National Aeronautics and
Space Administration

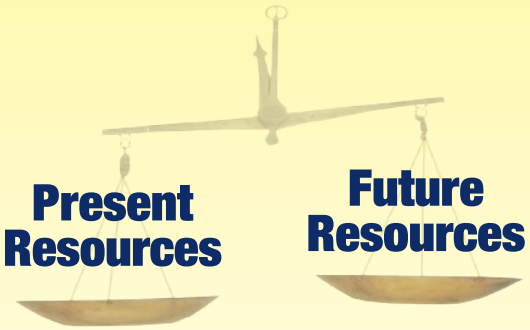
JSC Sustainability Engagement Strategy

FY2015

www.nasa.gov

What is Sustainability?

Sustainability is “development that meets the needs of the current generation without compromising the needs of future generations.” (http://www.epa.gov/sustainability/basicinfo.htm)



Our intent is to...

- ***To have an effective, functioning space center here in 50, 100, … 200+ years.***
- ***To inform JSC employees and managers what sustainability means and how we are organizing our efforts at JSC for everyone to contribute.***

YOU are our Natural Champions.

Together we have the ability to design more sustainable technologies and incrementally change our daily habits to reduce our cumulative demand on Earth’s natural resources.

You can help by…

√ Learning more (keep reading this!)

√ Talking about your own interests and efforts both at work and at home.

√ Participating in Monthly Sustainability Opportunities (Google: NASA JSC Sustainability)

√ Joining one of our JSC Sustainability Teams (see more on page 12)

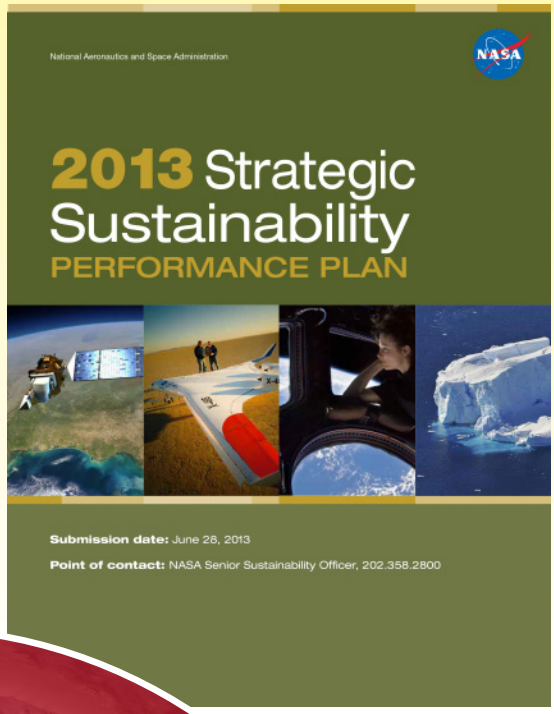
- Green Team: jsc-green-team@mail.nasa.gov
- Sustainability Partnership Team: michael.k.ewert@nasa.gov
- Contractor Environmental Partnership: jennifer.l.morrison@nasa.gov
- Environmental Stewardship Subcommittee: JSC-Environmental-Office@mail.nasa.gov

√ Brainstorming additional opportunities and sharing success stories at jsc-Sustainability@mail.nasa.gov

√ Joining the JSC Sustainability List Serve by entering your e-mail address at https://lists.nasa.gov/mailman/listinfo/jsc-sustainability

JSC Sustainability Model

Executive Order 13514 requires all U.S. Federal Agencies create a Strategic Sustainability Performance Plan (SSPP). NASA's SSPP can be found electronically on the NASA Sustainability Portal: http://www.nasa.gov/agency/sustainability/.



Natural Resources we are Sustaining

What are our Sustainability Goals?

GOALS

Goal 1: Greenhouse Gases

GOAL: Reduce direct GHG emissions (onsite or offsite) by 18.3% and indirect emissions (e.g., commuting, travel) by 12.6% by FY2020, compared to 2008

Goal 2: Sustainable Buildings

GOALS:

Facility Energy Intensity: Reduce energy consumption/GSF of building area by 3% annually from FY2003 baseline for FY2006 – FY2015 (30% Total)

Sustainable Buildings: At least 15% of Agency's existing buildings meet Guiding Principles by FY 2015.

