing fixtures with new, more water efficient plumbing fixtures;
- Evaluate the irrigation system for possible improvements in efficiency and management;
- Increase water efficiency of cleaning and maintenance equipment;
- Implement additional monitoring and/or metering of individual building components to refine building management plans, and;
- Install vegetated roofs wherever possible.

In 2009, The SI National Zoological Park (NZP) began to track water usage to understand where water conservation strategies should be implemented. By repairing leaks in one aquatic exhibit, NZP saved 110,000 gallons per day. In addition, NZP performed reforestation and stream bank restoration along Rock Creek.

To fulfill short term goals for water conservation and quality, NZP will:

- Conduct water audits of all National Zoo buildings;
- Communicate water use;
- Make recommendations for reducing water use, and
- Implement water conservation and quality practices such as:
 - Installing rain barrels
 - Decreasing storm water runoff by redirecting rainfall into natural infiltration beds
 - Implementing rain gardens
 - Implementing a Seal Lion gray water collection system and erosion control
 - Integrating practices that reduce storm water contamination, like replacing the snow team's use of salt during ice storms with viable alternatives
 - Installing water misters with automatic sensors
 - Continuing to reduce or eliminate toxic pesticide use around water ways

SI recognizes significant challenges to meeting its water use efficiency and management goals. At present, the data available on water use in SI facilities is often aggregated and lacks detail. Thus, it is hard to tell where the greatest potential lies. In many cases the cost of acquiring information or installing monitoring capability is prohibitive and the priority for water efficiency projects in the capital planning process is traditionally low. SI is also unique in the range and diversity of water uses within its facilities. Similarly, the physical characteristics of specific sites and surrounding areas create challenges to the implementation of SI-wide storm water policies and plans, which require tailoring and distillation at the facility level for maximum gain.

7. GOAL: Pollution Prevention and Waste Elimination

Goal Description

The purpose of this goal is to create policies and strategies to prevent pollution and eliminate waste through source reduction, diversion, and acquisition of chemically-free products and materials. The SI will draw on best practices (both regionally and locally) to develop policies and recommendations for reducing the generation of waste, increasing recycling and composting, purchasing products and materials that contain less harmful chemicals, and integrated pest management. Although tracking systems exist for several of these metrics, the SI will look to advance and centralize the tracking system, so as to streamline the measurement, verification, reporting, and evaluation processes for this goal area. Specifically, the SI will aim to:

- Increase source reduction of pollutants and waste;
- Divert at least 50% non-hazardous solid waste by FY 2015, excluding construction and demolition (C&D) debris;
- Divert at least 50% C&D materials and debris by FY 2015;
- Reduce printing paper use;
- Increase use of uncoated printing and writing paper containing at least 30% post consumer fiber;
- Reduce and minimize the acquisition, use, and disposal of hazardous chemicals and materials
- Increase diversion of compostable and organic materials from the waste stream;
- Implement integrated pest management and landscape management practices to reduce and eliminate the use of toxic and hazardous chemicals and materials;
- Increase agency use of acceptable alternative chemicals and processes;
- Decrease agency use of chemicals to assist agency in achieving FY 2020 GHG reduction targets [See Section 2.II.1.and 2.II.2 above];
- Report in accordance with Sections (301-313) of the Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986.
- Maintain/manage USTs/ASTs used to store petroleum products or hazardous materials in accordance with RCRA, EPCRA, SPCC and local government requirements.
- Decrease point source and non-point source water pollutants, effluents or other discharges that may exceed Clean Water Act (CWA) standards.
- Decrease point source and non-point source air emissions that may exceed Clear Air Act (CAA) standards.

Agency Lead

The Smithsonian's organizational lead for goal area target development, implementation, and oversight is the Office of Facilities Engineering and Operations, Office of Facilities Management and Reliability.

Implementation Methods

To meet their targets, the SI will draw on the best practices and recommendations of LEED for Existing Buildings: Operations & Maintenance (EB: O&M) in its approach to increasing source reduction of pollutants and waste. Other sources and standards for reduction of pollutants and

waste can be found through the Green Restaurant Association, U.S. Composting Council, and USDA Biopreferred products program. Accordingly, the SI will devise plans, policies and programs for the following, setting consistent SI-wide goals but allowing for regional variations in methodology:

- Waste management of ongoing consumables (defined as low-unit cost items frequently replaced, such as paper;
- Waste management of durable goods;
- Waste management for organic material;
- Waste management for construction and demolition waste debris;
- Chemical and pollutant source control;
- Integrated pest management (IPM), including conformance to LEED requirements for prior notification of occupants, and;
- The reduction of particulate matter through techniques such as source interruption, cleaning, and HVAC filtration.

