

Kennedy Space Center
FIVE YEAR
SUSTAINABILITY PLAN



2016 – 2020



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The Federal Government is committed to following sustainable principles. At its heart, sustainability integrates environmental, societal and economic solutions for present needs without compromising the ability of future generations to meet their needs. Building upon its pledge towards environmental stewardship, the Administration generated a vision of sustainability spanning ten goals mandated within Executive Order (EO) 13693, Planning for Federal Sustainability in the Next Decade.

In November 2015, the National Aeronautics and Space Administration (NASA) responded to this EO by incorporating it into a new release of the NASA Strategic Sustainability Performance Plan (SSPP). The SSPP recognizes the importance of aligning environmental practices in a manner that preserves, enhances and strengthens NASA's ability to perform its mission indefinitely. The Kennedy Space Center (KSC) is following suit with KSC's Sustainability Plan (SP) by promoting, maintaining and pioneering green practices in all aspects of our mission.

KSC's SP recognizes that the best sustainable solutions use an interdisciplinary, collaborative approach spanning civil servant and contractor personnel from across the Center. This approach relies on the participation of all employees to develop and implement sustainability endeavors connected with the following ten goals:

- Reduce greenhouse gas (GHG) emissions.
- Design, build and maintain sustainable buildings, facilities and infrastructure.
- Leverage clean and renewable energy.
- Increase water conservation.
- Improve fleet and vehicle efficiency and management.
- Purchase sustainable products and services.
- Minimize waste and prevent pollution.
- Implement performance contracts for Federal buildings.
- Manage electronic equipment and data centers responsibly.
- Pursue climate change resilience.

The KSC SP details the strategies and actions that address the following objectives:

- Reduce Center costs.
- Increase energy and water efficiencies.
- Promote smart buying practices.
- Increase reuse and recycling while decreasing waste.
- Benefit the community.
- Meet or exceed the EO and NASA SSPP sustainability goals.



This artist concept depicts a sleek, modern interior for the new Headquarters Building, centerpiece of Kennedy Space Center's Central Campus.

Responsibility for meeting these goals lies with KSC's Center Sustainability Officer (CSO) with support from the KSC Sustainable Environment Management System (SEMS) Steering Committee, goal points of contact (POCs) and goal champions. The goal POCs and champions set strategies and tactics for each EO goal. Also, employees at all levels are responsible and accountable for integrating sustainability into their day-to-day activities to reduce their environmental impact.

Our sustainability objectives help ensure mission success and our Center's obligations as the Nation's gateway to space. The Center strives to be recognized as a leader for sustainability within the Federal Government and the external community. Kennedy collaborates and communicates with employees and the local communities to demonstrate the benefits of a more sustainable society and instill sustainability as a core value.

Kennedy has accomplished great feats in its storied history. The Mercury, Gemini, Apollo and Space Shuttle programs used the Center as their launch pad into space and into history. Kennedy must draw on the innovative spirit that characterized past missions as it strives for sustainable solutions to support future endeavors. That includes growing as an economically sustainable multi-user spaceport supporting the Orion Multi-Purpose Crew Vehicle, Space Launch System, Commercial Crew, Launch Services and International Space Station Ground Processing.

Incorporating sustainability into the Center's work ethic is an important step in enhancing mission performance and being a leader in sustainability. Truly, we are Kennedy Space Center and we are **GO FOR GREEN!**

Nancy P. Bray
Center Sustainability Officer
Director of Spaceport Integration and Services

2.0 Overview

The Kennedy Space Center recognizes the importance of sustainability in preserving, enhancing and strengthening NASA's ability to perform its mission indefinitely. The KSC SP reflects the Center's commitment to innovation and leadership in sustainability and support to NASA's SSPP. Kennedy's sustainability vision exemplifies the importance the Center places on sustainability:

“Kennedy Space Center will promote, maintain and pioneer green practices in all aspects of our mission, striving to be an agency leader in everything we do.”

The SP lays the foundation for realizing this vision by incorporating sustainable practices into key Center activities. The SP outlines strategies and actions that guide KSC in helping the Agency achieve the NASA SSPP goals. As the Center's sustainability efforts progress, project status reports are reviewed quarterly at the SEMS Steering Committee meetings. An annual report showcasing the status of the goals and projects is published. Additionally, the SP is updated every five years to refine and validate the strategies and actions.











2.1 Team Structure

To better align the Center with the goals of EO 13693, Planning for Federal Sustainability in the Next Decade, the SEMS Support Teams were restructured in 2015 from a discipline-based to a goal-based hierarchy. Each goal now has a POC and multiple goal champions. To ensure continued success, each goal POC, working with the goal champions, is responsible for monitoring sustainability projects related to their respective goals. A cross cutting and tactical team supports efforts that span all the goals. This approach focuses on the goals and draws on the knowledge and experience of cross-functional resources while also uniting their efforts around the Center's sustainability vision. Responsibility for meeting the goals outlined in this SP ultimately lies with the KSC CSO. A diagram of the organization and hierarchy of the sustainability team is show in Appendix 1.