Goal 3: Fleet Management

GOAL: Reduce petroleum use by 2% annually, compared to 2005; increase use of alternative fuels by 10% annually through FY2015

Goal 4: Water Use

GOAL: Reduce potable intensity (gallons/sq ft) by 2% each year, compared to 2005; reduce use for industrial, landscaping, and agricultural by 2% each year, compared to 2010

Goal 5: Waste

GOAL: Divert 50% of solid waste (excluding construction and demolition debris); divert 50% of construction and demolition debris

Goal 6: Sustainable Acquisition

GOAL: >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

Goal 7: Electronic Stewardship

GOAL: Procure energy-efficient equipment rated per Electronic Product Environmental Assessment Tool (EPEAT); use best practices for computer operation and disposal

Goal 8: Renewable Energy

GOAL: For FY12, 5% of agency's total electricity consumption is from renewable energy sources; for FY13 and beyond, renewable energy is 7.5% of electricity consumption

Goal 9: Climate Change Resilience

GOAL: Evaluate climate change risks to identify and manage the effects of climate change on the agency's operations and mission in both the short and long term

Reference: NASA 2013 Strategic Sustainability Performance Plan

What is the Plan?

Sustainability takes a combination of both Awareness and Enforcement

Enforcement:

Because some environmentally related impacts of our actions are already causing significant consequences, there are some sustainability-related elements that are no longer optional. These high impact, high mitigation cost actions are controlled by entities like the Environmental Protection Agency (EPA) and the Council on Environmental Quality (CEQ).

Awareness: JSCs Sustainability Operating Rhythm

This strategy is aimed at inspiring awareness and motivation change in the areas that are still low to moderate impact and cost to mitigate. It's published every first quarter of the FY. Additional references that support this are the JSC Energy Dashboard, the JSC Monthly Sustainability Opportunities, and our JSC Annual Sustainability Report (published every 3rd quarter).

This information is always available to you by Googling: NASA JSC Sustainability.

Or e-mail JSC-Sustainability@mail.nasa.gov with specific questions.

Air

Includes:

Energy • Stationary Sources • Mobile Sources • Indoor Air Quality • Materials

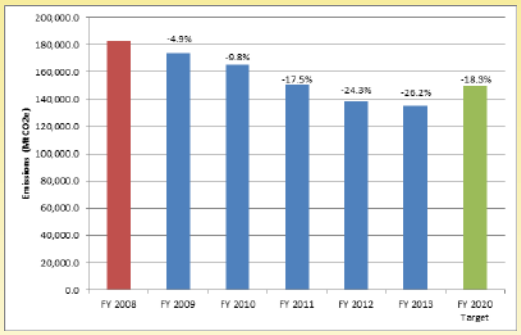
The Air Resource at JSC includes several types of emission activities. Stationary Sources includes both fixed stack sources and fugitive sources. Mobile Sources include Government and personal vehicles, government aircraft, and non-road equipment. Indoor Air Quality includes tracking Hazardous Material Usage and Air Conditions and Exposure Assessments for such parameters as lead, mold, dust, and asbestos.

Sustainability Goal #1

Greenhouse Gases: Reduce direct Greenhouse Gas (GHG) emissions (onsite or offsite) by 18.3% and indirect emissions (e.g., commuting, travel) by 12.6% by FY 2020, compared to FY 2008. (Related to ENERGY)

What has been done to meet the GHG reduction goal? What are we trying to do?

1. The Energy Manager is implementing several energy savings programs that result in reduced GHG emissions.
2. The Environmental Office has a JSC-specific FEMP GHG emission report to track the emission metric results. The following chart shows the current JSC status.



Note that none of the GHG reduction targets imposed by EO 13514 are Center-level targets (they are all Agency-level).

Here's what you can do!

Consider teleworking to reduce your vehicle emissions from commuting to work.

Sustainability Goal #6

Sustainable Acquisition: Ensure > 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.

What has been done to meet the sustainable acquisition goal? What are we trying to do?