To accomplish plans, policies and goals, the SI must fulfill the following sub-goals:

- Standardize waste tracking through OFEO (GSA currently tracks and quantifies SI waste);
- Perform periodic waste audits;
- Increase recycling efforts, especially at points of visitors' service (GSA currently tracks and quantifies SI recycling) ;
- Include construction and demolition waste diversion target requirements in all contractual agreements;
- Monitor recycling operations in back-of-house areas to ensure policies are being followed;
- Devise an SI-wide plan for composting and organic material, and ;
- Ensure that existing SI IPM standards are included and enforced in all vendor contract agreements.

Further, to minimize generation of ongoing consumables waste, the SI will:

- Eliminate hard-copy purchase orders through use of electronic signatures ;
- Use FTP server, SharePoint server, and ListServ techniques to avert large file prints and CD downloads;
- Expand implementation of eco-fonts;
- Improve and refine participation in NCR recycling program
- Consider a battery recycling program

The largest and most immediate task under this goal area is to identify baselines. Once the SI better understands its current level of performance, it can fully implement the comprehensive and innovative actions listed above.

Positions

In terms of staff availability, the SI has several entities that are already gathering and quantifying the information needed in this goal area, mostly located in the Office of Facilities Management and Reliability. Construction and Demolition waste is handled through contracts managed by the Office of Engineering Design and Construction.

Planning Table

POLLUTION PREVENTION & WASTE ELIMINATION	Units	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15
Non-Hazardous Solid Waste Diversion Targets (non C&D)	%	10%	15%	20%	30%	40%	50%
C&D Material & Debris Diversion Targets	%	10%	30%	50%	50%	50%	50%

Agency Status

In 2009, the SI saw a number of positive trends in recycling. The Institution has seen a 10-fold increase recycling of bottles and cans. The amount of cardboard recycled increased by 36 tons overall in the past year. Also in FY 2009, the SI purchased floor scales to spot check hauling vendor supplied weight tallies. FY 2009 also marked a significant improvement in data reporting from hauling and disposal vendors, which allowed the SI to begin tracking monthly total weight of solid waste hauled from SI facilities and disposed at landfills. Combining the landfill and recycling data has enabled the SI to make its first estimates of waste percentage diverted from landfill disposal. For the period from FY 2008 to FY 2009, this value was approximately 14%.

As an example of improving waste management, the following waste management strategies have been implemented at the National Museum of Natural History (NMNH):

- Eliminated Styrofoam and plastics from the Cafes and replaced them with corn, potato starch, sugar cane fiber and paper-based compostable products. Pulping and composting the material will begin this year;
- Cooking oils and grease are collected from cafes and recycled into bio-diesel;
- Extra café food is donated to local food banks. More than 2,500 pounds last year;
- Commingled recycling is collected from all staff and public areas including the cafes and has increased 370 fold in two years;
- Replaced café chairs and tables were diverted to be used by a non-profit organization;
- Whole fruits are exclusively organic reducing customer pesticide exposure;
- Cafes offer \$.05 discounts for staff using their own mugs and staff use of personal reusable dishes and flatware is encouraged;
- Compostable paper cups are offered with signage to encourage drinking tap water rather than bottled water;

- Cardboard from staff areas, cafes, and Smithsonian Enterprises operations are combined and recycled;
- Commingled paper from all sources is recycled;
- Wooden shipping pallets/skids are recycled through a vendor that reuses whole pallets and grinds broken pallets into mulch;
- Staff are calling catalog mailers and other shippers to cancel mailings to reduce junk mail;
- NMNH IT is setting up an internal web site for posting notices of surplus furniture, misc. office supplies and other materials to divert them from waste streams;
- Batteries are collected from staff and at store counters and recycled through OSHEM;
- IMAX 3-D eye glasses are cleaned and reused;
- Cell phones are recycled through SE and Nokia;
- IMAX theater seating and carpeting are being recycled by SE;
- Printer and toner cartridges are recycled by NMNH IT;
- Computers are recycled through contracts with DELL computers;
- Tree limbs, leaf debris, etc. is composted through HSD;
- Gift shop staff reduce bag use by asking the customer if they need a bag before bagging their purchase;
- Reusable tote bags are offered for sale at each register;
- Scrap metal is recycled from all sources (177 tons last year);
- Storm drains around the building are marked with anti-pollution decals;

Additionally, the NZP has implemented the following:

- Installed almost 200 containers to collect recyclable cans and bottles used by visitors and staff. In their first season of use, the NZP increased the amount of recycled material from ¼ ton to 2 ½ tons per month;
- Established an electronic-waste recycling collection program for staff and visitors. The volunteer organization Friends of the National Zoo (FONZ) partially funds education and conservation programs with proceeds from recycled electronic devices, including cell phones and accessories, MP3 players, digital cameras, gaming devices, external hard drives, certain laptop computers, printer cartridges and many types of batteries.
- Reused and recycle paper, cardboard, newspapers, and magazines in all of office areas.
- Reused items like cardboard tubes, fire hose, and empty boxes as enrichment for the Zoo's animals.
- Composted green waste or reused it as exhibit furnishings or animal enrichment.
- Worked with Zoo vendors to recycle mulch bags and plastic pots.
- Reduced the use of bags in souvenir shops and providing visitors the option to purchase reusable bags.