2.2 Success Criteria

Throughout the year, the Center tracks its efforts in helping the Agency achieve each long-term SSPP goal by measuring KSC progress toward targets derived from those goals. The KSC Annual Report includes a goal scorecard that gives a snapshot of KSC's sustainability performance for that year.

KSC Sustainability Long-Term Success Criteria for Fiscal Year (FY) 2025

	<p>GHG Emissions Reduction Reduce Scope 1 & 2 GHG emissions by at least 47 percent as compared to an FY 2008 baseline Reduce Scope 3 GHG emissions by 32 percent as compared to an FY 2008 baseline</p>
	<p>Sustainable Buildings Reduce energy intensity (BTU/GSF) by 25 percent as compared to an FY 2015 baseline Identify a percentage of the existing buildings above 5,000 square feet that are intended to be energy, waste or water net-zero buildings by FY 2025 and implement actions that will allow those buildings to meet that target. Targets will be established in 2016 Establish a power usage effectiveness (PUE) target in the range of 1.2 – 1.4 for new data centers and less than 1.5 for existing data centers. The PUE is a measure of how efficiently a computer data center uses energy; specifically, how much energy is used by the computing equipment (in contrast to cooling and other overhead). $PUE = \frac{\text{Total Facility Energy}}{\text{IT Equipment Energy}}$</p>
	<p>Clean and Renewable Energy At least 25 percent of the Center's total electric and thermal energy will come from renewable and alternative energy sources At least 30 percent of the Center's total electric energy consumed will be renewable energy</p>
	<p>Water Use Efficiency and Management Reduce potable water consumption intensity by at least 36 percent as compared to an FY 2007 baseline</p>
	<p>Fleet Management Reduce fleet-wide per-mile GHG emissions by at least 30 percent as compared to an FY 2014 baseline Determine the optimum fleet inventory, emphasizing eliminating non-essential vehicles</p>
	<p>Sustainable Acquisition Educate and train 100 percent of KSC purchase requisitioners regarding the use of bio-based/bio-preferred products Review 10 percent of purchases via the Systems Application and Programming (SAP) system quarterly for green purchase compliance</p>
	<p>Pollution Prevention and Waste Management Divert 50 percent of non-Construction and Demolition (C&D) non-hazardous solid waste and pursue opportunities for net-zero waste Divert 50 percent of C&D non-hazardous solid waste</p>
	<p>Energy Performance Contracting Implement performance contracts for Federal buildings Establish annual targets for performance contracting to be implemented in FY 2017 and annually thereafter</p>
	<p>Electronics Stewardship Promote electronics stewardship Ensure procurement preference for environmentally sustainable electronic products Establish and implement policies to enable power management, duplex printing and other energy-efficient or environmentally sustainable features on all eligible agency electronic products Employ environmentally sound practices with respect to the Agency's disposition of all Agency excess or surplus electronic products</p>
	<p>Climate Change Resilience Evaluate climate change risks and vulnerabilities as they relate to habitat change Plan and conduct climate adaptation workshops Collaborate with regional partners to support environmental adaptation strategies using NASA's scientific data and Kennedy's expertise</p>

3.1 Goal 1 – GHG Emissions Reduction

Goal Description

Executive Order 13693 states that all agencies will be required to more aggressively pursue energy projects and enhance energy performance. NASA has set FY 2025 GHG emission reduction goals of 47 percent for scopes 1 and 2 emissions, and 32 percent for scope 3 emissions relative to an FY 2008 baseline.

3.1.1 - KSC Strategies and Actions

The Center is committed to meeting or exceeding scope 1, 2 and 3 GHG emissions reduction targets established in the NASA SSPP by proactively addressing areas of infrastructure, energy consumption, renewable energy production and transportation logistics. There is also a desire to increase energy awareness across the Center. These objectives will be achieved by:

Scopes 1 & 2 GHG Emissions

- Right-sizing the KSC General Services Administration (GSA) vehicle fleet.
- Procuring more electric vehicles, and promoting electric charging infrastructure to increase the number of KSC's alternate fuel vehicles (AFVs). As of FY 2016, 512 of 639 GSA vehicles at KSC are AFVs.
- Promoting and implementing energy conservation measures.
- Increasing understanding and use of renewable energy.

Scope 3 GHG Emissions

- Installing another 29 electric vehicle charging stations, including 14 at the new Headquarters building bringing the total to 71 charging stations.
- Partnering with the KSC Visitor Complex to promote alternative fuel buses.
- Optimizing the ordering and delivery processes at KSC to eliminate redundant deliveries.
- Pursuing information technology solutions to expand telework program to reduce employee commuting.
- Encouraging employee participation in vanpools and carpools.



C5 Emergency Power Station - Oxidation catalysts were installed at the exhaust side of the engines in 2014 reducing CO emissions by >= to 70%.



