

Smithsonian Institution
2019 Sustainability Report and Implementation Plan

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2019

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Executive Summary

Founded in 1846 the Smithsonian Institution 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. We are active in over 80 countries around the world with permanent locations in eight states plus Washington, D.C. and Panama.

James Smithson established the Smithsonian Institution as "an Establishment for the increase and 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 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.

As a trust instrumentality of the United States, the Smithsonian is committed to the goals which Executive Order 13834, Efficient Federal Operations, and remains focused on making improvements in environmental, energy, and economic performance. As stated in the current Smithsonian Strategic Plan, One Smithsonian, Goal 6 – "Preserve natural and cultural heritage while optimizing our assets" underscores our mission and values. Smithsonian Institution is poised to leverage our scholarly intellect to "balance preservation and sustainability."

In response to the Executive Order the Smithsonian is meeting goals to decrease potable water use per square foot and increase use of renewable energy. Deployment of energy efficient, electric, hybrid, and bio-fuel vehicles is reducing petroleum use. A growing recycling program diverts increasing quantities of solid waste from landfill disposal, and cuts Smithsonian greenhouse gas emissions. Smithsonian is making progress but has not yet reached the goal for reduced energy intensity. Fulfilling goals for energy and sustainability performance of the buildings is a challenge. Demands on the buildings, some of which are historic, include maintaining environments suitable for conservation of: 155 million collection objects; 2.1 million library volumes; 162,300 cubic feet of archival material; caring for more than 2,000 live animals and tens of thousands of live plants; accommodating 30 million visitors each year; and hosting hundreds of special events. While continuing to meet these demands, the Smithsonian has attained 3rd party sustainability certifications for building construction and revitalization projects, and operation and maintenance practices.

This 2019 Smithsonian Institution Sustainability Report and Implementation Plan reports sustainability successes and challenges of the past year. It describes the Smithsonian today. More importantly it identifies the sustainability strategies we will pursue in the year ahead, how we will measure progress, and the milestones we intend to reach. It is a map the Smithsonian can follow towards a sustainable future. For more information on sustainability-related programs please visit our website at: www.si.edu. Charts illustrating Smithsonian Institution progress relative to baseline can be accessed at www.sustainability.gov. In Fiscal Year 2019 the Smithsonian Institution plans to advance sustainability in agency operations, meet annual energy and environmental performance targets and requirements including priorities such as:

- Investigate and develop a plan to implement a UESC/ESPC targeting high energy intense museum facilities. Currently targeting the Quadrangle.
- Fix the data discrepancy between SI fleet management and GSA to ensure data is being reported accurately.
- Increase facility energy efficiency by implementing low/no cost HVAC control measure changes, small scale LED lighting retrofits, and steam trap audits and replacements.

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Implementation Summary: Facility Management

1. FACILITY ENERGY EFFICIENCY

FY18 Energy Intensity Progress (Btu/GSF):

15.5% reduction from FY03

1.4% reduction from FY17

FY19-FY20 Plan:

1.5% reduction in FY19 from FY18

1.5% reduction in FY20 from FY19

Implementation Status:

SI plans to increase facility energy efficiency by identifying and implementing low/no cost energy conservation measures relating to HVAC controls and lighting retrofits. The following strategies were completed throughout the fiscal year.

- Performed comprehensive energy and water audits to identify energy conservation measures at the Quadrangle and Donald W. Reynolds Center for American Art and Portraiture.
- Participated in electric demand side management programs through GSA resulting in \$45,000 in rebates.
- Performed existing building commissioning and mechanical equipment Re-Tuning and implement low-cost control measures such as reducing the amount of simultaneous heating and cooling and demand driven fan speed reductions.
- Performed steam trap maintenance program including annual surveys and trap replacements utilizing utility incentives from local providers
- Installed and monitored energy meters and sub-meters at the National Zoo to decrease water consumption.
- Expanded continuous commissioning software connectivity.
- Updated details on evaluations of overdue covered facilities in CTS.
- Used revenue generated from incentive programs to fund projects that reduce energy and water intensity and corresponding GHG emissions.
- Collaborated with division offices to promote formation of a commissioning team to optimize local facility operations.
- Upgrade EnergyCAP software restoring ENERGY STAR Portfolio Manager reporting capability and advanced benchmarking capabilities for easy building access.

