

JSC

Annual Sustainability Report 2013

FY2013

Water Consumed:
325,571,000 gallons

Energy Used:
1,029,768 MMBTU
(gas, electric, fuel oil)

Paper Purchased: 447 tons

Petroleum Fuel Used:
40,863 gasoline gallon equivalents

Alternative Fuels Used:
55,468 gasoline gallon equivalents

Johnson Space Center
4,445,851 Gross Square Feet
1,600 Acres

FY2013

Disposed Non-Hazardous Waste: 1,354 tons

Disposed Hazardous Waste: 21 tons

Renewable Energy Produced Onsite: 368,840 kWh

Composted: 192 tons

Total Materials Recycled: 3,420 tons

(Includes paper, cardboard, bottles, cans, scrap metal, construction/demolition debris, office supplies, pallets, tires, Industrial Solid Waste, and electronics)

FY2013

Air Emissions:

Carbon Dioxide (CO₂): 107,704 metric tons

Particulate Matter (PM): 13.9 tons



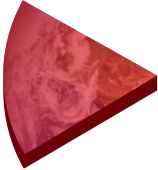

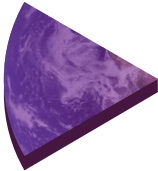

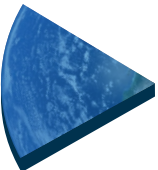

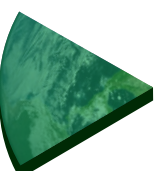

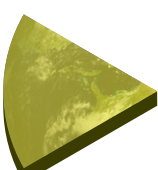

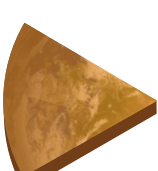


Nitrogen Oxides (NO_x): 5.4 tons

Carbon Monoxide (CO): 3.2 tons

Sulfur Dioxide (SO₂): 0.1 tons

Volatile Organic Compounds (VOCs): 8.2 tons

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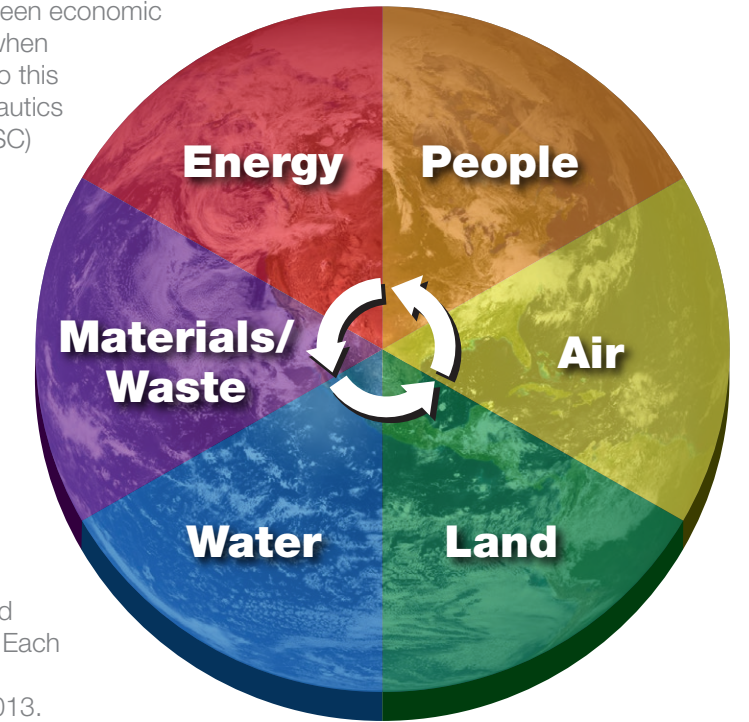
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Sustainability at JSC










Sustainability is a mindset that demonstrates a balance between economic vitality, environmental stewardship, and social responsibility when considering short and long-term planning. Businesses refer to this concept as the "The Triple Bottom Line." The National Aeronautics and Space Administration (NASA) Johnson Space Center (JSC) has been implementing aspects of sustainability for over 20 years. With the NASA Strategic Sustainability Performance Plan (SSPP) providing specific sustainability goals and targets, JSC can provide a coordinated effort to reach and even surpass these goals.

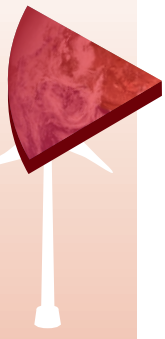
JSC's sustainability program breaks down into six major resource areas: Energy, Materials & Waste, Water, Land, Air, and People. Each resource group identifies ways to meet Agency and Center sustainability goals within their purview.

The Fiscal Year (FY) 2013 Annual Sustainability Report documents these efforts over the past year and brings awareness to the JSC community. This is by no means an exhaustive list of accomplishments. More success stories and goal details are available on the [JSC Sustainability Web Site](#). Each year, JSC makes strides towards achieving Agency and Center sustainability goals, and here is our status as of FY 2013.



