National Aeronautics and Space Administration

2012
Kennedy Space Center
Annual Sustainability Report

21,635 Tons Construction & Demolition Waste Diverted

28% Reduction in Water as Compared to FY 2006

24% Reduction in Electricity Use as Compared to FY 2003

Over 1 Million lbs Paper Recycled

18,800 MWH Onsite Solar Power Generated

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Kennedy Space Center is
GO for GREEN!

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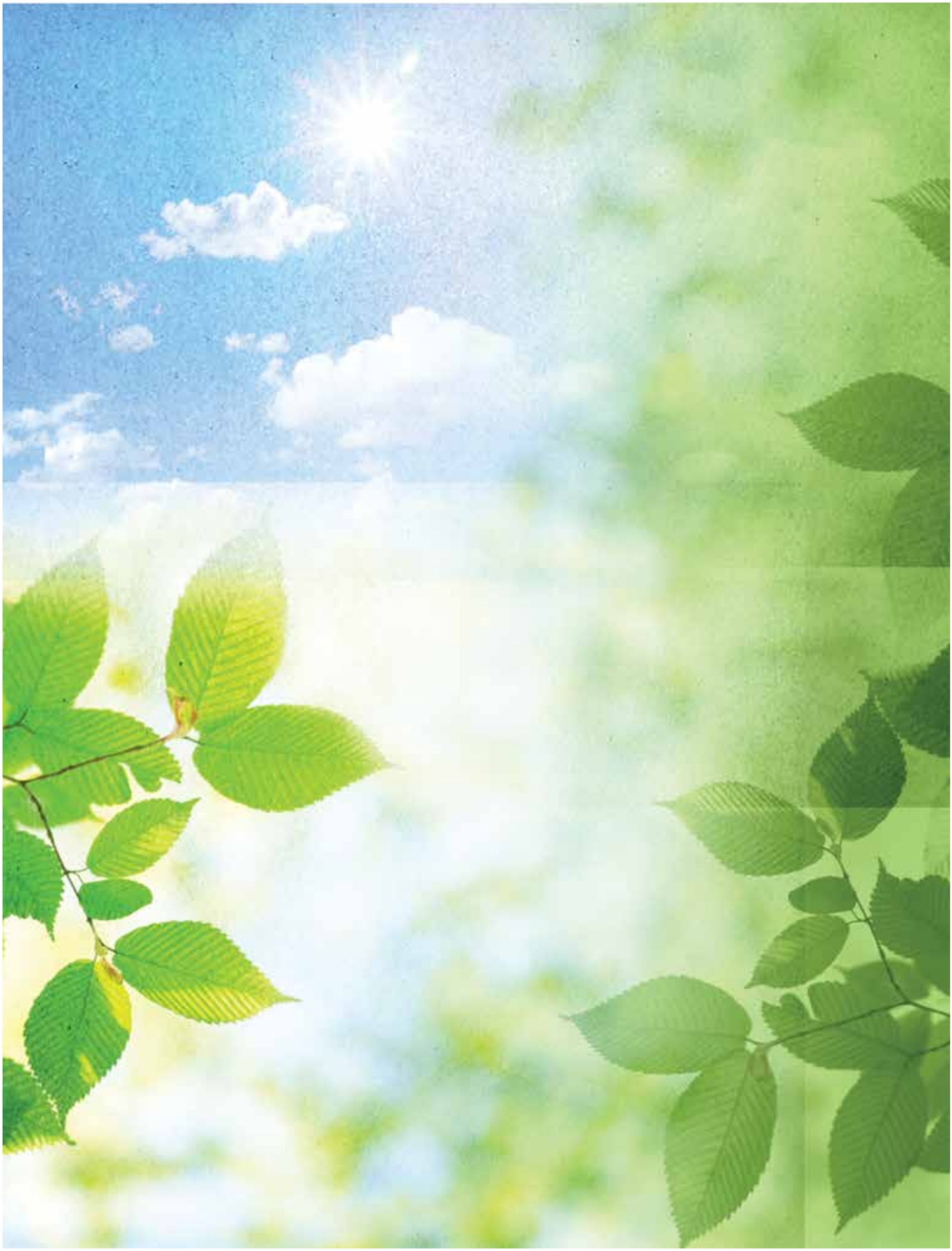