The Data Center Consolidation Project at KSC has successfully migrated three less efficient Data Centers into a new power efficient and more reliable Data Center Facility.

3.2 Goal 2 – Sustainable Buildings

Goal Description

The EO states that all government agencies will promote building energy conservation by reducing building energy intensity by 2.5 percent annually, compared to an FY 2015 baseline, for a total of 25 percent by FY 2025, measured in British thermal units per gross square foot (BTU/GSF). NASA will operate and maintain its buildings in a manner that reduces energy, water and material consumption, thereby also achieving a reduction in operations and maintenance (O&M) costs.

The EO states that all government agencies will identify a percentage of the agency's existing buildings above 5,000 square feet that are intended to be energy, waste or water net-zero buildings by FY 2025 and will implement actions that will allow those buildings to meet that target. Targets will be established in 2016.

The EO states that all government agencies will improve data center efficiency at agency facilities. NASA will establish a power usage effectiveness (PUE) target in the range of 1.2 to 1.4 for new data centers and less than 1.5 for existing data centers. The PUE is a measure of how efficiently a computer data center uses energy; specifically, how much energy is used by the computing equipment (in contrast to cooling and other overhead).

3.2.1 - KSC Strategies and Actions

The Center will strive to meet or exceed the Agency's Sustainable Building goals by meeting the High Performance and Sustainable Buildings Guiding Principles for cost savings and increased efficiencies; operating and maintaining its buildings in a manner

that reduces energy, water and material consumption; improving data center efficiency; reducing or consolidating unnecessary infrastructure and implementing construction standards for sustainable building design across the Center. These objectives will be achieved by:

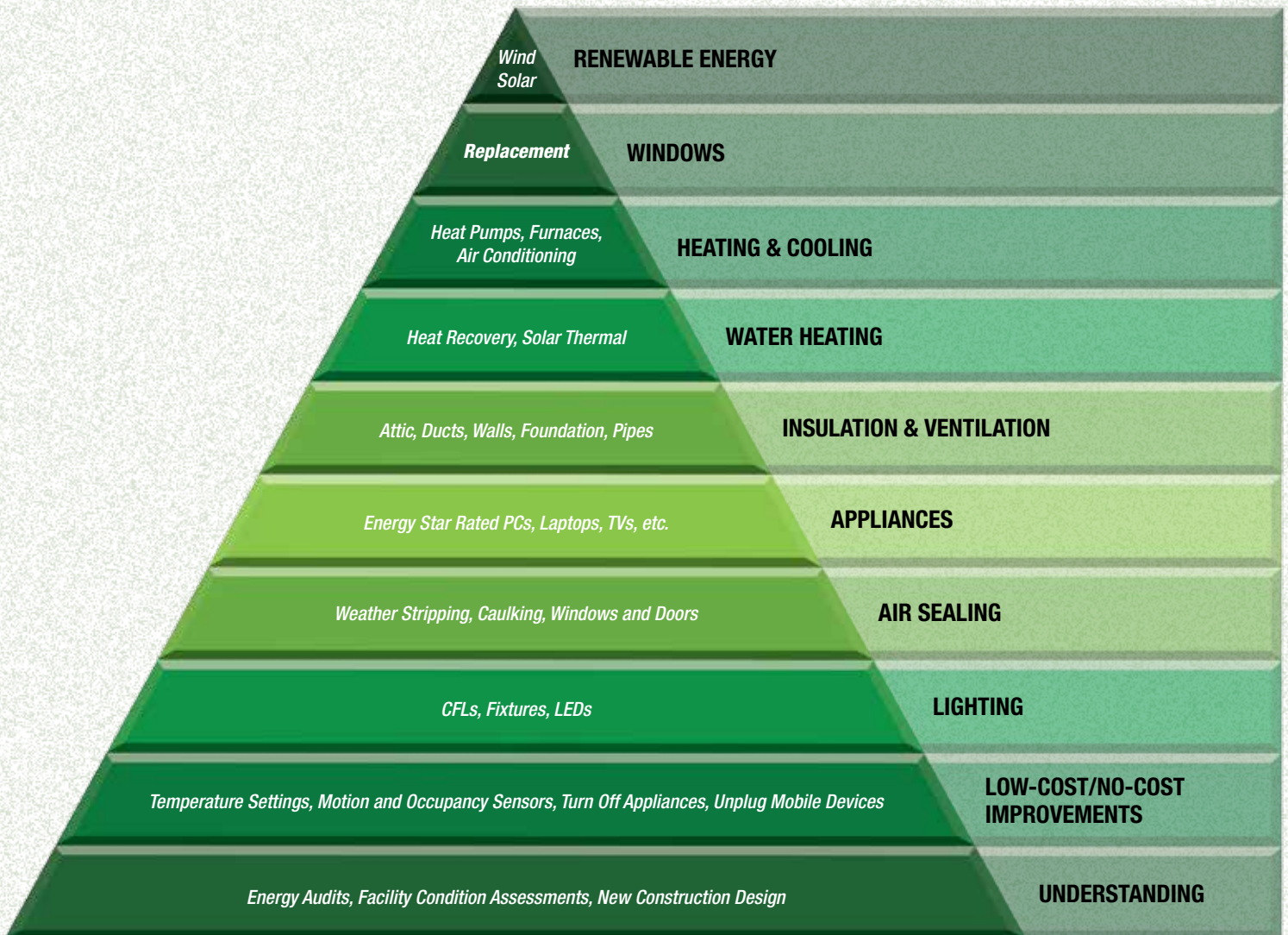
- Promoting and implementing energy conservation projects.
- Increasing employee awareness of unnecessary energy consumption in order to reduce costs.
- Ensuring subject matter experts support the Center's Energy and Water Working Groups to promote energy and water conservation.
- Striving towards NASA's Net Zero Energy Buildings objective by 2020 by using Leadership in Energy and Environmental Design (LEED) principles in all facilities.
- Auditing the energy impacts of facility operations and systems throughout the Center.
- Developing a multi-phased plan for the construction of new facilities to eliminate or reduce the environmental impacts of buildings, improve building performance, reduce long-term O&M costs and increase worker productivity.
- Building a Central Campus that consolidates several buildings and services into an efficient and walkable campus. Phase 1 of this project replaces an aging KSC Headquarters (HQ) building and will be pursuing LEED-New Construction (NC) Gold certification.
- Coordinating with the KSC Partnership Development Office to ensure that the requirement for sustainable building construction is in every new agreement, as applicable.
- Migrating the Space Station Processing Facility (SSPF) and the Neil Armstrong Operations and Checkout Facility (O&C) data centers into the Kennedy Data Center (KDC).