NASA and JSC Sustainability Goals

1 Greenhouse Gases (GHG)	Reduce direct GHG emissions by 18.3% and indirect emissions (e.g., commuting, travel) by 12.6% by FY 2020 compared to FY 2008.	
2 Sustainable Buildings	Reduce energy intensity (energy consumption per gross square feet) by 3% annually compared to FY 2003. Ensure that at least 15% of existing buildings meet Guiding Principles for High Performance Principles by FY 2015.	
3 Fleet Management	Reduce petroleum use by 2% annually, compared to FY 2005, and increase the use of alternative fuels by 10% annually through FY 2015.	
4 Water Use	Reduce potable water intensity (gallons consumed per square foot) by 2% each year, compared to FY 2005, and reduce use for industrial, landscaping, and agricultural by 2% each year compared to FY 2010.	
5 Waste	Divert 50% of solid waste and 50% of construction and demolition debris from landfill.	
6 Sustainable Acquisition	Ensure that over 95% of applicable new contract actions meet Federal mandates for acquiring products that are energy efficient, water efficient, biobased, environmentally preferable, non-ozone depleting, recycled content, or are non-toxic or less toxic alternatives.	
7 Electronic Stewardship	Procure energy-efficient equipment rated per Electronic Product Environmental Assessment Tool (EPEAT) standards, and use best practices for computer operation and disposal.	
8 Renewable Energy	For FY 2013 and beyond, ensure that 7.5% of total electricity consumption is from renewable energy sources.	
9 Climate Change Resilience	Evaluate climate change risks to identify and manage the effects of climate change on operations and Mission in both the short and long term.	

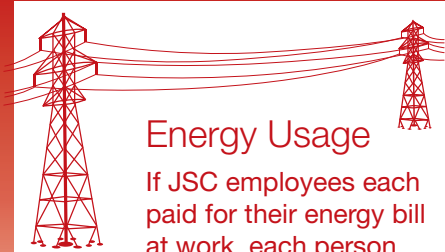


Energy

Energy resources include energy sources that JSC needs to operate the site. The goal of Energy is to reduce energy consumption while still accomplishing the Mission. Topics covered in this area include electricity, natural gas, and fuel consumption, as well as renewable energy sources and building efficiency.

That's a Lot of Kilowatt!

In FY 2013, JSC used over 168 million kilowatt hours (kWh) of electricity, more than enough to power all the homes in the Cities of Webster and Dickinson and an additional 1,700 homes for a year.



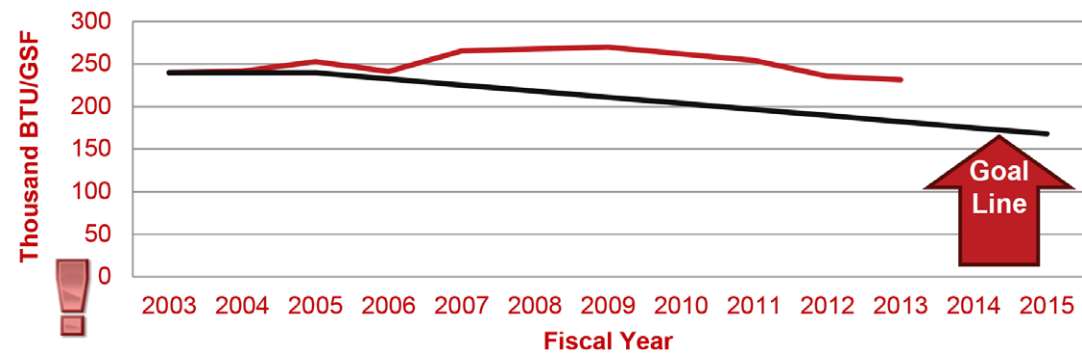
Energy Usage

If JSC employees each paid for their energy bill at work, each person would pay \$1,750 a year on average!



Did You Know

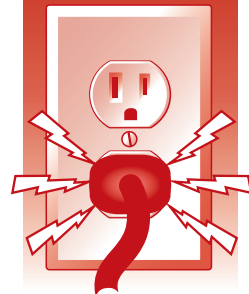
JSC Energy Intensity



Goal: Reduce energy intensity by 3% annually (for a total of 30%) from FY 2003 through FY 2015. Energy intensity is British Thermal Units (BTUs) per gross square foot (GSF).

Capture the Savings

Many appliances still draw power even when turned off, accounting for about 5% of residential power bills. With an \$11.6 million electric bill, JSC can capture significant savings if we unplugged appliances when not in use!



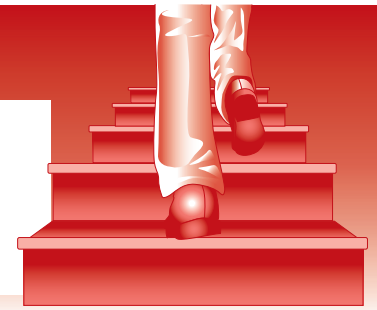
Lighting Project

JSC installed motion activated lighting and personalized lighting settings in Building 419 in FY 2013. This pilot project saved 76,190 kWh since January 2013.