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Executive Summary

To help transform Kennedy Space Center (KSC) into America's premier 21st century sustainable spaceport, sustainability concepts and philosophy are inherent in our mission and goals, as outlined in the 2012 Kennedy Space Center Sustainability Plan. Our objective is to "promote, maintain, and pioneer green practices in all aspects of our mission, striving to be an Agency leader in everything we do." This 2012 Annual Report highlights many sustainability projects being pursued at Kennedy in support of our Sustainability Plan and mission.

Sustainability is often associated with the task of recycling. In fact, recycling is the largest environmental movement the world has ever known, especially given its reach into our professional and private lives and the numerous municipalities that perform the work. As noted in this report, KSC has a highly evolved recycling program that leverages advanced information technology to streamline operations. However, sustainability is much more than just recycling. Organizations throughout KSC are contributing to sustainable goals that cover energy, water conservation, acquisition, transportation, property disposal, logistics, information technology, waste management, green construction, ecology, and more. Sustainability ensures the needs of the present without compromising the ability of our future generations to meet their requirements. As illustrated by a Native American proverb, *"We do not inherit the Earth from our ancestors; we borrow it from our children."*

This Annual Report is divided into three sections. First, a scorecard for fiscal year (FY) 2012 is presented that illustrates KSC's performance in meeting various sustainability goals. Second, an assortment of short articles highlights KSC's successes with support for Earth Day, communications, electronic waste collection, copper recycling, battery recycling, composting, paper pulping, automated recycling requests, community partnering, lighting upgrades, solar powered lighting, and recycling improvements based on recommendations from a waste diversion study. Lastly, this report provides extended feature articles spanning a secondary dune construction project, a sustainable building, repurposing of office supplies for teachers, and a data center consolidation. Even more success stories are available on the KSC Sustainability Website.

Sustainability is becoming embedded into our Center's culture and mission. KSC will ensure that future generations have the same opportunities and resources upon which to persist, thrive, and explore the world and universe around them. We will continue to stretch and strive in our efforts to execute NASA's mission without compromising our planet's resources while ensuring future generations meet their needs.

Nancy P. Bray
Center Sustainability Officer
Director of Center Operations

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Sustainability and Energy Scorecard

The Sustainability and Energy Scorecard provides a quick snapshot of KSC's performance in meeting the sustainability goals outlined in the KSC Sustainability Plan. It provides a status for the functional areas spanning green house gas (GHG) emissions, energy intensity, renewable energy, potable water intensity, reduction in fleet petroleum use, green buildings, pollution prevention and waste management, and sustainable acquisition. The KSC Environmental Management Branch monitors the performance in each of these categories to achieve a "Go for Green" status and to identify continuous improvements.