Priority Strategies & Planned Actions

- Continue to participate in GSA Areawide energy supply contracts with planned implementation in FY2021.
- Identify and implement Energy Conservation Measures via building audits to implement low cost control measures and lighting retrofits to the extent practical.
- Evaluate available contract vehicles for implementation of energy conservation measures and while upgrading existing infrastructure.
- Pilot Remote Re-Tuning as a more effective alternative to desktop energy audits.
- Continue piloting energy conservation programs and incorporate successful programs into business processes.
- Evaluate and implement measures to reduce Herndon Data Center Power Usage Effectiveness (PUE) equal to or below the six-year historical low.
- Implement phased Advanced Metering projects.

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2. EFFICIENCY MEASURES, INVESTMENT, AND PERFORMANCE CONTRACTING

FY18 Performance Contracting – Investment value and number of new projects awarded:

\$0M / 0 projects in FY18

FY19-FY20 Plan:

\$0M / 0 projects in FY19

\$0M / 0 projects in FY20

Implementation Status

SI plans to complete ongoing pipeline planning utilizing performance contracting and current budget to meet energy and water efficiency reduction goals. The following activities were completed to reach this goal.

- Manage to ensure energy performance of the following ESPC contracts:
 - Award: July 2007, Natural History & American History, \$20.5M
 - Award: July 2013, Suitland Collection Center, \$12.2M
 - Award: May 2014, Smithsonian National Zoo and Conservation Biology Institute, \$23.5M
- Use Energy Management Branch funding of \$250,000 to implement low cost energy conservation measures. Any amounts in excess of \$250,000 are dependent on rebates and other incentive programs available through local utilities and GSA contracts.
- Coordinate energy conservation measures, investment, and performance contracting with major facility revitalization and master planning to ensure pipeline success.
- Capital projects and master plans are reviewed for deep energy retrofit opportunities that can utilize ESPC or UESC projects.

Priority Strategies & Planned Actions

- Smithsonian forecasts \$0.0M performance contracting, as nothing is being planned at this time. Smithsonian is currently evaluating our ESPC pipeline plans for future projects where applicable.
- Energy Management Branch will continue to identify potential Energy Conservation Measures (ECMs) and infrastructure needs for potential project development and utilize performance contracting or Federal appropriations to the extent practical.
- Smithsonian plans to investigate, develop, and award an ESPC/UESC in FY 2021.

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3. RENEWABLE ENERGY

FY18 Renewable Electricity Use:

21.8% of total electricity in FY18

FY19-FY20 Plan:

20.0% of total electricity in FY19

20.0% of total electricity in FY20

Implementation Status

SI meets renewable energy goals by installing onsite solar arrays and purchasing renewable energy credits. The following strategies were deployed this fiscal year.

- SI included goal-level renewable energy percentages in new electricity supply contracts, and purchased additional renewable energy certificates, as needed, when funding allowed.
- Planned actions in the next 12 months include advocacy for inclusion of on-site renewable energy in new construction & major facility revitalization, and continuing work with other agencies on renewable energy purchases and projects when advertised such as the Capital Solar Challenge.
- Renewable Energy Credits (RECs) are purchased as funding permits, typically for a two-year delivery period.
- REC purchases not only offset GHG but also supported green power credits in projects pursuing LEED certification.
- Projected progress for FY 2019: 20% renewable electricity.

Priority Strategies & Planned Actions

- Screen facilities for cost effective renewable energy development including onsite solar generation using power purchase agreements.
- Incorporate requirements for electric generated from renewable sources in long-term electric supply contracts to support goal-level renewable electric requirement.
- Purchase RECs as funding permits to support SI's renewable energy and sustainable building requirements.
- Agency target for FY 2020 and 2021: 20% renewable electricity.

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4. WATER EFFICIENCY

FY18 Water Intensity Progress (Gal/GSF):

- 50.1% reduction from FY07
- 12.1% increase from FY17

FY19-FY20 Plan:

- 2.0% reduction in FY19 from FY18
- 2.0% reduction in FY20 from FY 19

Implementation Status

SI plans to continuously monitor water usage using building level water meters and advanced metering techniques to determine high water use areas and implement reduction measures.