Facility Managers Take Action

In Building 45, the Facility Manager (FM) challenged residents to take the stairs when possible to boost health and save energy from elevator use. Also, the FM consulted with occupants to remove excess lighting in offices to help reduce unnecessary energy usage.



SCTF Cuts the Kilowatts

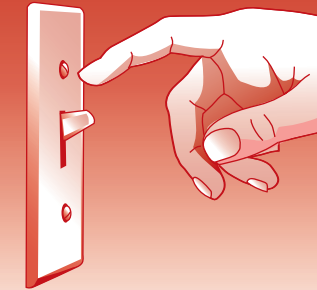
The Sonny Carter Training Facility took a proactive approach to saving energy and JSC funding during the summer of 2013.

Air Conditioning

SCTF turned off air handlers at night instead of running them 24/7.

Parking Lights

SCTF replaced parking lot lights with low-powered LED lights.



Lighting Cutbacks

SCTF only used half of overhead lighting in the high bay areas during the day and turned off lights at night, saving 1,000 watts for each light bulb.

Overall, SCTF's extensive energy saving efforts reduced their total energy consumption by 1.5%, saving \$46,565.

Energy Saving Tips

You can help JSC meet energy goals and save funding by incorporating the following into your everyday routine:

- Remember to turn off lights when you leave the room.
- Turn off and unplug (or switch surge protectors off) computers, other electronics, and appliances when not in use and at the end of each day.
- Close your blinds during the sunny parts of the day to reduce air conditioning needs.
- Notify Work Control (x32038) if you see outside building lights on during daylight hours or if your office lights do not turn off when they are supposed to.

FY 2014 Focus Areas

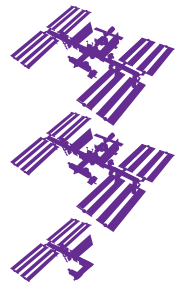


1. Encourage behavior that saves energy, such as unplugging electronics when not in use.
2. Identify additional areas for energy improvements.
3. Encourage employees to turn off computers during nights and weekends, and report energy saving opportunities to Facility Managers.

Materials & Waste

Materials & Waste resources include anything that JSC buys, sells, or disposes to keep the site running and the Mission accomplished. The goal of Materials & Waste is to reduce unnecessary material purchases, reduce toxics material use, reduce waste, and reform waste into new materials, resulting in procurement and disposal savings. Specific topics include green purchasing, reuse, recycling, and pollution prevention.

JSC recycled 2.2 million pounds of trash in 2013. That is more than twice the weight of the International Space Station.

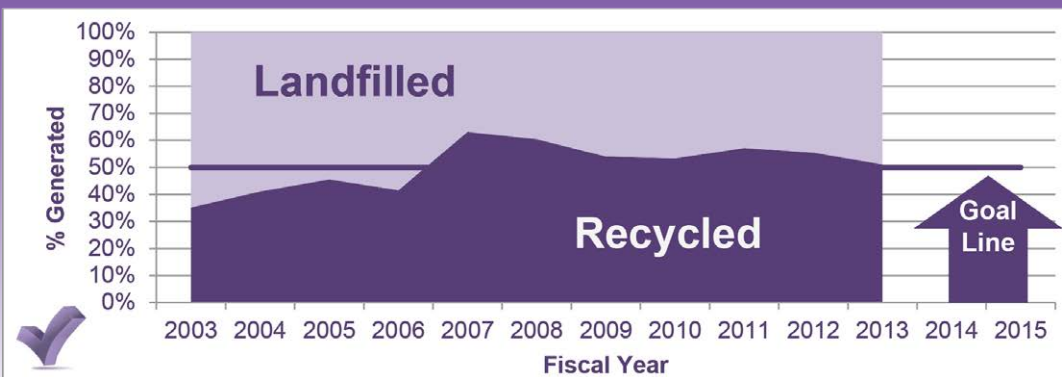


In 2013, JSC won a national award from the U.S. Environmental Protection Agency for the increase in onsite composting efforts. JSC composts enough organic material to avoid buying mulch for landscaping beds across the site, saving thousands of dollars.



Did You Know

JSC Waste Diversion Goal



Goal: Divert at least 50% of trash from landfills by FY 2015.

Composting

JSC increased food waste and shredded paper composting by 45%, from 38,940 pounds in 2012 to 56,560 pounds in 2013.



Coffee Grounds

Volunteers in 10 buildings collected over 2.18 tons of used coffee grounds and shredded paper for JSC to compost in the first 9 months of the Coffee to Compost Program.