Energy Pyramid

The Energy Pyramid shown below provides an illustration of layered actions that the Center implements to reduce our energy footprint. The bottom lists initial planning steps that then progress up the pyramid to representative projects. In general, implementing renewable energy projects should be undertaken last. At KSC, Facility Comprehensive Evaluations (FCEs) consist primarily of facility condition assessments and energy audits. Annually, FCEs are performed on 25 percent of KSC's goal subject facilities, thus covering 100 percent of such facilities every four years. Key objectives in doing an FCE include characterizing current facility infrastructure and system performance, identifying energy and water conservation

measures (ECMs and WCMs) for consideration, and generating cost and schedule estimates for those conservation measures.

New construction projects are designed to incorporate sustainability principles such as maximizing internal natural lighting, selecting carpet that minimizes volatile organic compound emissions, selecting low-flow restroom fixtures, and using xeriscape landscaping with native species. One new KSC facility captures rainwater from the roof and uses it to flush toilets and for irrigation. Many KSC facilities already use motion sensors to control lighting, and automated temperature set points geared for worker comfort. The Center is beginning to use occupancy sensors (e.g. carbon dioxide sampling) to help



smart systems determine how often a facility's internal air needs to be changed/refreshed. Employees are encouraged to turn off computer monitors when not in use, unplug mobile devices when they are fully charged, and completely shut down their computers during off-shift hours. A number of ECMs already being implemented include replacement of standard fluorescent lighting with light-emitting diode (LED) fixtures, both inside and outside facilities.

All windows at KSC are required to be properly caulked and most facilities have windows that are to remain closed or are sealed shut. Doors without weather stripping are reported for maintenance. Small appliances, personal computers, etc. are procured with an eye on energy efficiency. Because KSC makes extensive use of centralized chiller plants, ducting between facilities is always insulated. Large central boilers are being phased out in favor of modular boilers co-located at the facilities where they are needed, eliminating long hot water lines and their inherent energy losses.

Over the years, KSC has made limited use of solar hot water heating systems at various locations, and has recently begun looking for cost-effective heat recovery options through combined heat and power systems. As heating, ventilation and air conditioning (HVAC) systems reach the end of their serviceable life, they are being replaced with much more efficient, software driven systems and subsystems. A few years ago, KSC replaced many of the Apollo-era windows at the Launch Control Center and also the Operations and Checkout building, installing glass with better thermal efficiency characteristics. As for electricity from solar energy, KSC currently has 11 Megawatts (MW) of photovoltaic (PV) solar panels onsite and is planning to expand its PV presence with up to another 2 MW of PV panels in FY 2017. Although KSC is not harvesting wind energy at this time, the Center is following technological advances being made in the areas of bird friendly turbines that might also do well in KSC's fairly low-wind environment. Having a skilled and knowledgeable work force responsible for operating and maintaining hundreds of buildings, several of which are more than fifty years old, there is no shortage of energy and water conservation possibilities at KSC.