- Eliminated Styrofoam plates and containers and replaced many food services products with those that have 80-100% post consumer recycled content and/or are biodegradable.
- Provided utensils in Zoo restaurants made from eco-friendly materials such as corn, sugar cane or bamboo as well as bio-degradable utensils and serving-ware at special events.
- Composted much of the Zoo's food scraps, plant material, and animal waste (several dumpsters each week).

Goals for waste management at the zoo over the next year include:

- Expansion of composting efforts and creation of a demonstration site;
- Collection of grease from food services to be converted to bio-diesel;
- Continued work with vendors to reduce packaging;
- Implementation of reusable food storage containers for animal feeding; evaluating where reusable vs. disposable containers are being used, with options for making changes;
- Ensuring that all buildings/offices have co-mingle recycling bins and are being used by Zoo staff;
- Continuing to reduce or eliminate use of plastic bags in Souvenir shops and provide increasing supply of reusable bags for Zoo visitors, and;

Among the challenges in this goal area is the enormous presence of visitors. However, this also presents SI with an opportunity and a responsibility to help influence the waste and recycling behaviors of an enormous amount of people per year – behaviors that can bring changes far beyond the confines of SI facilities. To this end, the SI will continue to improve upon recycling efforts and reduce waste generation through increased public education and more effective waste management throughout its facilities.

8. GOAL: Sustainable Acquisition

Goal Description

SI has great opportunity to reduce environmental impact through its purchasing practices. Where practicable, the SI will incorporate into its task and delivery orders various sustainability requirements modeled from criteria included in Executive Order 13514. The noted goals are:

- a. To ensure that 95% of new contract actions, including task and delivery orders under new contracts and existing contracts, require the supply or use of products and services that are energy efficient (Energy Star or FEMP-designated), water efficient, bio-based, environmentally preferable (including EPEAT-registered products), non-ozone depleting, contain recycled content, or are non-toxic or less toxic.
- b. To update agency affirmative procurement plans (also known as green purchasing plans or environmentally preferable purchasing plans), policies and programs to ensure that all Federally-mandated designated products and services are included in relevant acquisitions, where practicable.

Agency Lead

The Smithsonian's organizational lead for target development, implementation, and oversight of Goal Area 8, Sustainable Acquisition is the Office of the Chief Financial Officer, Office of Contracting and Personal Property Management (OC&PPM) within the Office of the Chief Financial Officer.

Implementation Methods

- Smithsonian Directive 314, Contracting (SD314), contains SI contracting policy and is implemented through the Procurement and Contracting Procedures Manual (PCPM). The SD and PCPM are periodically reviewed and updated as necessary by OC&PPM. The PCPM guides both large contracts and simplified acquisitions. OC&PPM are currently in the process of updating the PCPM, to which guidance will be included to assist with assuring compliance with the SI level of conformance to Executive Order 13514. SI will undertake an array of actions to reach the Goal 8 performance targets, and incorporate, where practicable, sustainability specifications in vendor selection and contract language;
- Continue working with computer vendors to expand equipment recycling programs;
- Adopt the tenets of electronic commerce in the acquisition process wherever practicable and not prohibited by special requirements or law;
- Create guidance for contracted vendors managing inventories of custodial supplies and consumables;
- Use SI intranet and existing in-house training of purchasing staff to inform and educate on green purchasing procedures;
- Amend existing purchasing checklists to guide individuals making purchases through decentralized processes.
- Explore additional financial chartfields or values in PeopleSoft Financials to enable tracking green purchases

Positions

This is a new initiative and therefore it may be difficult to implement the actions required as well as monitor and assess compliance with existing staff. As a result, implementation may be slower than desired.

Planning Table

It is not possible to accurately quantify all of the interim targets and investments related to this goal at this time. However, SI will endeavor to work towards such quantification in future versions of this report.

Agency Status

Although SI has always emphasized purchasing of eco-friendly products and paper and other products with recycled materials when they adequately meet the needs of the purchasing unit, work already underway to meet the above performance goals is, in many ways, breaking new ground for SI. Since there is no precedent for a standalone sustainable purchasing policy, SI seeks to integrate sustainability actions into existing policies and acquisition processes.

At present, tracking and monitoring capabilities do not facilitate measurement of sustainable percentages for the identified acquisition categories, and data on decentralized purchases made at the individual SI units is extremely burdensome and difficult to collect. This remains a significant barrier to computing baselines and developing targets for which measurement of progress will be practical.