Electronic Forms

JSC's Property Branch now uses electronic forms instead of printing hard copies. The Procurement Branch is working on implementing similar paperless processes.

Improved Paper Recycling



In 2013, JSC started tracking how much shredded paper was securely recycled through the JSC 'Burn Bag' Program for sensitive documents. This increased JSC's paper recycling rate by about 12,000 pounds more a month.

JSC Café Recycling

In 2013, the JSC Cafés started recycling empty food cans as scrap metal and recycling fryer oil. These programs will divert 1,560 cans and 3,640 pounds of fryer oil from disposal.

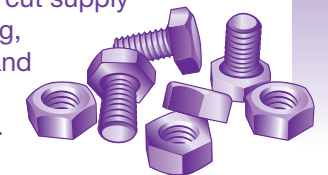
Drum Roll, Please!



JSC started reconditioning empty product drums in 2012. In the first 18 months of the program, JSC diverted 23,220 pounds from landfill and saved about \$28,700.

Sharing is Caring

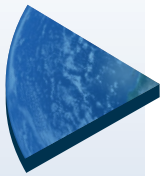
Instead of buying new flight hardware for each project, JSC's Logistics Branch has a streamlined Shared Program Stock option that makes excess flight-related inventory available to other projects, which will cut supply purchasing, storage, and disposal expenses.



FY 2014 Focus Areas

1. Expand efforts to go paperless, specifically in shipping and procurement documents.
2. Improve accounting and capture waste diversion weights for all reused and recycled NASA property.
3. Improve waste diversion rates at unmanned recycling locations and office areas.
4. Improve data collection and implementation of sustainable acquisition purchases for designated items (e.g., cleaners, carpet, paint, toner cartridges, office products, paper products, etc.)
5. Improve data collection of Construction & Demolition (C&D) diversion weights.





Water

Water resources include the water that comes and goes from the site. The goal of Water is to reduce consumption and protect local water resources from potential pollutants. Topics covered in this area include potable water, water reuse, fire suppression water, wastewater, and stormwater. JSC is very close to several bodies of water, so managing our water resources appropriately is critical to operating sustainably.

Potable Water Use

In FY 2013, JSC used 326 million gallons of potable water, enough potable water to fill all of Building 1 more than 17 times!



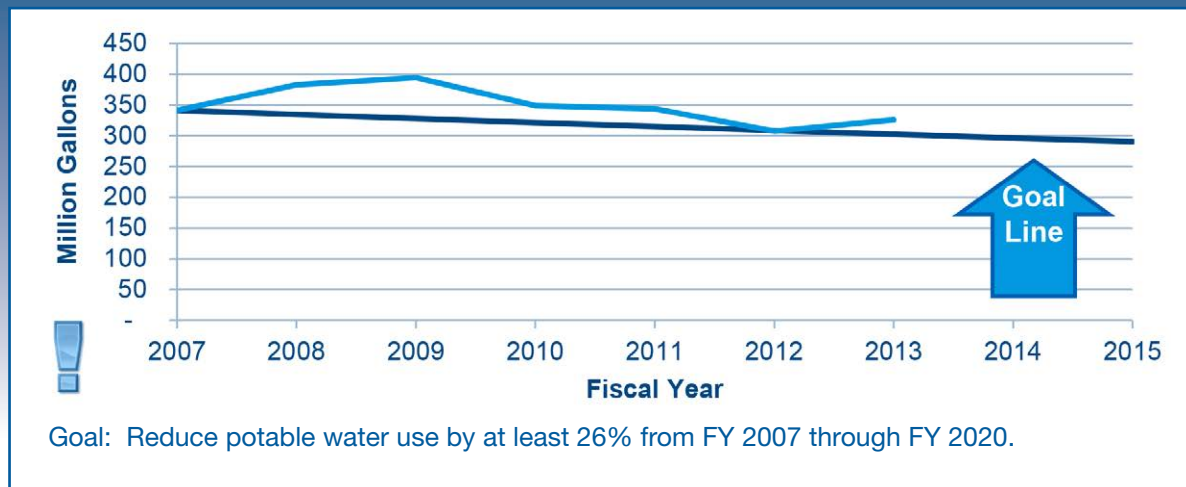
Potable Water Reduction

Ellington Field decreased their potable water use by 14% from FY 2012. That is enough water to provide 32 houses with water for an entire month!



Did You Know

Water Consumption

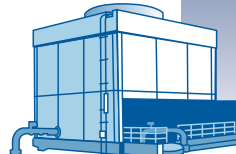


Water Usage Increase

JSC potable water usage increased by 6% in FY 2013 from FY 2012 due to several operational and maintenance activities, such as pond cleaning, State-required potable water tank cleaning, and new fire water system filling and flushing. Some chilled water leaks also contributed to the increase.