3.3 Goal 3 – Clean and Renewable Energy

Goal Description

The EO states that all government agencies shall ensure the percentage of the total amount of facility energy consumed shall be clean energy, accounted for by renewable electric energy and alternative energy:

- 10 percent in FY 2016 - FY 2017
- 13 percent in FY 2018 - FY 2019
- 16 percent in FY 2020 - FY 2021
- 20 percent in FY 2022 - FY 2023
- 25 percent in FY 2025 and each year thereafter

The EO states that all government agencies shall ensure that the percentage of the total amount of facility energy consumed shall be renewable energy that is not less than:

- 10 percent in FY 2016 - FY 2017
- 15 percent in FY 2018 - FY 2019
- 20 percent in FY 2020 - FY 2021
- 25 percent in FY 2022 - FY 2023
- 30 percent in FY 2025 and each year thereafter

3.3.1 - KSC Strategies and Actions

The Center will strive to meet or exceed the Agency's clean and renewable energy goals by expanding KSC's clean and renewable energy position beyond the existing solar farms. These goals will be achieved by:

- Increasing KSC's renewable energy generation through solar farm expansions. In 2016, the Center had more than 11 MWs of photovoltaic (PV) panels and will add up to another 2 MWs of PV panels.
- Pursuing Agency funding opportunities to expand KSC's solar energy footprint.

- Investigating cost effective geothermal and combined heat and power applications.
- Partnering with public and private entities to encourage the use of KSC as a renewable and/or clean energy test bed.
- Increasing employee awareness of the uses of renewable and clean energy.
- Maintaining an on-going synergistic atmosphere within the KSC Energy Working Group, including discussions with utility partners.

3.4 Goal 4 - Water Use Efficiency and Management

Goal Description

The EO states that all government agencies must improve water use efficiency and management, including stormwater management. It requires all government agencies to reduce potable water consumption intensity by at least 2 percent annually through FY 2025 relative to an FY 2007 baseline for a total of 36 percent by FY 2025. This can be accomplished by identifying and implementing water reduction and reuse management strategies. The EO also states that each agency shall reduce industrial, landscaping and agricultural water consumption use by at least 2 percent annually relative to an FY 2007 baseline.



3.4.1 - KSC Strategies and Actions

The Center will strive to meet or exceed the Agency’s water use efficiency and management goals while maintaining water quality standards. The Center will also act in accordance with stormwater

management guidance provided by the Agency. These objectives will be achieved by:

- Gathering information and educating employees on water usage at KSC.
- Reducing the demand on the water system by focusing on the primary water users and develop specific projects to reduce their water utilization at the point of consumption.
- Reducing flushing through water distribution system alterations.
- Defining partnership strategies with neighboring Cape Canaveral Air Force Station for water and wastewater flow to improve efficiency and reduce consumption.
- Maintaining the ongoing synergistic atmosphere within the KSC Water Working Group, including discussions with utility partners.



3.5 Goal 5 – Fleet Management

Goal Description

The EO states that agencies with a fleet of at least 20 motor vehicles will improve fleet and vehicle efficiency and management. It requires agencies to take actions that reduce fleet-wide per-mile GHG emissions from agency fleet vehicles relative to a new FY 2014 baseline and sets new goals for percentage reductions:

Not less than 4 percent by the end of FY 2017

Not less than 15 percent by the end of FY 2020

Not less than 30 percent by the end of FY 2025

The EO requires that agencies determine the optimum fleet inventory, including eliminating unnecessary or non-essential vehicles.

3.5.1 - KSC Strategies and Actions

The Center will strive to meet or exceed the Agency's fleet management goal by tracking fleet-wide average GHG emissions and replacing existing vehicles that are nearing the end of their service life with more fuel-efficient vehicles. KSC will achieve these objectives by:

- Replacing existing vehicles nearing the end of their service life with more fuel-efficient vehicles. Over the next 5 years, KSC will be replacing up to 94 vehicles annually.
- Procuring more hybrid and electric vehicles.
- Polling the fleet user community to re-evaluate their transportation needs and reduce vehicle count when appropriate.
- Promoting ride-sharing to meetings.
- Increasing use of telecommunications and software for conducting online meetings.

3.6 Goal 6 – Sustainable Acquisition

Goal Description

The EO requires agencies to promote sustainable acquisition by ensuring that environmental performance and sustainability factors are considered to the maximum extent practicable for all applicable procurements in the planning, award and execution phases of acquisition. It also requires that until agencies have achieved at least 95 percent compliance with the bio-preferred and bio-based purchasing requirement, an annual target must be established for the number of contracts to be awarded with bio-preferred and bio-based criteria and a dollar value of bio-preferred and bio-based products to be delivered and reported under those contracts in the following FY. To establish these targets, agencies shall consider the dollar value of designated bio-preferred and bio-based products reported in previous years, the specifications reviewed and revised for inclusion of bio-preferred and bio-based products, and the number of applicable product and service contracts to be awarded, including construction, operations and maintenance, food services, vehicle maintenance and janitorial services.