Functional Area	Criteria	Status	Score
	Scope 1 & 2 GHG Emission Reduction Green: Reduce energy intensity British Thermal Unit/Gross Square Footage (Btu/GSF) in Energy Independence and Security Act (EISA) goal-subject facilities by at least 21 percent compared with FY 2003 and is on track for 30 percent reduction by FY 2015 Yellow: Reduce energy intensity (Btu/GSF) in EISA goal-subject facilities by at least 18 percent compared with FY 2003 Red: Did not reduce energy intensity (Btu/GSF) in EISA goal-subject facilities by at least 18 percent compared with FY 2003	**Scope 1 & 2 GHG Emission Reduction** Reduction in energy intensity in goal-subject facilities compared with FY 2003 for FY 2012 was 35 percent	Green
	Scope 3 GHG Emission Reduction For FY 2012, KSC did not have a Scope 3 GHG Emission Reduction Goal	**Scope 3 GHG Emission Reduction** Not Applicable (NA)	NA
	Reduction in Energy Intensity Green: Reduce energy intensity (Btu/GSF) in EISA goal-subject facilities by at least 21 percent compared with FY 2003 and is on track for 30 percent reduction by FY 2015 Yellow: Reduce energy intensity (Btu/GSF) in EISA goal-subject facilities by at least 18 percent compared with FY 2003 Red: Did not reduce energy intensity (Btu/GSF) in EISA goal-subject facilities by at least 18 percent compared with FY 2003	**Reduction in Energy Intensity** Energy intensity reduction in goal-subject facilities compared with FY 2003 baseline for FY 2012 was 35 percent	Green
	Use of Renewable Energy Green: Use at least 5 percent electricity from renewable sources as a percentage of facility electricity use and at least 2.5 percent of facility electricity came from new sources (post-1999) Yellow: Use at least 5 percent renewable energy from electric, thermal or mechanical sources to power facilities and equipment; but less than half was obtained from new sources (post-1999) or part of the requirement was met with thermal and mechanical renewable energy Red: Did not use at least 5 percent renewable energy from electric, thermal or mechanical sources to power facilities and equipment	**Use of Renewable Energy** For FY 2012, 16.9 percent of electricity was from renewable electricity sources, including 8.5 percent from new renewable energy sources	Green
	Reduction in Potable Water Intensity Green: Reduce water intensity by at least 10 percent from final approved FY 2007 baseline and is on track for 26 percent reduction by FY 2020 Yellow: Reduce water intensity by at least 8 percent from final approved FY 2007 baseline Red: Did not reduce water intensity by at least 8 percent from final approved FY 2007 baseline	**Reduction in Potable Water Intensity** Reduction in potable water intensity compared with FY 2007 baseline for FY 2012 was 14 percent and is on track for 26 percent in FY 2020	Green

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Functional Area	Criteria	Status	Score
	Reduction in Fleet Petroleum Use Green: Achieve 8 percent reduction in petroleum use in its entire vehicle fleet compared to FY 2010 and is on track for 20 percent reduction by FY 2015 Yellow: Achieve at least 8 percent reduction in petroleum use in the entire vehicle fleet compared to FY 2005 Red: Did not achieve at least 8 percent reduction in petroleum use in its entire vehicle fleet since FY 2005	**Reduction in Fleet Petroleum Use** Reduction in fleet petroleum use compared to FY 2010 baseline for FY 2012 was 9 percent and is on track for 20 percent by FY 2015	Green
	Increase in Fleet Alternative Fuel Use Green: Increase Alternative Fuel use by at least 10 percent annually for a total of 100 percent by FY 2015 from FY 2005 baseline Yellow: Increase Alternative Fuel use by at least 5 percent annually as compared to FY 2005 baseline Red: Did not increase Alternative Fuel use by at least 5 percent annually as compared to FY 2005 baseline	**Increase in Fleet Alternative Fuel Use** Increase in fleet alternative fuel use compared to FY 2005 baseline for FY 2012 should be 70 percent but was 22 percent and is declining Note: This metric is not normalized against the significantly decreased population at KSC. Thus, the indicator is misleading. For FY13, a new metric will be proposed, ratio of alternative fuel usage to overall fuel usage.	Red
	Green Buildings Green: Demonstrate implementation of Guiding Principles (GP) for Federal Leadership in High Performance and Sustainable Buildings for new, existing, and leased buildings, and is on track to meet 15 percent by FY 2015 by reporting that at least 5 percent of buildings greater than 5,000 GSF meet GP as reported in the Federal Real Property Profile (FRPP) Yellow: Incorporate GP into all new design contracts for construction, major renovations, and leases and at least 5 percent GSF of its building inventory over 5,000 GSF meets GP as reported in FRPP Red: Did not demonstrate compliance with GP on new construction, major renovations, or leases, and/or less than 5 percent of building inventory, either by number of buildings or GSF, over 5,000 GSF meets GP as reported in FRPP	**Green Buildings** GP were incorporated into all new design contracts for construction, major renovation, and leases and 6.6 percent GSF of building inventory over 5,000 GSF at KSC met the GP as reported in the FRPP in FY 2012 but is not on track to meet 15 percent by FY 2015	Yellow
	Pollution Prevention and Waste Management Green: Divert 50 percent or more of non-hazardous solid waste (excluding Construction and Demolition (C&D) waste) and divert 50 percent or more of C&D waste Yellow: Did not divert at least 50 percent of non-hazardous solid waste (excluding C&D waste) or at least 50 percent of C&D waste, but both are on track to divert 50 percent or more by FY 2015 Red: Did not divert at least 50 percent of non-hazardous solid waste (excluding C&D waste) or at least 50 percent of C&D waste, and is not on track to divert 50 percent or more by FY 2015	**Pollution Prevention and Waste Management** KSC diverted 90 percent of non-hazardous solid waste (excluding C&D waste) and 74 percent of C&D waste in FY 2012	Green
	Sustainable Acquisition Green: Sustainable products and services comprise 95 percent of new contract actions Yellow: Sustainable products and services comprise more than 50 percent of new contract actions Red: Sustainable products and services comprise less than 50 percent of new contract actions	**Sustainable Acquisition** 100 percent of applicable contract actions required use of environmentally preferred products in FY 2012	Green