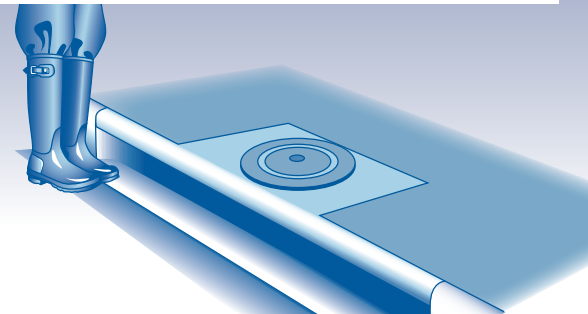
Water Savings

JSC added the ability to reroute condenser water during cooling tower maintenance in Building 24, which will save at least 10 million gallons of potable water a year.



Making a Big Difference

A JSC employee reported hearing flowing water next to Building 13 on a sunny day. After investigating, the Environmental Office found that Building 13 equipment uses potable water to keep cool. After one use, the water drains to the stormwater discharge system. JSC is installing a closed-loop water recycling system to save potable water, which has the potential to save 3% of JSC's total water consumption, about 9.75 million gallons per year.



Look and Listen

Employees are JSC's eyes and ears! Listen and report any unusual noises or water flows (e.g., water running in storm drains on sunny days). Your efforts might help JSC conserve water and meet sustainability goals!



Meter Mania

JSC now has water meters on all buildings. This will help JSC identify any problems or leaks quickly.



Smart Thinking

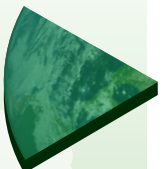
JSC Custodial implemented new floor cleaning equipment for common areas that reduces the water needed to mop floors. In addition, it eliminated all except one cleaning chemical, and added traction for increased safety.



FY 2014 Focus Areas



1. Encourage employees to conserve water whenever possible.
2. Encourage the use of WaterSense products and water saving fixtures and appliances.
3. Identify target areas and funding for additional water conservation projects.
4. Encourage employees to listen for "rogue water flow."
5. Review opportunities for recycled water use.



Land

Land resources include any physical structures, infrastructure, and land-based natural resources that JSC owns, maintains, builds, protects, or uses to operate the site. The goal of Land is to develop and maintain facilities in a sustainable and high performing manner. Specific topics include landscaping, wildlife, agriculture, vegetation, roads, and buildings, including green buildings and historic facilities.

Debris Diversion

JSC diverted over 95% of construction and demolition debris from landfill during the Building 12 renovation!



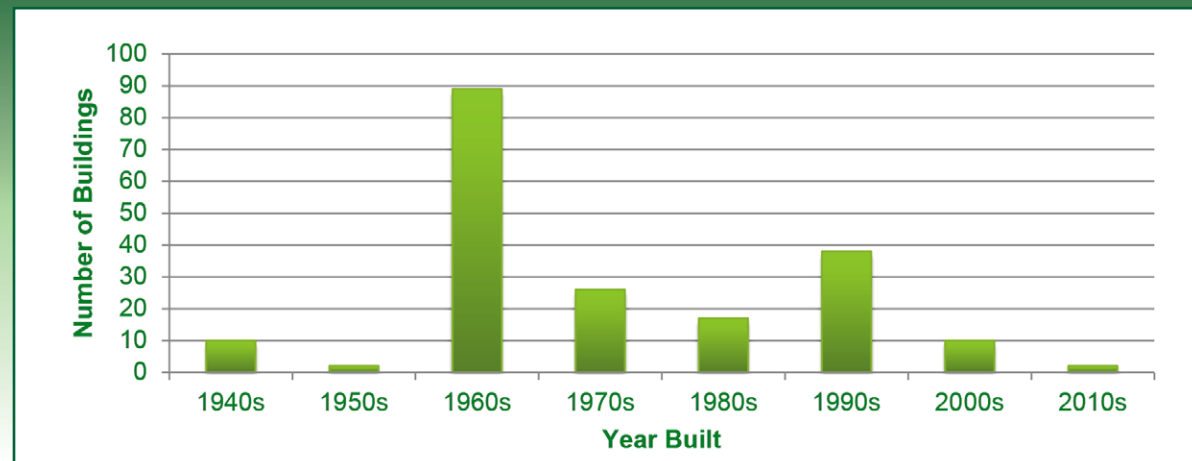
Going Green

JSC has over 6,900 civil servant and contractor employees onsite that work in 4.4 million square feet of office space to support Mission objectives. Over 321,000 square feet of office space is green certified, and more improvements are made each year that help save resources.



Did You Know

JSC and EF Building Ages



From Problem to Wetland

In 2013, JSC took a 2,200 square foot area with drainage problems that was difficult to mow and transformed it into a new, thriving wetland habitat. JSC harvested wetland plants already growing in ditches onsite to seed the new wetland, so there was no need to purchase plants. In 3 weeks, the new wetland was thriving and providing a home for local bird and plant species.