1. JSC Procurement is including FAR sustainability clauses in all applicable construction and other relevant service contracts.
2. The Environmental Office works with several other organizations to track and manage the use of toxic and hazardous chemicals and materials, including ozone-depleting substances (ODSs). For example, JSC eliminated the last of the Class I ODS (most damaging) materials from use in 2011, and is gradually phasing out use of the Class II ODS.

Here's what you can do!

For your home or auto air conditioning system, select a reliable service contractor. Make sure they use refrigerant recovery equipment during service. And request that service technicians locate and repair leaks instead of "topping off" leaking systems.

And that's not all. Contact the Air Resource focal point Kirk Hummel to learn more and get involved.

Energy

Includes:
Renewable • Electricity • Natural Gas • Conservation • Metrics

Energy use impacts all of us every day here at JSC. Our mostly 1960's era campus and increasing use of electronic devices provide many opportunities to conserve energy and achieve several sustainability goals.

Sustainability Goal #1

Greenhouse Gases: Reduce direct Greenhouse Gas (GHG) emissions (onsite or offsite) by 18.3% and indirect emissions (e.g., commuting, travel) by 12.6% by FY 2020, compared to FY 2008.

What has been done to meet the GHG reduction goal? What are we trying to do?

By reducing energy use on site JSC reduces not only emissions from our boiler plant but also emissions from offsite power plants that generate our electricity.

Here's what you can do!

Consider Cycling to work. JSC is creating a team of avid cyclists to help mentor and suggest improvements.

Sustainability Goal #2

Federal Energy Intensity: Reduce energy intensity per Gross Square Foot (GSF) of building area from a 2003 baseline by 3 percent per year, or 30 percent by FY 2015.

What has been done to meet the Energy Reduction Goal? What are we trying to do?

The Energy Managers work closely with FM's to reduce lighting and HVAC run times, as well as constant monitoring of energy use with our Energy Support Services Contractor Honeywell to look for energy waste and correct it. We work closely across JSC to install energy saving equipment and facilities, and promote energy awareness. This effort includes working with IRD on energy saving tips for printers and computers.

Here's what you can do!

Follow Energy Saving Tips like reducing energy-using equipment in your work areas (especially refrigerators) and participating in JSC's Superflex Program.

Sustainability Goal #8

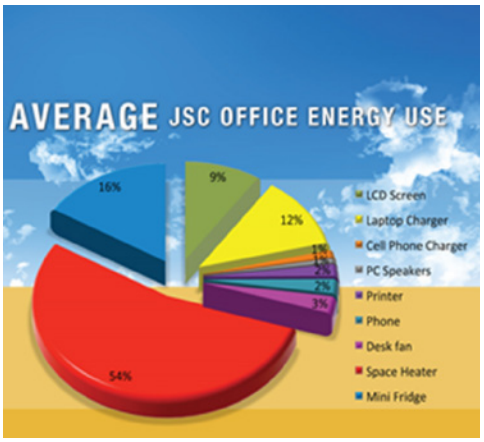
For FY 12, 5% of the agency's total electricity consumption is from renewable energy sources; for FY 13 and beyond, renewable energy is 7.5% of electricity consumption.

What has been done to meet the Renewable Energy goal? What are we trying to do?

JSC is planning or working on several renewable projects including making Rocket Park and the Child Care Center NET ZERO (net generate all the power the facility consumes). Site renewable energy generation is supplemented by purchase of Renewable Energy Credits (REC) to meet the goal.

Here's what you can do!

Learn more about renewable energy and support JSC's program by contacting your JSC Energy Manager, Kevin McCue.



Land

Includes:
Buildings • Master Planning • Grounds • Historic Sites • Wildlife

The land resource includes the nearly 1,600 acres of property as well as the native prairie, oak forest, and 375 buildings that make up JSC. Managing this resource calls for preservation and intelligent use of landscaping, existing buildings, local wildlife, native vegetation, historic landmarks, and new building construction.

Sustainability Goal #2

Sustainable Buildings: At least 15% of Agency's existing buildings meet Guiding Principles by FY2015.

Building structures that meet sustainable standards is accomplished in one way by meeting Leadership in Energy and Environmental Design (LEED) standards. There are eight LEED certified buildings at JSC (B27, B29, B207A, B2N, B26, B265, B20, and B12).

Here's what you can do!