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FY 2012 Highlights

Earth Day 2012

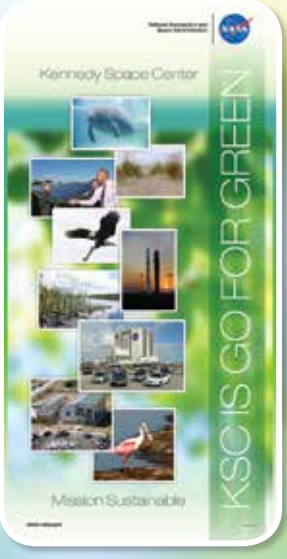
For Earth Day, a Sustainability Fair was held at Kennedy's All-American Picnic. The purpose of the Sustainability Fair was to promote green and sustainable products and services for commercial and residential use. Twelve vendors provided information and samples of products or services to participants of the fair. Another activity was a scavenger hunt called "Green-A-teering." This game was designed to educate kids from ages 4 to 17 years old about our greening efforts at the picnic. Participants were given "Mr. E. B. Green's" clues to help them find stations where "Greening the Picnic" activities were taking place. Prizes were awarded.

POC: Alice Smith, alice.f.smith@nasa.gov

Sustainability Outreach Banners

The Sustainability Communication Team created banners promoting Sustainability. The banners are used at NASA outreach activities to show the importance that NASA places on Sustainability and to display the initiatives that NASA is working on.

POC: Mike Curie, michael.curie@nasa.gov



America Recycles Day Electronic-Waste Event

For America Recycles Day on November 15th, KSC held an event that collected 6,514 pounds of electronic waste that employees brought from home. Many contractors and civil servants supported this effort.

POC: Annie Williams, ann.t.williams@nasa.gov

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Recycled Copper

KSC diverted approximately 35,000 pounds of copper cable from the KSC Landfill. This copper was generated during facility demolition and infrastructure improvements across the Center.

POC: Frank Kline, francis.x.kline@nasa.gov

Battery Recycling

KSC completed a very successful 90-day Alkaline Battery Recycling Pilot Program which resulted in the expansion and continuation of alkaline battery recycling for the Center. Approximately 900 pounds of spent batteries were collected in that period. This program continues today.

POC: Hien Nguyen, hien.t.nguyen@nasa.gov

Composting at the KSC All American Picnic

The KSC Sustainability Team conducted an on-site composting pilot project using the organic waste from the KSC All American Picnic. This project diverted 2,500 pounds of food waste out of the land fill and helped KSC's understanding of the composting process. Data from the pilot program will contribute to a potential on-site composting program in the future.

POC: Mike Omans, michael.d.omans@nasa.gov

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Pulping Sensitive but Unclassified (SBU) paper

KSC no longer pays to shred SBU paper. By utilizing a secure pulping process directly located at the paper mill, the paper is pulped and used to make new paper. KSC receives revenue for the pulp thereby incurring a significant savings for NASA.