- Smithsonian water efficiency successes include application of sub-meters and leak detectors to discover water waste and water-efficient management of gardens and landscapes through smart irrigation systems.
- ESPC contracting installed sub-meters, smart irrigation systems, and updated filtration infrastructure reducing water and chemical use at the National Zoological Park and Smithsonian Conservation Biology Institute. The National Zoological Park is the most water intensive campus in SI's portfolio.
- ESPC conservation measures included continuous commissioning via new advanced metering infrastructure to utilize real time data to assess water usage characteristics.
- Water intensive operations are a challenge. Heavy water use can occur in museum air-conditioning systems, National Zoo exhibit pools, irrigation and museum water features.

Priority Strategies & Planned Actions

- Monitor sub-meters recently installed to improve existing processes and place controls on those processes where cost effective.
- Purchase and install water efficient filtration technologies at the National Zoo to decrease water and chemical use.
- Designing, installing, and maintaining landscapes for reduced water use.
- Pilot enhanced water treatment chemistry on cooling tower systems to reduce water use at facilities with chiller plant operations.
- Pilot remote condenser water monitoring and metering system to reduce water waste.
- Update existing mechanical cooling equipment controls to ensure water is used efficiently and ongoing maintenance practices are eased.

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5. HIGH PERFORMANCE SUSTAINABLE BUILDINGS

FY18 Sustainable Buildings Progress:

0 sustainable Federal buildings
0% of buildings / 0% of gross square footage (GSF)

FY19-FY20 Plan:

4.0% of GSF in FY19
7.5% of GSF in FY20

Implementation Status

SI strives for a minimum of LEED Gold on all new construction and renovation projects.

- In FY2018 Smithsonian determined, on a square foot basis, LEED project certification conforming to the Guiding Principles and will continue to pursue and achieve LEED® green building certifications.
- During FY2018, LEED certified buildings were evaluated relative to Guiding Principle cross-walk(s) to substantiate compliance.
- The Smithsonian is in the process of obtaining LEED certifications for several newly constructed facilities including Hazy Collections Storage Building, SCBI Bio Repository Lab Building, and Zoo Pavilion.

Priority Strategies & Planned Actions

- Review LEED projects and cross-walk applicable points to appropriate Guiding Principles.
- On a GSF basis, buildings will be evaluated for Guiding Principle compliance, starting with facilities under phased renovation that are less than 100% compliant.
- Once EnergyStar Portfolio Manager is updated, Guiding Principle compliance worksheets can be transferred and tracked in Portfolio Manager. Smithsonian Institution will maintain Excel worksheets until functionality is restored to Portfolio Manager.
- The Smithsonian is planning to receive LEED Gold for our multi-year renovation of the National Air and Space Museum.

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6. WASTE MANAGEMENT AND DIVERSION

FY18 Non-hazardous Waste Management and Diversion:

4,539.21 metric tons of non-hazardous solid waste generated*

52.95% sent to treatment and disposal facilities

*not including construction and demolition waste

Implementation Status

SI works to reduce and capture all waste streams to maximize diversion rates by completing waste audits, installing recycling bins that are easily accessible, increasing outreach to employees, increasing composting operations and working with restaurants to ensure compliance.

- In FY 2018, the Smithsonian diverted 47.05% of solid waste from landfill/incinerator disposal, a slight increase from 45.93% in 2017. The Smithsonian Recycling Task Force is working to identify opportunities to increase waste diversion.
- Composting operations are continuing at the NMAI, NMAH and NMAAHC.
- SI continued operation of a staff operated in-vessel compost machine with a long-range goal of a larger machine located on National Zoological Park grounds.
- Construction waste diversion is commonly reported for LEED but difficult to track across the building portfolio other than by the honor system. Smithsonian Institution is not currently called to report Construction Waste diversion.