The OC&PPM will investigate the potential of current system enhancements to assist with improved procurement reporting, including the use of purchase cards. Current

9. GOAL: Electronic Stewardship and Data Centers

Goal Description

Perceived globally as a keeper and protector of knowledge, SI has the responsibility to improve environmental stewardship of its data and information management practices. SI is committed to following best practices in energy efficiency with respect to electronic device use and data center design and operation. SI also seeks to reduce the impact of electronic asset disposition by working with government and non-profit entities and participating in established industry programs. The specific goals for Electronic Stewardship and Data Centers, as outlined in Executive Order 13514 are:

- a. Establish and implement policy and guidance to ensure use of power management, duplex printing, and other energy efficient or environmentally preferred options and features on all eligible agency electronic products.
- b. Update agency policy to reflect environmentally sound practices for disposition of all agency excess or surplus electronic products.
- c. Update agency policy to ensure implementation of best management practices for energy efficient management of servers and Federal data centers.
- d. Goals should identify how the agency intends to meet technology energy consumption reduction goals in its data centers.
- e. Discuss how the agency is planning on meeting the technology energy reduction goals in data centers. Include details on the investment plan, covered vs. non-covered facilities, and how the agency identified the covered facilities.
- f. Discuss how the agency will increase the quantity of electronic assets disposed through sound disposition practices. Include in the discussion how your agency is using or plans to use programs such as disposal through GSA Xcess, recycling through Unicor, donation through GSA's Computer for Learning (CFL) or other non-profit organizations, and/or recycling through a private recycler certified under the Responsible Recyclers (R2) guidance or equivalent.

Agency Lead

The Smithsonian's organizational lead for Goal Area 9 target development, implementation, and oversight is the Office of the Chief Information Officer's Office of Information Technology Operations.

Implementation Methods

SI developed comprehensive technology and acquisition strategies that substantially improve electronic stewardship and data center efficiency to meet the performance targets of Goal Area 9, Electronic Stewardship and Data Center. In brief, these strategies include:

- Complete consolidation and collocation of data centers;
- Expand use of server virtualization technology;
- Encourage staff to purchase computers and laptops through existing blanket purchase agreements, and;
- Revise system-wide default settings on printers, computers and monitors to maximize energy and resource efficiency and reduce waste.

Positions

Additional FTEs are not anticipated.

Planning Table

ELECTRONIC STEWARDHIP & DATA CENTERS	Units	FY 10	FY 11	FY 12	FY 13
% of device types covered by current Energy Star specifications that must be energy-star qualified ¹	%		90%	95%	hold
% of electronic assets covered by sound disposition practices ¹	%				
% of cloud activity hosted in a data center	%		30%	60%	hold
% of agency data centers independently metered or advanced metered and monitored on a weekly basis	%		90%	100%	hold
Reduction in the number of agency data centers	%		20%	40%	hold
% of agency, eligible electronic products with power management and other energy-environmentally preferable features (duplexing) actively implemented and in use	%		95%	100%	hold
% of agency data centers operating with an average CPU utilization of 60-70%	%		50%	75%	hold
% of agency data centers operating at a PUE range of 1.3 – 1.6	%		25%	50%	hold
% of covered electronic product acquisitions that are EPEAT- registered	%		95%	95%	hold
% of agency data center activity implemented via virtualization	%		30%	40%	hold
Other, as defined by agency					

Agency Status

The SI acquires $\geq 95\%$ EPEAT-registered (Electronic Product Environmental Assessment Tool) electronics, enables power management features on 100% of eligible laptops & monitors, strives to extend life to ≥ 4 years, and uses sound disposal practices. The SI has an ENERGY STAR electronics purchasing plan and is on track to implement goals by December, 2010. Details of progress and current efforts are listed below:

- EPEAT is a system to help purchasers in the public and private sectors evaluate, compare and select desktop computers, notebooks and monitors based on their environmental

attributes. More than 95% of SI current computers are Dell computers. Every computer listed in the SI Blanket Purchase Agreement (BPA) with Dell is EPEAT-compliant and all computers purchased for the Periodic Desktop Replacement Program are purchased through the Dell BPA. All 810 machines purchased through the Dell BPA in 2009 (including 490 desktops and 320 laptops) were EPEAT compliant.

- The SI extends the life of computers to 4 years through our Periodic Desktop Replacement Program. That program targets replacing PCs every four years. SI business units get the vast majority of their computers through this program, and these are EPEAT compliant machines.
- The SI is working towards being fully Energy Star compliant. At the present time, laptop computers and monitors are compliant.
- The SI complies with end of life goals in using Dell's Asset Recovery Service. Dell takes all SI computer hardware back for credit and recycles or disposes of the hardware in a manner that meets or exceeds all of the EPA guidelines.
- OCIO began installing new software on all Smithsonian Windows computers. This new software, *EcoFont*, is designed to reduce the ink density of standard fonts to enable the use of 20% less toner for printed documents without compromising legibility.

The current status on SI policy and guidance to ensure use of power management, duplex printing, and other energy efficient or environmentally preferred options and features is notable. Our technology program strives to implement such features as noted below:

- SI currently has power monitoring and management settings in place for desktop machines. This was not done in response to a directive, but rather as a standard operational and deployment protocol. OCIO will seek to expand power management features to laptops, where feasible.
- Duplex printing is the default for all printers with that capability. This can be changed for individual print settings, but default cannot be changed. This is a network wide setting. At present, the SI is not certain of the number of printers that generate duplex output, and is investigating whether a potential supplier will perform this study for free.