Consider designing or remodeling your home to be more sustainable with our natural resources. Insulation, desiccant wheels, rainwater catchment, solar panels, and permeable pavers are all on display at http://www.codegreenhouston.org/.

Sustainability Goal #9

Climate change resilience: Evaluate climate change risks to identify and manage the effects of climate change on the agency's operations and mission in both the short and long term.

Protecting native plants and animals: Grounds contractors have been utilizing native or locally adapted species to maintain building landscaping. Wildlife managers maintain native species in the prairies and forest by removing invasive species and planting native prairie plants in areas of important bird habitat.

Here's what you can do!

Plant native plants in your own yards to attract songbirds and butterflies. They also need less water. Remove invasive and noxious plants that impact native species and damage local wildlife populations. Read more at www.wildflower.org/.

And that's not all. Contact Matt Strausser to learn more and get involved.

Water

Includes:
Potable Water • Fire Suppression Water • Re-use Water • Storm Sewer • Sanitary Sewer

Saving water is everyone's responsibility. JA is working to improve the facility and utility systems at JSC. And by saving water, sanitary sewer flows are also reduced. This means less impact on local sewage treatment systems and less impact on the environment. And by finding leaks that erroneously flow to the storm sewer systems, we can reduce possible polluted flows into our local waterways and lakes.

Sustainability Goal #2

Sustainable Buildings: At least 15% of Agency's existing buildings meet Guiding Principles by FY2015.

JA fully embraces LEED and the Five Guiding Principles, which include provisions for water conservation. New buildings at JSC are constructed with low flow plumbing fixtures and rain water catchment systems for landscaping irrigation. Other building programs installed low-flow plumbing fixtures on existing buildings as part of an Energy Savings Performance Contract. JSC is striving to meet the sustainable goal of 15% of buildings by 2015; however, the water conservation area is well on its way.

Here's what you can do!

Using a Low-Flow (2.5Gal/min) shower head can save you up to $1.10 per shower. Average cost of a 10-min shower with a regular shower head is ~$1.69, so that's significant.

http://www.paystolivegreen.com/shower-water-and-energy-use-calculator/

Sustainability Goal #4

Water use: Reduce potable intensity (gallons/SF) by 2% each year, compared to 2005 Reduce use for industrial, landscaping, and agricultural by 2% each year, compared to 2010.

JA is in the final stages of projects to split the potable and fire suppression water services. This will significantly reduce the flushing needed to maintain a healthy and pure drinking water system. Because the amount of flushing can be reduced, JSC's water usage is also reduced. JA is also finding and eliminating cooling water systems on lab equipment that use a once-through water flow. Because this water is not recirculated, there is no recycling of the water. Upgrades will include a heat exchanger, pump and recirculation loop to reduce water waste. Other planned projects to reduce water usage include a reclaimed waste water system utilizing a STP effluent product for non-potable uses, such as cooling tower makeup and irrigation for landscaping.

Here's what you can do!

Fix those dripping faucets at home and notify any facility manager for dripping faucets, toilets or external water leaks that you see or hear on site.

And that's not all. Contact Doug Conover to learn more and get involved.

Materials

Includes:
Procure • Use • Recycle • Dispose • Reutilize

Our goal is to close the loop on materials and waste by diverting more than 50% of our waste from landfills and by purchasing items made from recycled and biobased content.

You can help: Reduce unnecessary purchases
Reuse when it's still useful
Recycle everything you can

Then: Rebuy items with recycled, biobased, and less hazardous content

Sustainability Goal #5

Waste: Divert 50% of solid waste (excluding construction and demolition debris); divert 50% of construction and demolition debris

Divert 50% or more of our waste from landfills through recycling and reuse.

- JSC manages a mature recycling program for paper, cardboard, cans, bottles, and office supplies.
- JSC created a stock reuse program: OSCAR
- JSC asks employees to participate in the Freecycle@Work program.
- JSC implemented Coffee to Compost as an addition to our award-winning composting program.

Here's what you can do!

1. Participate in the JSC Coffee Compost Program.
2. Commit to throw NO recyclables in the trash.
3. Start a compost or worm bin for food scraps.
4. Participate in Freecycle in your own city.