POC: Annie Williams, ann.t.williams@nasa.gov

Badging Station Lighting

Kennedy completed a project at the Badging Station where a solar powered light emitting diode (LED) string was installed to internally illuminate the station sign. This project was an attempt to prove facilities can be self-sufficient and perform efficiently off the grid. This sign is an initial project to raise awareness of sustainability on and off Center and to encourage the use of solar means for power. The Energy team will continue to monitor the performance of both the solar panel and LED installation to provide engineering data for future installations on a larger scale.

POC: Cory Taylor, cory.a.taylor@nasa.gov

Sustainable Tool for Automated Recycling (STAR)

STAR
Sustainable Tool for Automated Recycling

To conserve resources and increase recycling, KSC began an on-call recycling program starting with SBU paper and eventually expanding to all commodities. This program saves manpower by alleviating the need for a “milk run” by the recycling service contractor. When a recycling bin is ¾ full, an employee submits an electronic request for service. The system generates daily reports and the recycling contractor uses the reports to build a schedule for the driver’s daily service routes.

POC: Frank Kline, francis.x.kline@nasa.gov

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Lighting Upgrade for Facility Infrastructure

The Facilities Lighting Upgrades Project improves lighting systems and lighting controls at various KSC facilities. The lighting system upgrades have enhanced light level illumination and reduced energy consumption through the installation of energy efficient lighting fixtures. The lighting control upgrades power-down light fixtures during unoccupied hours thereby reducing energy consumption. A significant reduction in energy and cost has resulted. Additionally, life safety standards are now being met with the further illumination.

POC: Anthony Harris, anthony.s.harris@nasa.gov

Recycling Program Improvements

In FY 2012, Kennedy made several improvements to the recycling program based on the recommendations of a FY 2011 waste diversion study. The study investigated types of solid waste (not including construction or demolition) generated at various KSC facilities. Kennedy increased the diversion rate by making changes in four areas: 1) recordkeeping 2) improved recycling participation by educating the workforce 3) expanded paper recycling by incorporating SBU paper and 4) conducted a composting study.

POC: Alice Smith, alice.f.smith@nasa.gov

Community Partnering

KSC civil servants, contractor personnel, and local government agencies are on a working team called Environmental Solutions Partners. The goal of this team is to support, enhance, and enable the individual missions of our agencies. The team worked together on electronic-waste events, beach clean-ups, and other outreach events. The team also repurposed chemicals and other equipment by transferring them to each other thereby diverting waste from the landfill.

POC: Alice Smith, alice.f.smith@nasa.gov

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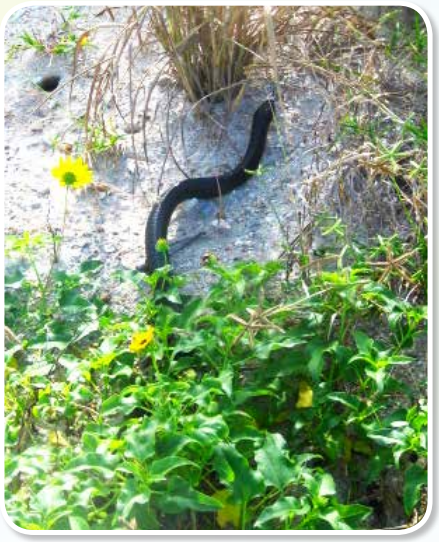
Secondary Dune Near Launch Pads Attracts New Residents

A secondary dune project was created near Launch Complex 39 to shield part of KSC's beach from launch pad lights, which can disorient nesting and hatchling sea turtles, and to protect the shoreline from severe erosion. Some 24,000 cubic yards of sand were used to build the secondary dune. This man-made dune, set back from the natural primary dunes about 70 feet, is 725 feet long, 15 feet high, and 75 feet wide and the vegetation includes sea grape, sea oats, dune sunflower, saw palmetto, beach grass, beach elder, marsh hay cordgrass, and blanket flower.

The project was a cooperative effort between Kennedy, the U.S. Fish and Wildlife Service, and the Medical and Environmental Support Contractor, InoMedic Health Applications. What was once a barren pile of sand by the railroad tracks is now a thriving dune habitat with vegetation and wildlife. Recent field-sampling results revealed that beach mice, gopher tortoises, and even an indigo snake have taken up residence in the dune system since it was created. Beach mice and indigo snakes are federally protected species, so the ability to create a habitat that they will occupy and use has great species management potential.