In order to update agency policy to reflect environmentally sound practices for disposition of all agency excess or surplus electronic products:

- SI uses Dell's asset recovery service to recycle equipment. This information was reported to EPA in recent scorecards; some data is available on what was bought and recycled; OCIO is confident that this is in the high-90s percentage range.
- SI will develop a policy by leveraging an agency or industry standard template.

In order to update agency policy to ensure implementation of best management practices for energy efficient management of servers and Federal data centers, SI is advancing in its work to sub-meter and consolidate data centers. SI has 4 data centers, including those in Herndon, VA (13,000 sf); Washington, DC and Suitland, MD (500 sf in total), which support NMAI as redundant sites for critical business functions; and STRI, Panama (~500 sf). In recent months,

the SI recently underwent a process to reduce the number of servers in use, a notable achievement in electronic stewardship. Of the 305 servers identified:

- 162 were consolidated to the Herndon Data Center;
- 54 were decommissioned;
- 20 are still under evaluation;
- 63 were retained at their existing location where they are (typically specific to a function that is locally tied; the bulk of these (40 of 63) are at the Zoo where no latency is required)

Efforts to consolidate SI servers are outlined in detail in the table below:

SI/OCIO/OIT Server Management Status					
Unit/Museum	Total Unit Servers	Co-located to HDC	Taken Offline	Being Evaluated for Co-Location	Will Remain at the Museum/Unit
AAA	1	1	0	0	0
CHNDM	5	1	2	0	2
Folklife CFCH	10	10	0	0	0
Fort Pierce	1	0	0	0	1
FSGA	12	2	6	0	4
NASM	18	14	2	0	2
NMAI	43	7	11	20	5
NMAH	15	7	8	0	0
NMNH	54	34	18	0	2
NZP	65	20	4	0	41
OEA/OD	7	7	0	0	0
OFEO/OPS	4	3	0	0	1
OHR	3	3	0	0	0
SAAM	5	5	0	0	0
SBV	40	40	0	0	0
SITES	3	3	0	0	0
SERC	9	2	2	0	5

SI/OCIO/OIT Server Management Status					
Unit/Museum	Total Unit Servers	Co-located to HDC	Taken Offline	Being Evaluated for Co-Location	Will Remain at the Museum/Unit
SIA	3	3	0	0	0
SIL	1	1	0	0	0
TSA	8	7	1	0	0
TOTALS	307	170	54	20	63

At present, roughly 93% of total data center square footage has advanced metering in place. The facility in Herndon is fully sub-metered, while those supporting NMAI and STRI are not (small closet size rooms with less than 10 servers remaining on-site).

Currently, virtualization is at less than 1%. Phase 1 of the data center streamlining plan (co-location) has already been completed, as described above, in response to the data center reduction sub-goal. Phase 2 (consolidation) has yet been allocated funding due to budgetary and political constraints.

The challenges with tracking IT purchases from the standpoint of compliance with OMB requirements are threefold:

1. While the Dell BPA is product rich and priced competitively, it is not a mandatory use vehicle for SI units. Further, Dell products cannot meet all of SI computing requirements and mandatory use of a single BPA may also violate federal procurement law. There is currently no mechanism to gain visibility into unit level IT purchases.
2. SI lacks over-arching procurement/IT policy or guidance that directs units to consider EPEAT-compliant purchases, so many units (if not most) likely do not consider EPEAT when making an IT purchase. They simply are not aware of the value of the requirement. Once implemented, additional steps will be required to establish an audit of SI procurement activities to verify our level of compliance.
3. Lastly, reporting of IT purchases is required by OMB. Reports must be aggregated SI-wide to demonstrate compliance with green IT efforts.

10. GOAL: Agency Innovation

Goal Description

The purpose of Goal Area 10 Agency Innovation is to develop innovative methods, practices, technologies, or techniques to expand sustainability beyond what is required in Executive Order 13514 and beyond what is described elsewhere in this document. Part of the definition of innovation is that it should be replicable in other situations and by other agencies. To that end, the SI has realized tremendous successes in Institution-wide coordination and has developed a robust set of unique and innovative ideas that are discussed in this section.

Agency Lead

All offices of the SI can lead to the fulfillment of this goal. Coordination across the Institution is led by the Strategic Sustainability Officer and the Office of Facilities Engineering and Operations.