Building 12 Got The Gold

The newly renovated Building 12 was awarded Leadership in Environmental and Energy Design (LEED) Gold certification in FY 2013. Building features that contributed to the Gold certification include open floor plans with access to natural lighting for most occupants, air conditioning from floor vents instead of ceiling vents to help increase efficiency, the energy saving green roof and solar panels, and environmentally friendly or local building materials.

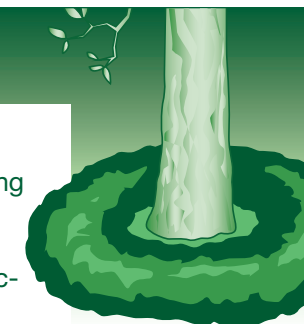


Restoring the Prairie

JSC started a Texas Coastal Prairie restoration project in FY 2013 by removing thousands of invasive Chinese tallow trees from the site's prairie lands and planting native wildflower and grasses harvested from the Attwater's Prairie Chicken National Wildlife Refuge.

Mucho Mulch

JSC mulches tree limbs from landscaping efforts for use in landscaping beds across the site. In FY 2013, JSC generated over 328,000 pounds of mulch, significantly reducing the need to purchase mulch.



Birds on the Brain

Birds have a hard time recognizing window glass, and they sometimes run into the glass and injure themselves. Occupants in Building 20 helped reduce bird collisions by making an effort to close their blinds during major migration seasons. That is using their noggins!

Wildlife Rescue

In 2013, JSC worked with wildlife rehabbers to rehabilitate and release several animals found onsite, including a roseate spoonbill, a whitetail deer, and several hawks. If you find an injured or distressed animal onsite, be sure to keep your distance and call Work Control at x32038 to contact the Wildlife Response Team.



FY 2014 Focus Areas



1. Develop the Space Life Sciences Laboratory facility.
2. Renovate the Building 45 annex.
3. Remove invasive species and begin 500-acre habitat restoration efforts.
4. Maximize the use of office space to reduce resource use.
5. Integrate sustainable maintenance practices into buildings.

Air

Air resources include both indoor and outdoor air quality. The goal of Air is to maintain regulatory compliance with air regulations and work with regional efforts to reduce the release of specific air pollutants. Topics covered in this area mainly focus on outdoor air quality, greenhouse gas emissions, and reductions in toxic chemical use. Air quality is a topic that affects the whole Houston area, and JSC works with neighboring cities to improve air quality throughout the region.

Ozone

In 2013, Houston had 17 days with bad ozone levels. Fear not! This was a decrease from the 43 bad ozone days in 2012.

60%

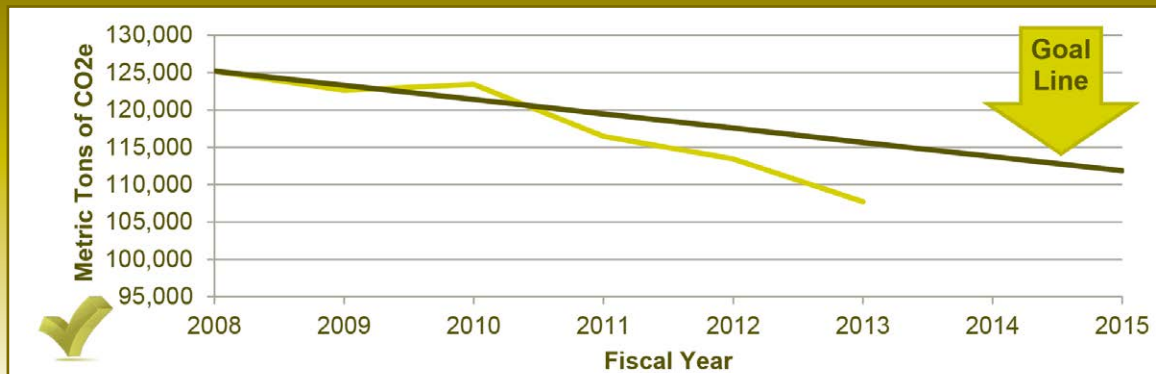
Emissions

JSC reduced stationary source air emissions by more than 30% since 2012, which include particulate matter, nitrogen oxides, carbon monoxide, sulfur dioxide, and volatile organic compounds (VOCs). These emissions occur mainly from combustion processes and chemical usage.



Did You Know

JSC Scope 1 & 2 Greenhouse Gases (GHG)



Goal: Reduce Scope 1 & 2 greenhouse gas emissions by 18.3% from FY 2008 through FY 2020. (Scope 1 & 2 emissions are direct onsite or offsite emissions.)

Super Flex Fridays

JSC started a pilot program where employees can choose one of two options: 1) work an hour extra each day and take every other Friday off, or 2) telework every other Friday. In addition to water and electricity savings, these options help employees save gas needed to get to and from work and help reduce associated air emissions. If 1/3 of employees take advantage of Super Flex Fridays, it would save about 750 metric tons of carbon dioxide emissions per year just from transportation savings. It would take 615 acres of U.S. forests to absorb all that carbon dioxide that Super Flex Friday saves.