The project has given KSC the opportunity to study and monitor the effects of creating a secondary dune habitat. This effort provides valuable data for future environmental permits, monitoring programs, and design criteria. The goal is to collect data that will help KSC understand what it takes to create a functioning, healthy dune ecosystem. This knowledge will become very important as KSC contends with the realities of climate change and sea-level rise. The data collected in FY 2012 is being used to design a monitoring plan and to acquire the necessary Endangered Species permits for an upcoming dune project.

This beach mouse is a new resident of the secondary dune at KSC.



An indigo snake slithers across the secondary dune at KSC.

A KSC environmentalist holds a juvenile spadefoot toad at the secondary dune.

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Ordnance Operations Facility (OOF) Earns Leadership in Energy and Environmental Design (LEED) Gold

KSC's OOF received the U.S. Green Building Council's LEED Gold rating in FY 2012.

On March 28, 2012, the Center's OOF received the U.S. Green Building Council's LEED Gold rating. This is the sixth facility at Kennedy and the 26th for NASA to be recognized as a sustainable building through the LEED Program. LEED awards are designed to encourage and facilitate the development of more sustainable buildings. The system is based on the use of sustainable sites, materials and resources, water and energy efficiency, indoor environmental quality, and design innovation.

The OOF will receive about 20 percent of its power from a five-kilowatt photovoltaic system located on the ground, south of the building. The facility is heated and cooled with a three and a half ton geothermal heat pump system located six feet below the ground and is expected to achieve 34 percent energy use reduction and a 49 percent water use reduction compared to traditional buildings on an annual basis. The OOF increased KSC's total sustainable square footage as defined by the Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings to 76,570 gross square feet.

Savings during construction included 95.8 percent waste diversion from the landfill (144 tons) and 33.9 percent of the building materials were manufactured using recycled materials.

The facility is not only good for the environment, but also for the people working inside as 97.3 percent of the building is lit by natural daylight. By using less energy, less water, and fewer resources, this facility will save the taxpayers' money, reduce carbon emissions, contribute to a healthier environment for workers, and help KSC meet mandated requirements.

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Kennedy Collects Supplies for Teachers

KSC's Sustainability Team members repurposed office supplies that would have otherwise been sent to the landfill after the retirement of the Shuttle Program. By garnering these excess supplies, the resulting donations benefitted six surrounding county's public schools, helping the teachers meet the students' needs. KSC's civil servant and contractor community collected and distributed enough office supplies to fill 3,300 square feet of store space at a local mall. There were 293 teachers who received surplus supplies from this Excess Office Supplies Donation Project. The estimated value of the supplies was $115,000.

The Environmental Management Branch of Kennedy offered free school supplies to public and charter school teachers from the surrounding counties.

Kennedy Data Center Consolidation Project

In February of 2010, the Federal Government instituted the Federal Data Center Consolidation Initiative (FDCCI). Part of the effort was to promote the use of green information technology by reducing the overall energy and real estate footprint of Government data centers. The Kennedy Data Center Consolidation (KDCC) Project is the local KSC effort to meet the requirements of FDCCI and assist the Center in meeting its sustainability goals. This team is responsible for rightsizing and consolidating the computing infrastructure at KSC.

By consolidating data center hardware and software systems, energy savings will be realized due to reductions in the power consumption needed to operate and cool the data center resources. In 2010, KSC had more than 2,400 server assets with more than 100,000 square feet of related information technology space. Through the KDCC Project, KSC continues to meet annual goals of information technology server power reduction.

The server reduction power goal for calendar year 2012 was 97.7 kilowatt hours (kWH). The consolidation effort exceeded the 2012 goal and saved the Center approximately 198.8 kWH. In addition to power savings, more than 23,500 square feet of space previously occupied by servers has been returned to the Center for administrative use. Reduced power to servers and the areas to cool them equates to an annual Center savings of $363,375.