Implementation Methods

For purposes of collaboration, innovation and identifying unique implementation methods, the SI held two workshops attended by staff from many SI facilities, including SI architects, energy managers, fleet managers, museum exhibit designers, purchasing managers, and information technology (IT) representatives. On April 1, 2010, the Office of Facilities Engineering and Operations (OFEO) coordinated and held the first of two kick-off meetings to outline the requirements of EO 13514 and related Federal directives and Acts, such as the Energy Independence and Security Act of 2007. On April 8 the 40-person workshop – including the SI Senior Sustainability Officer -- met to give input and ideas and identify informational gaps. Subsequent follow up meetings and data gathering continued where possible in the limited time frame. Representatives of OFEO coordinated these meetings and will continue to act as facilitators for this data gathering, which will use an internal SI SharePoint site as a digital working archive.

The SI will continue this coordination effort, and all ideas previously identified will need assignment to responsible parties and a timeframe for implementation. These innovative ideas currently under evaluation are categorized and noted as follows:

Financing

- Continue using Energy Performance contracts to obtain funding outside of the Capital Program request, S&E, and/or trust funds;
- Reach out to patrons interested in funding green SI initiatives;
- Research EPA grants and similar, and;

Integrated Education

- Internal education:
 - Continue to use videos and webinars to educate staff on sustainability (and avoid travel).
 - Update employee orientation programs to focus on green behavior, and;
 - Continuously educate occupants on recycling, thermostats, lights, etc.
- External education:
 - Use signage to inform the public of their responsibilities within all SI facilities, and;
 - Build on digitization efforts associated with SI collections, and develop a full-blown “virtual museum” to allow the public to travel to the SI.

Goal Area 4 High Performance Sustainable Design/Green Buildings

- Continue discussions with the US Green Building Council to explore the establishment of a LEED for Museums pilot, and;
- Work with the EPA to share data, leverage resources, and investigate expanding the CBECS database so that museums can become a ratable space type.

Goal Area 5 Regional-Local Planning

- Identify urban and suburban reforestation opportunities near sites, as engaged carbon offsets.

Goal Area 6 Water Use Efficiency and Management

- Expand efforts in the area of storm/rainwater capture, and;
- Determine feasibility to direct that future construction projects have onsite water treatment and reuse.

Goal Area 7 Pollution Prevention and Waste Elimination

- Evaluate conducting annual or biannual waste audits;
- Assess food composting at restaurants;
- Implement broader public sorting of recyclables, with signage and education campaign, and;
- Plan for waste audits at each individual facility to identify the amount, type, and opportunities for further recycling of waste generated, and helping to increase education and access to recycling for the staff members and visitors of the SI.

Goal Areas 8-9 Sustainable Acquisition and Electronic Stewardship

- Continue to evaluate methods for enterprise tracking, develop tools, and then offer to share these with other Agencies.

Communication

- Use the Sustainability Committee SharePoint site as a more prominent link on the SI intranet site, Prism;
- Prominently post the SSPP on the Intranet site;

- Leverage OCIO technology to communicate with Public Affairs offices regarding web interfaces with the public.
- Work with the museum directors to implement sustainability content and links to the general SI sustainability page website;

To further innovation goals, the SI is already collaborating with or proposes to reach out to other organizations to form partnerships. Targeted organizations include:

- The National Park Service
- The Department of Energy
- The Federal Facilities Council
- The American Public Gardens Association
- The International Association of Museum Facility Administrators
- The EPA ENERGY STAR Program
- US Green Building Council

As an example of its commitment to innovative deployment of information technology, the SI in 2009 released an Information Technology Plan for FY 2009 through 2014. In it, the SI describes its progress and staffing, as well as its overall goal: to digitize all its collections. “By digitizing collections, archives, library, and research information, the Smithsonian can continue to focus on its founding mission to increase and diffuse knowledge while simultaneously pursuing its current objectives of dramatically enlarging its audiences and the degree of engagement with them, and strengthening its scientific research. Digitizing our collections will help the Institution meet its founding mission to increase and diffuse knowledge broadly, deeply, and personally. Throughout the Institution an urgent need exists to enrich records with textual information and images, and to make this information available to the public on the web.”

Positions

The ideas presented in this section require the efforts of many existing staff members.

Planning Table

Specific investments in these strategies cannot be determined at this time.

Agency Status

In 2009, SI implemented a variety of innovative initiatives. These are summarized below:

- SI hosted “Convergence on Zero: the Transition to Zero Emissions” conference as part of the Smithsonian Folklife Festival. This effort was based on collaboration between SI and the Centre for Alternative Technology in Wales, UK. Leading environmental thinkers and

practitioners from Wales, UK, and the United States shared their experiences and strategies.