No VOCs? No Problem!

In 2013, JSC developed a better way to track painting activities on fixed structures (i.e., buildings, parking lots, etc.) through JSC Form 2118 to ensure regulatory compliance. Part of the program included increasing awareness about no-VOC paint. If you do not have VOCs in your paint, you do not have to fill out the extra paperwork, encouraging individuals to choose paints with fewer emissions.

New and Improved

Old boilers can be very inefficient, producing significantly more air emissions than their modern counterparts. JSC replaced an old boiler at Ellington Field with two small, high-efficiency boilers. The replacement boilers reduced nitrogen oxides air emissions by more than 80% compared to the old boiler.

Progress on Petroleum

JSC only used 41,000 gallons of gas and diesel in fleet vehicles during 2013, a 51% decrease from the 84,000 gallons in 2012. The significant decrease in petroleum fuel use well exceeds the required 2% decrease per year.



Buy to Save

When purchasing equipment that generates air emissions, your choice matters! Be sure to purchase equipment with the highest emission controls feasible. JSC did. JSC purchased two emergency generators with state-of-the-art emission controls, one for the potable water plant and one for the Sonny Carter Training Facility computer room. Because of those choices, JSC will reduce air impacts while improving system reliability.

Scope 3 GHGs

Scope 3 GHGs are air emissions that come from employee travel, commuting, trash disposal, and electricity transmission and distribution. NASA has been developing Scope 3 GHG Inventories for all the Centers, so JSC can see how our efforts reduce these emissions. Center inventories should be available in FY 2014.

FY 2014 Focus Areas



1. Renew JSC's main Title V Federal Operating Permit for air compliance.
2. Develop a database tracking system for air emissions to increase efficiency.
3. Provide air permitting and regulatory compliance support during procurement and construction phases of significant Facilities projects.
4. Encourage employees to replace high-VOC coatings and solvents with low- or no-VOC alternatives where possible.

People

People affect every element of sustainability at JSC. Your decisions on how to accomplish tasks either use or save resources. Decisions like remembering to turn off lights and equipment when leaving for the day, following sustainable acquisition requirements, carpooling, or teleworking all make a difference. Topics covered in this area include behavior change (awareness, personal growth, happiness, and transition), communication (marketing, outreach, and external relations), recognition and awards, environmental planning, and technology transfer.

Footprints

You can calculate your individual ecological footprint at www.myfootprint.org. If everyone lived like you do, how many planets would we need?



Spinoffs

Every year, JSC publicizes all the technology transfers to the public sector through a publication called Spinoff. Find out how NASA and JSC are changing the world and saving the environment through technology transfers at the [Spinoff Web Site](#).



Did You Know

Who to Call

Wondering who to call if you are interested in electric cars or cycling to and around site? **Demetrius Roberts** is the new JSC Cycling point of contact (POC), and **Dave Hanson** is the new JSC Electric Car POC. Also, **Jerry Rowlands** is the new Conservation Projects POC.



Sustainability Operating Rhythm

JSC now has a sustainability operating rhythm. The annual Sustainability Engagement Strategy will be released in October, and the Annual Sustainability Report will be released in March. Find out about monthly sustainability opportunities through JSC Today and on the new [Sustainability Initiatives Web Site](#).

Employee Resource Groups

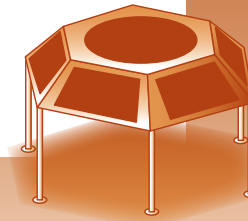
Did you know that JSC has several **employee resource groups (ERGs)** to encourage collaboration between individuals that share a common purpose, interest, or background? Check out an ERG that sparks your interest:

- African American ERG (AAERG)
- Asians Succeeding in Innovation & Aerospace (ASIA) ERG
- Emerge ERG (Next Generation Professionals)
- Hispanic ERG (HERG)
- Human/Systems Integration (HSI) ERG
- Out and Allied (Lesbian, Gay, Bisexual, Transgender, and Allies) ERG



JSC Sustainability Team Projects

The Sustainability Partnership Team developed the design for a Solar Powered Outdoor Collaboration Cupola (SPOCC). (POC: **Mike Ewert**).



The JSC Green Team conducted LEED building tours and hosted an energy reduction competition (POC: **JSC-Green-Team@mail.nasa.gov**).



The JSC Contractor Environmental Partnership started the volunteer-based Coffee-to-Compost Program (POC: **Jeni Morrison**).



The Environmental Stewardship Subcommittee offered Environmental Management System training in 2013 and identified several water conservation projects for FY 2014 (POC: **JSC-Environmental-Office@nasa.gov**).

Music on the Mall

JSC celebrated the people element on Earth Day by inviting everyone to bring a musical instrument to the Mall Area. Several groups took a stress-free work break during their lunch by playing guitars, makeshift drums, or other instruments.