To learn more about sustainability at KSC visit our **KSC Sustainability Website**:
http://www.nasa.gov/centers/kennedy/about/sustainability/index.html

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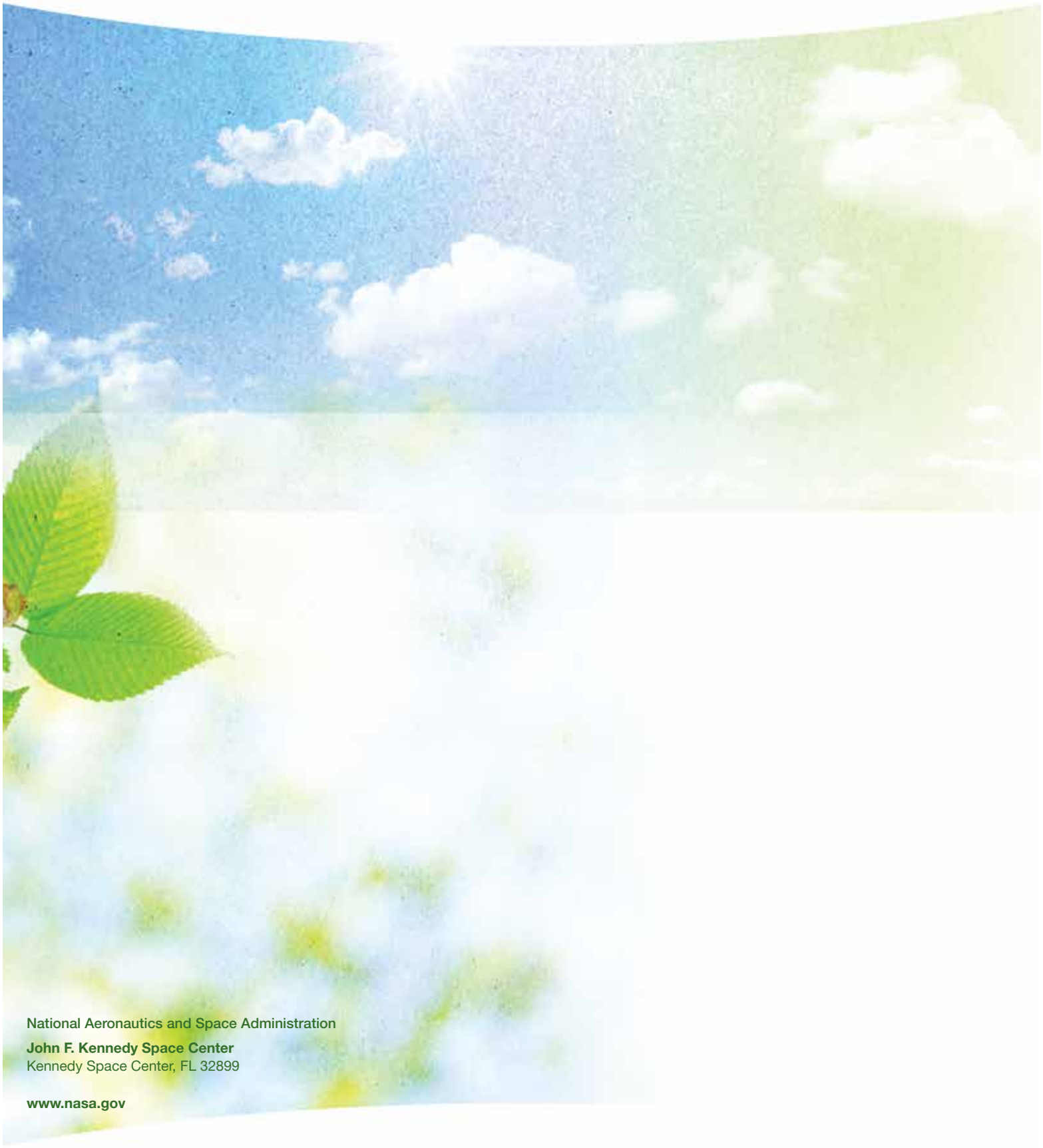

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SP-2013-04-083-KSC

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