- SI applied storm drain markers at SI properties in conjunction with Earth Day and World Oceans Day.
 - The SI completed 100% of construction implementation of ESPC awarded in FY07 for chilled water, domestic hot water, HVAC and lighting upgrades at the American History and Natural History museums. The project will reduce GHG emissions by 3,908 tons/year and remove 8,000 lbs of obsolete ozone depleting refrigerants.
 - SI piloted the use of low energy sleep modes in network PCs.
 - SI implemented the use of B-5 Bio diesel at the National Zoological Park fuel site.
 - SI sponsored an online Education Conference on Climate Change, September 29 through October 1, 2009. Several current research projects at NMNH relate to climate change and carbon cycle and the museum continues to explore ways to strengthen activities in this area.
 - SERC completed a Feasibility Study for the use of ground source energy for heating and cooling of SERC facilities. This project has the potential to replace existing air cooled roof top air handling units with water cooled heat pumps using water circulated deep in the ground.
 - The Smithsonian Migratory Bird Center (SMBC) developed the only 100% organic shade-grown coffee certification, also known as “bird-friendly” coffee which requires coffee beans to be grown in a shade environment that preserves bird habitats. All coffee served at the National Zoological Park carries this certification.
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Section 3: Agency Self Evaluation

The Smithsonian's responses to the Agency Self Evaluation criteria are presented in the table below.

Does your plan provide/consider overarching strategies and approaches for achieving long-term sustainability goals?	YES
Does your plan identify milestones and resources needed for implementation?	Where Possible
Does your plan align with your agency's 2011 budget submission?	YES
Is your plan consistent with your agency's FY 2011 budget and appropriately aligned to reflect your agency's planned FY 2012 budget submission?	YES
Does your plan integrate existing EO and statutory requirements into a single framework and align with other existing mission and management related goals to make the best use of available resources?	YES
Does your plan provide methods for obtaining data needed to measure progress, evaluate results, and improve performance?	YES

The Smithsonian's priority actions for the periods of July-December 2010 and January-June 2011 are presented in the Goal Area tables below.

Goals 1-3 Actions for the Following Year	July-Dec 2010	Jan-June 2011
Hiring one additional energy management staff member	X	
Finalizing metering plan for SI facilities and beginning implementation		X
Updating DOE on findings of evaluations in covered facilities ($\geq 50\%$ of covered GSF) conducted under EISA Section 432		X
Install fleet telemetric devices to optimize vehicle routing and utilization with an expected result of reduced miles driven and fuel use		X
Expand Fleet-Share program to a second site, with an expected fleet reduction of 1%	X	
Develop vehicle allocation methodology baseline and survey	X	
Pilot diesel idle reduction devices in Smithsonian shuttle buses and HD transport vehicles		X
Convert diesel fueling site at the Conservation Research Center to a renewable B-20 bio-diesel	X	
Install fuel management system at the Conservation Research Center. New controls will improve fuel management and accountability. Fuel records will be integrated into the Smithsonian's Fleet management Information System (FMIS)	X	

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Goals 1-3 Actions for the Following Year	July-Dec 2010	Jan-June 2011
Request fleet capitol replacement funding to ensure Smithsonian achieves federal mandates to reduce petroleum and GHG emissions	X	

Goal 4 Actions for the Following Year	July-Dec 2010	Jan-June 2011
To achieve peer agreement/management approval through wider reviews of the SSPP, SBIP, the SD 422 update and OEDC Design Standards (in development now)		X
To designate and agree on responsible persons in OPPM, OEDC and OFMR for these initiatives	X	
To confirm and verify baseline building inventory information	X	
To update annual tracking of LEED projects in progress	X	
To institute a more formal tracking mechanism for sustainability (currently, the SI uses LEED certifications as a validation and means to track LEED projects)		X
To consider using EPA's Portfolio Manager to track the 5 Guiding Principles (including an effort to evaluate and compare to LEED certification)	X	
To continue to pursue, with EPA, the question of a comparative museum building type for energy benchmarking		X
To educate SI visitors on LEED and green building goals, to promote their responsible use of SI resources		X

Goal 5 Actions for the Following Year	July-Dec 2010	Jan-June 2011
NEPA compliance information consolidation	X	

Goal 6 Actions for the Following Year	July-Dec 2010	Jan-June 2011
Identify simple and low cost water efficiency improvements	X	
Determine budgetary needs for additional water use studies and metering infrastructure in various facilities		X

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Goal 7 Actions for the Following Year (Note – all of these actions will be implemented at the Zoo, which will be a pilot for SI-wide facilities)	July-Dec 2010	Jan-June 2011
Expand composting efforts and create a demonstration site at the Zoo		X
Collect grease from food services to be converted to bio-diesel		X
Continue to work with vendors to reduce packaging		X
Implement reusable food storage containers for animal feeding; evaluate where reusable vs. disposable containers are being used and options for making changes		X
Identify a recycling vendor that can accommodate Zoo's green strategies		X
Ensure all buildings/offices have co-mingle recycling bins and are being used by Zoo staff		X
Reduce or eliminate use of plastic bags in Souvenir shops and provide increasing supply of reusable bags for Zoo visitors		X
Track what is being recycled and determine how far above regulatory requirements the Zoo is recycling		X

Goal 8 Actions for the Following Year	July-Dec 2010	Jan-June 2011
Update Procurement Contracting Procedures Manual (PCPM)	X	
Explore creating additional financial chartfields or values in PeopleSoft Financials to track green purchases		X
Create guidance for contracted vendors managing inventories of custodial supplies and consumables		X