You Can Make a Difference

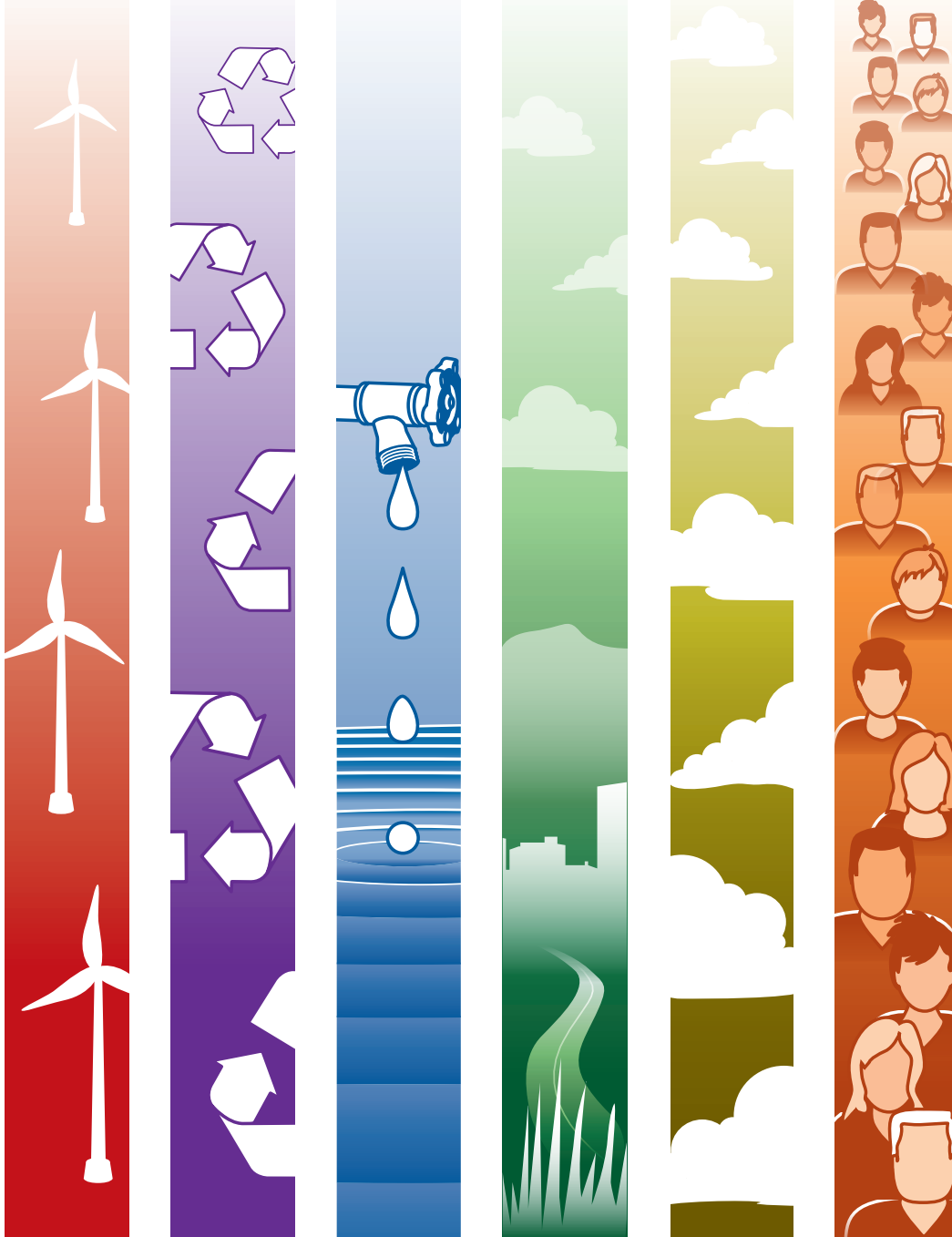
There are four ways you can make a difference:

1. Personally – Understand your footprint.
2. Professionally – Be more sustainable in your office area.
3. Professionally – Be more sustainable in your job function.
4. Professionally – Promote sustainability by joining a JSC Sustainability Team

FY 2014 Focus Areas



1. Increase awareness of Agency and Center Sustainability Goals.
2. Encourage behavior changes that support Mission success and sustainability goals.
3. Encourage employees to incorporate features with positive environmental impacts to every project.
4. Record more success stories about what JSC is doing and has done to meet sustainability goals.



Are you interested in how JSC measures up against NASA's sustainability goals and targets? Check out JSC's sustainability status on the [JSC Sustainability Web Page](#).

Do you have questions, suggestions, ideas, or success stories? Tell us about it! E-mail JSC-Sustainability@mail.nasa.gov with your story.

Join the JSC sustainability movement. Find out how you can help, and make a change.

Why? Because Every Effort Makes a Difference!