3.6.1 - KSC Strategies and Actions

The Center will strive to meet the outlined Agency acquisition goals by modernizing and streamlining its current acquisition process to ensure bio-preferred/bio-based products and services are procured. This will be achieved by:

- Increasing sustainable purchasing awareness and providing practical resources for environmentally preferred products and services.
- Developing a method to monitor acquisitions in order to measure environmentally preferred procurement progress.
- Modifying the KSC acquisition process to help purchasers identify sustainable goods and services.
- Increasing use of uncoated printing and writing paper containing postconsumer fiber.
- Establishing annual targets for the number of contracts and dollar values with bio-based products to be delivered, if the Center is less than 95 percent compliant with sustainable acquisition objectives.
- Reviewing contracts to ensure they contain applicable sustainable acquisition clauses.
- Updating purchasing plans, policies and programs to ensure federally mandated sustainable products and services are included in all relevant acquisitions.
- Establishing mandatory training for requisitioners to teach them how to use the online Green Procurement Compilation resource.
- Providing more collaborative training opportunities, such as with the United Soybean Council and the U.S. Department of Agriculture for instructor led bio-preferred/bio-based training.
- Pursuing educational partnerships with academia, such as the 2015 partnership with the George Washington University to produce a case study that analyzed exemplary Federal Government sustainability actions.

3.7 Goal 7 – Pollution Prevention (P2) and Waste Reduction

Goal Description

The EO states that Federal agencies should advance waste prevention and pollution prevention. It requires agencies to annually divert at least 50 percent of non-hazardous C&D debris and requires agencies to divert at least 50 percent of non-hazardous solid waste, including food and compostable material, and to pursue opportunities for net-zero waste or additional diversion.

3.7.1 KSC Strategies and Actions

The Center will continue to strive to meet the Agency's Pollution Prevention and Waste Management goals. Kennedy will achieve this by:

- Exploring creative diversion methods to dispose of excess property.
- Reducing the chemical volume introduced into the KSC waste stream through chemical consolidation, right-size ordering and use efficiencies.
- Consolidating redundant institutional logistics services with the intent of expansion to other programs across the Center.
- Exploring waste-to-energy systems for possible KSC applications.
- Exploring compostable and organic material recovery approaches.
- Adopting best practices for solid waste diversion.
- Partnering with universities, utility companies or other government agencies on biomass-to-energy pilot projects.
- Continuing outreach and educational efforts at KSC, emphasizing personal responsibility for waste diversion.



Kennedy Space Center employees turned in no longer needed household items as part of America Recycles Day (ARD). The national emphasis for ARD focuses on opportunities not to discard items that can be recycled, giving them new life and protecting the environment.

3.8 Goal 8 – Energy Performance Contracts

Goal Description

The EO requires agencies to implement performance contracts for Federal buildings. It also requires that agencies provide annual agency targets for performance contracting to be implemented in FY 2017 and annually thereafter.

3.8.1 - KSC Strategies and Actions

The Center will strive to meet or exceed the Agency's Energy Performance Contracts goal by:

- Analyzing facility energy audit reports for opportunities to significantly enhance facility efficiencies through performance contracting.
- Assessing the implementation of electrical load shifting projects as a performance contract, e.g. thermal energy storage system.
- Expanding KSC's renewable energy position beyond solar farms (e.g. combined heat and power systems).
- Collaborating with utility providers to uncover creative solutions to KSC energy challenges
- Socializing the fiscal and risk reduction benefits of energy performance contracting.

3.9 Goal 9 – Electronics Stewardship

Goal Description

The EO requires that agencies promote electronics stewardship and requires ensuring procurement preference for environmentally sustainable electronic products. Agencies must establish and implement policies to enable power management, duplex printing and other energy-efficient or environmentally sustainable features on all eligible agency electronic products. They must also employ environmentally sound practices with respect to the Agency's disposition of all agency excess or surplus electronic products.

3.9.1 - KSC Strategies and Actions

The Center will become an Agency leader in electronic stewardship. This includes expanding the deployment of a communication system in which all telephones use Voice over Internet Protocol (VoIP) technology and having all electronic products used on Center meet Federal requirements for electronic stewardship. The Center will achieve these objectives by:

- Advocating for the activation of power management features such as low CPU power states.
- Establishing VoIP policy that will power down certain phones from 15w to 1w of power consumption during non-peak times. Estimated savings are \$32,000 annually.
- Reusing peripherals in good condition for computer refresh cycles. As of FY 2016, KSC has successfully reused an estimated 3,800 computer peripheral devices including monitors, keyboards and mice.
- Requiring that 100 percent of KSC's multi-functional devices (MFDs) are set by default to duplex printing. In 2015, end users printed close to 21.8 million pages using MFDs, saving an estimated 10 million sheets of paper by printing on both sides.
- Converting analog telephones to a Voice over Internet Protocol (VoIP) solution, allowing IT Communications to use one common infrastructure to service both network and telephone systems. As of FY 2016, KSC had successfully converted 40 percent of the analog telephones.