Goal 9 Actions for the Following Year	July-Dec 2010	Jan-June 2011
Complete phase 2 of the SI server consolidation project		X
Expand use of server virtualization technology		X
Provide guidance to staff to purchase computers and laptops through existing blanket purchase agreements	X	
Revise system-wide default settings on printers, computers and monitors to maximize energy and resource efficiency and reduce waste	X	

Appendix A: Acronyms and Abbreviations

Acronym	Definition
AAA	Archives of American Art
AF	Alternative Fuel
AFV	Alternative Fuel Vehicle
AP	Accredited Professional
ARRA	American Recovery and Reinvestment Act
AST	Above ground Storage Tank
BLCC	Building Life-Cycle Cost
BPA	Blanket Purchase Agreement
C&D	Construction and Demolition
CAA	Clean Air Act
CBECS	Commercial Building Energy Consumption Survey
CEQ	Council of Environmental Quality
CFCH	Center for Folklife and Cultural Heritage
CFL	Computer for Learning
CHNDM	Cooper-Hewitt National Design Museum
COP	Coefficient of Performance
CRV	Current Replacement Value
CWA	Clean Water Act
DM	Deferred Maintenance
DOE	Department of Energy
EB:O&M	Existing Building Operations and Maintenance
ECB	Environmental Cost and Benefits
EISA	Energy Independence and Security Act
EO	Executive Order
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
EPEAT	Electronic Product Environmental Assessment Tool
ESCO	Energy Service Company
ESPC	Energy Saving Performance Contracting
EUL	Enhanced Use Leasing

Acronym	Definition
FASAB	Federal Accounting Standards Advisory Board
FCI	Facility Condition Index
FEMP	Federal Energy Management Program
FMIS	Fleet Management Information System
FSGA	Freer and Sackler Galleries Archives
FTE	Full-Time Employee
FTP	File Transfer Protocol
FY	Fiscal Year
GHG	Greenhouse Gas
GPRA	Government Performance and Results Act
GSA	General Service Administration
GSF	Gross Square Footage
HD	Heavy Duty (vehicle)
HDC	Herndon Data Center
HSD	Horticultural Services Division
HVAC	Heating, Ventilation, Air Conditioning
IAMFA	International Association of Museum Facility Administrators
IPM	Integrated Pest Management
ISO	International Organization for Standardization
IT	Information Technology
LEED	Leadership in Energy and Environmental Design
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MSCB	Mission-Specific Cost and Benefits
NASM	National Air and Space Museum
NC	New Construction
NCPC	National Capital Planning Commission
NCR	National Capital Region
NEPA	National Environmental Policy Act
NIST	National Institute of Standards and Technology
NMAH	National Museum of American History
NMAI	National Museum of the American Indian

Acronym	Definition
NMNH	National Museum of Natural History
NPV	Net Present Value
NZP	National Zoological Park
O&M	Operation and Maintenance
OC	Office of the Comptroller
OCFO	Office of Chief Financial Officer
OCIO	Office of Chief Information Officer
OCON	Office of Contracting
OCON&PPM	Office of Contracting & Personal Property Management
OEA/OD	Office of External Affairs/Office of Development
OEDC	Office of Engineering Design and Construction
OFEO	Office of Facilities, Engineering, and Operations
OFMR	Office of Facilities Management, and Reliability
OHR	Office of Human Resources
OIT	Office of Information Technology
OMB	Office of Management and Budget
OPMB	Office of Planning, Management and Budget
OPPM	Office of Planning and Project Management
OSHEM	Office of Safety Health and Environmental Management
PC	Personal Computer
PCPM	Procurement Contracting Procedures Manual
PPA	Power Purchase Agreement
R2	Responsible Recyclers
RCM	Reliability Centered Maintenance
RCRA	Resource Conservation Recovery Act
REC	Renewable Energy Certificate
ROI	Return on Investment
SAAM	Smithsonian American Art Museum
SBIP	Sustainable Buildings Implementation Plan
SBV	Smithsonian Business Ventures
SCB	Social Costs and Benefits
SCI	System Condition Index

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Acronym	Definition
SD	Smithsonian Directive
SE	Smithsonian Enterprises
SERC	Smithsonian Environmental Research Center
sf	Square Feet
SI	Smithsonian Institution
SIA	Smithsonian Institution Archives
SIL	Smithsonian Institution Libraries
SITES	Smithsonian Institution Traveling Exhibition Service
SMBC	Smithsonian Migratory Bird Center
SPCC	Spill Prevention, Control, and Countermeasures
SSPP	Strategic Sustainability Performance Plan
STRI	Smithsonian Tropical Research Institute
TMIS	Travel Management Information System
TSA	The Smithsonian Associates
UESC	Utility Energy Service Contracts
USGBC	United States Green Building Council
UST	Underground Storage Tank
VOC	Volatile Organic Compound
www	World Wide Web