Priority Strategies & Planned Actions

- Smithsonian is working to maximize waste diversion and recycling content and has implemented strategies to optimize collection procedures and assure compost meets the minimum acceptable criteria set by regional composting facilities.
- FY 2020 and 2021 Smithsonian diversion target is 50%. Actions planned for the next 12 months include single use plastics reduction, reducing waste generation, increasing composting participation, conducting facility waste audits, and improving tracking/reporting of construction and demolition waste. Staff and public education on waste reduction and diversion strategies that can be employed at work and at home are a top priority.
- Lack of participation in the Recycling Task Force and lack of implementation of procedures remain a barrier to increasing diversion rates. Evaluation of progress is based on metrics including diversion rate, based on the weight of materials disposed in thirteen discrete streams of non-hazardous solid waste. Plan to increase participation by increasing communication on importance of waste diversion.
- Key challenges are a diverse waste stream and inadequate space at most museums for sorting, storing and shipping solid waste, and poor participation by restaurant contractors. SI plans to tackle these issues as ongoing action items in FY2020 and 2021.
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Implementation Summary: Fleet Management

1. TRANSPORTATION / FLEET MANAGEMENT

FY18 Petroleum Reduction Progress (Gal):

25.1% increase in petroleum fuel since 2005

94.7% increase in petroleum fuel since FY17

FY19-FY20 Plan:

2.0% reduction in FY19 from FY18

2.0% reduction in FY20 from FY19

Implementation Status

SI plans to reduce petroleum fuel use by introducing alternative fueled vehicles into the fleet, reinstating telematics, optimizing and right-sizing composition of the fleet and acquiring only highly fuel-efficient vehicles.

- At the Udvar Hazy Center, Smithsonian Conservation Biological Institute, and National Zoo studies are ongoing to determine the feasibility of installing EV charging stations for Smithsonian vehicles by December 2019. This will compliment the pool of six charging stations already installed throughout Smithsonian including at the Environmental Research Center in Edgewater, Maryland.
- Although the availability of E85 fuel is not readily accessible within the DOE required 5-mile radius of our base of operations, SI's usage of E85 has gone up significantly since the installation of an E85 fueling station at our Paul E. Garber facility in Suitland, MD. In FY18, our expectation was a 20% increase in E85 fuel, but we have performed above that expectation and yielded a 25% increase in E85 fuel.
- The 94.7% increase in petroleum fuel use since FY17 is equated to data discrepancies between SI's fleet management and GSA.

Priority Strategies & Planned Actions

- Priorities for the year ahead include reinstating telematics, optimizing and right-sizing composition of the fleet and acquiring only highly fuel-efficient and alternate fuel vehicles.
- Vehicle acquisitions are based on the availability of excess funds. We plan to purchase replacement vehicles with zero or low emissions as a priority. Through our agency communication plan our users are instructed to prioritize E85 for their Flex Fuel vehicles.
- Agency target for FY 2020 and 2021 is 2.0% overall reduction of petroleum by continuing our efforts in procuring FlexFuel and/or BioDiesel compatible vehicles that will provide a longer cruising range using less fuel.

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Implementation Summary: Cross-Cutting Operations

1. SUSTAINABLE ACQUISITION / PROCUREMENT

FY18 Sustainable Acquisition Progress:

3.0% of contract actions and 23.0% of obligations (in dollars), for a total of \$135.0M in contract actions with statutory environmental requirements

Implementation Status

SI's overall strategy for sustainable acquisition and procurement is to look for practical ways to increase sustainable purchases through contract management.

- The Smithsonian Institution has engaged a central office paper supplier to provide all offices with recommended recovered fiber content levels for uncoated printing and writing papers which ensures nearly 100% usage of EPA recommended printing and writing papers.
- The Smithsonian Institution includes statutory environmental requirements in all its design and construction contracts.
- The Smithsonian Institution has engaged three contractors on an Open Term Contract basis to provide the Institution with only cleaning supplies that meet or exceed EPA recommendations for buying "green" cleaning products.