- Mapping the spatial distribution of the water table in the surficial aquifer.
- Examining sea level rise impacts to the surficial aquifer under extreme event conditions.
- Modeling hydrodynamics and hydrology during extreme events under sea level rise with the support of a local university.
- Conducting gas exchange monitoring, including CO2, using a Reddy Flux System deployed at KSC. The system will monitor ambient air quality to determine increases in GHG emissions.
- Providing outreach activities to educate the workforce on potential environmental impacts.
- Pursuing funding sources for full shoreline restoration.

3.10 Goal 10 – Climate Change Resilience

Goal Description

The EO states that all government agencies shall evaluate climate change risks and vulnerabilities as they relate to habitat change. These changes will be directly correlated to future land use capabilities for Centers and risk to infrastructure will be assessed. NASA will continue to develop and apply a robust local adaptation workshop process at its installations by partnering to help other agencies and local communities benefit from the adaptation expertise it continues to develop.

3.10.1 – KSC Strategies and Actions

The Center will implement dynamic modeling of sea level rise influences on surface water behavior given various meteorological scenarios, land inundation estimates and surficial aquifer systems response including saltwater intrusion and aquifer elevation relative to land surface. These topics directly relate to infrastructure risks, stormwater management system designs, contamination remediation actions, facility design and sighting actions. The Center will achieve these objectives by:



Prescribed fire mimics natural wildfire under safer conditions and is used to manage natural habitats and protect infrastructure at Kennedy. In addition to providing necessary ecosystem services for plants and wildlife, prescribed fire reduces the threat and severity of wildfire by consuming excess fuels.

The KSC Sustainability Plan lays the foundation for realizing KSC's vision to promote, maintain and pioneer green practices in all of our activities, striving to be an Agency leader in everything we do. Strategic sustainability decision-making is needed to ensure that we do not diminish or waste our resources, thus preserving our ability to perform tomorrow's mission. This plan incorporates goals, strategies and actions that support our sustainability vision, NASA's SSPP goals and other Federal mandates. In summary, this plan will help the Center:

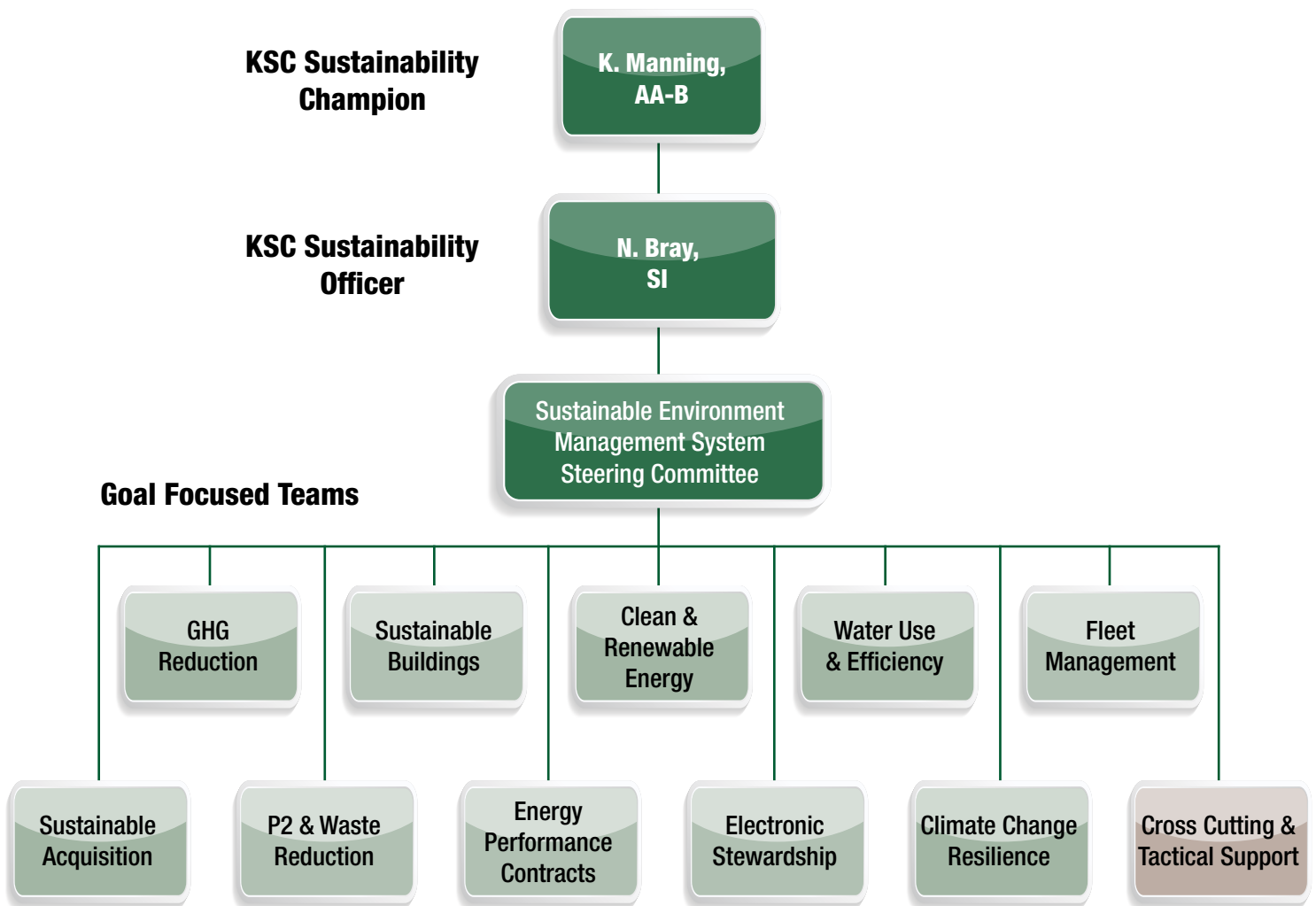
- Reduce GHG emissions.
- Design, build and maintain sustainable buildings, facilities and infrastructure.
- Use increasing amounts of clean and renewable energy.
- Improve the Center's water conservation position.
- Improve fleet and vehicle efficiency and management.
- Purchase sustainable products and services.
- Minimize waste and prevent pollution.
- Implement performance contracts for Federal buildings.
- Manage electronic equipment and data centers responsibly.
- Pursue climate change resiliency.

As we embark on our mission of sustainability, employees at all levels must be responsible and accountable for integrating sustainability into their day-to-day activities. With your help, the Center will continue to be a recognized leader in sustainability and an inspiration to others.



ROLES AND RESPONSIBILITIES

- KSC Sustainability Champion: Advocate for sustainable practices throughout Center management.
- KSC Sustainability Officer: Center representative to the Agency regarding all sustainability initiatives at KSC.
- KSC Sustainable Environment Management System Steering Committee: Direct the overall strategy and implementation of the Sustainability Plan. The Committee also manages the efforts of the sustainability goal POC and goal champions.
- KSC Sustainability Goal POCs and Champions: Each goal has a POC and Champions assigned to it to create strategies, actions and projects for their respective goals. Working with the Goal Champions, the POC will provide periodic reviews of goal progress to the Steering Committee.



Acronym Listing

BTU/GSF:	British Thermal Units per gross square feet
C&D	Construction and Demolition
CMO	Center Management and Operations
CSO	Center Sustainability Officer
ECM	Energy Conservation Measures
EO	Executive Order
FCE	Facility Comprehensive Evaluations
FY	Fiscal Year
GSA	General Services Administration
GHG	Greenhouse Gas
HQ	Headquarters
HVAC	Heating, Ventilation and Air Conditioning
IT	Information Technology
KSC	Kennedy Space Center
KDC	Kennedy Data Center
KW	Kilowatt
LEED	Leadership in Energy and Environmental Design
MFD	Multi-Functional Devices
MW	Megawatts
NASA	National Aeronautics and Space Administration
NC	New Construction
P2	Pollution Prevention
PV	Photovoltaic
PUE	Power Usage Effectiveness
POC	Point of Contact
O&M	Operations and Maintenance
SAP	Systems Application and Programming
SEMS	Sustainable Environment Management System
SSPP	Strategic Sustainability Performance Plan
SP	Sustainability Plan
VoIP	Voice over Internet Protocol
WCM	Water Conservation Measures

NASA Strategic Sustainability Plan

Energy Independence and Security Act 2007

Energy Policy Act 2005

Executive Order 13693 Planning for Federal Sustainability in the Next Decade

NPR 8570.1 Energy Efficiency and Water Conservation

NPR 8820.2F Facility Project Requirements

High Performance Sustainable Building Guiding Principles

NPD 8831.2E Maintenance and Operations of Institutional and Program Facilities and Related Equipment

NPD 6000.1C Transportation Management

KDP-KSC-F2616 KSC Sustainability Steering Committee

NPD 8820.2C Design and Construction of Facilities

NPR 8553.1B NASA Environmental Management System

NPR 8810.2A Master Planning for Real Property

NPR 8810.1 Master Planning Procedural Requirements

NPD 8500.1B NASA Environmental Management

NPR 8530.1A Affirmative Procurement Program and Plan for Environmentally Preferable Products

NPR 8590.1A Environmental Compliance and Restoration Program

NPR 6200.1C NASA Transportation and General Traffic Management

NPR 3600.2 NASA Telework Program

NPR 8580.1 Implementing the National Environmental Policy Act and Executive Order 12114

NPD 1000.5B Policy for NASA Acquisition

National Aeronautics and Space Administration
John F. Kennedy Space Center
Kennedy Space Center, FL 32899
Public Affairs Directorate

www.nasa.gov