Priority Strategies & Planned Actions

- Smithsonian Institution is working with two contractors to create pre-negotiated catalogs for the supply of non-paper office products that meet recycled content requirements under the Comprehensive Procurement Guideline (CPG). Buyers throughout the Institution will be directed to these catalogs for all Office Supplies which will strongly increase assurances that procurement of these items meet the requirements of the CPG. Further, the Institution will be able to track these purchases and those that deviate.
- Smithsonian Institution will strive to ensure that 100% of all applicable contract spend contains statutory environmental requirements.

2. ELECTRONICS STEWARDSHIP

FY18 Electronics Stewardship Progress:

100% of newly purchased or leased equipment met energy efficiency requirements

97% of equipment with power management enabled*

100% of electronic equipment disposed using environmentally sound methods

**excluding exempted equipment*

Implementation Status

SI includes sustainable requirements as part of our contract vehicles for both goods and services acquisitions, including standards requiring EPEAT (Electronic Product Environmental Assessment Tool) registered equipment, uses sustainability as a factor in choosing cloud-computing services, and ensure all equipment is disposed of in a capacity that promotes reuse and/or recycling.

- 100% of covered electronic products purchased by the SI Office of the Chief Information Officer (OCIO) are EPEAT (Electronic Product Environmental Assessment Tool) registered. OCIO will continue to research and publish recommendations for sustainable IT products. OCIO also continues to include sustainable requirements as part of contract vehicles managed by OCIO.
- FY2018, native Windows utilities are managing the power usage of 97.5% of Windows computers. The FY2019 goal is to maintain this level.

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- In FY2018, the monitors for Apple systems are put to sleep when not in use. This is not being done with Apple computers because there is no way to remotely wake them for maintenance or telework needs. In FY2019, OCIO will investigate and try to identify software tools that allow for remote wake-up.
- All excess IT components and non-working electronics are disposed of through either an R2/eSteward recycler to include USPS Blue Earth. Working electronics are disposed of through GSA and/or the GSA Computers for Learning (CFL) program for repurposing in schools and other Federal Agencies.
- America Recycles Day, held each year on November 15, will provide an additional opportunity in 2019 to raise awareness about recycling initiatives across the SI, particularly the recycling of electronic assets.

Priority Strategies & Planned Actions

- On Earth Day 2019 the OCon&PPM Personal Property Management Office launched a Reutilization website “freestuff” to promote the reuse of excess property. This webpage allows staff from Smithsonian offices, museums and research centers to display their excess property so that staff that are interested in acquiring property from the webpage can select it.
- Priorities for the next 12 months include ensuring that additional power management options are enabled; updating procedures for disposal compliance; and implementing new guidelines for purchasing EPEAT-compliant equipment.
- Sustainable features of electronic devices will be promoted to SI staff.
- Agency target for FY 2020 and 2021 is 100% equipment acquisition meeting EPEAT and energy efficiency requirements; 97.5% equipment with power management; & 100% compliance with disposal guidelines.

3. GREENHOUSE GAS EMISSIONS

FY18 Scope 1&2 Greenhouse Gas (GHG) Emissions:

- 27.9% reduction from FY 2008
- 1.8% reduction from FY 2017

Implementation Status

SI plans to decrease scope 1 and 2 green house gas emissions by implementing energy conservations measures that reduce energy use and purchasing renewable energy credits to increase our renewable energy portfolio.

- GHG reduction is typically a direct result of increased facility energy efficiency.
- Scope 2 contributions from Renewable energy source: Municipal Solid Waste –Waste To Energy (MSW WTE) is not currently included.

Priority Strategies & Planned Actions

- Priorities for the year ahead include reducing on-site use of fossil fuel, reducing use of grid-supplied electricity, and employing operations and maintenance best practices.
- Fluorinated gas inventory accuracy needs to be enhanced with transition to an internet-based refrigerant tracking and accounting system.

Agency Priorities and Highlights

AGENCY IDENTIFIED PRIORITIES

Greenhouse Gas Emissions

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In FY 2018, the Smithsonian achieved a 27.9% reduction in Scope 1&2 GHG emissions compared to the FY 2008 baseline and is on track to meet the Smithsonian Institution 40% reduction target established for FY 2025.

Smithsonian deployed an electronic commuter survey to measure our Scope 3 GHG emissions from employee commuting. We had a 46% participation rate and our emissions decreased by 9% from the previous year.