And that's not all. Contact Michelle Fraser-Page to learn more and get involved.

Sustainability Goal #6

Sustainable Acquisition: >95% of applicable new contract actions meet federal mandates for acquiring products that are energy efficient, water efficient, biobased, environmental preferable, non-ozone depleting, recycled content, or are non-toxic or less toxic alternatives

Purchase 100% of designated items with the minimum required content.

- Since a significant portion of JSC's annual budget goes to contracts, our goal is to ensure 95% of contracts have applicable requirements for "green" purchasing.
- JSC offer short, focused training sessions on sustainable acquisition requirements, including reporting requirements.
- Download the new sustainable acquisition brochure. <http://www6.jsc.nasa.gov/ja/apps/news/newsfiles/3484.pdf>

Here's what you can do!

1. Watch "The Story of Stuff."
2. Ask yourself if you absolutely need this now.
3. Learn to make and use your own cleaning supplies.

People

Includes:
Awareness • Education • Opportunities • Rewards • Behavior Change

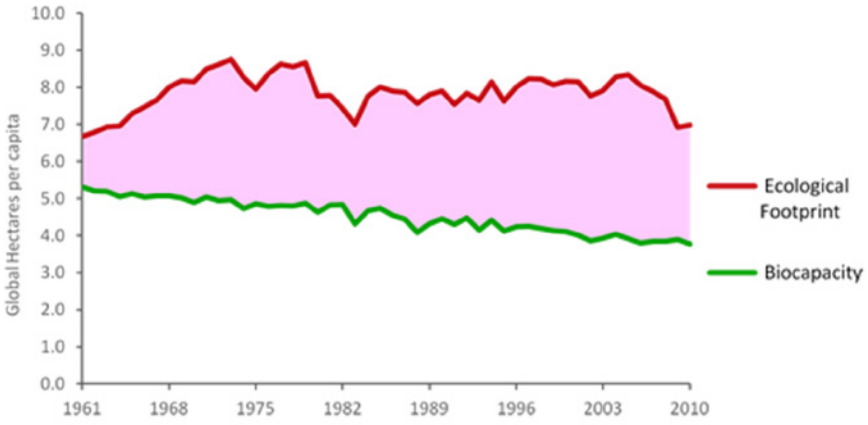
How many planets does it take to sustain your lifestyle?

Calculate your ecological footprint using the personal calculator, and explore scenarios to reduce your demand. Encourage your friends and family to participate, apply this at work and at home, and champion legislation to decrease our country's footprint. http://www.footprintnetwork.org/en/index.php/GFN/page/calculators/

Do We Fit on Our Planet?

We are now borrowing capacity for our resources from future generation. It now takes the Earth longer to regenerate what we use than the rate we are using it. We measure our ecological footprint to make sure that the human demand rate of Earth's natural resources is equal to or less than the Earth's ability to replenish those resources, known as biocapacity (a.k.a. – supply).

Balanced Resource Sustainability =
Earth's Biocapacity ≥ Human Demand (Ecological Footprint)



Credit: Global Footprint Network 2013 National Footprint Accounts. Available at the Global Footprint Network Web page.

This figure tracks the per-person resource demand Ecological Footprint and biocapacity in United States of America since 1961. Biocapacity varies each year with ecosystem management, agricultural practices (such as fertilizer use and irrigation), ecosystem degradation, and weather, and population size. Footprint varies with consumption and production efficiency. Where a dotted line is shown, interpolation estimates have been used in place of highly unlikely outliers in the results.

At present, based on the research of the Global Footprint Network, the United States has a higher demand than our resources can replenish. Neither nationally nor globally are our human demands on natural resources equal to or less than the Earth's ability to regenerate them. The calculations in the National Footprint Accounts are primarily based on international data sets published by the Food and Agriculture Organization of the United Nations, United Nations Commodity Trade Statistics Database, and other data from the UN Statistics Division, the International Energy Agency, and the Intergovernmental Panel on Climate Change. Other data sources include studies in peer-reviewed science journals and thematic collections.

How do I get more involved?

Proactively Communicate Sustainability Initiatives Across Directorates

The **Environmental Stewardship Subcommittee (ESS)** is JSC's advocate for conserving natural resources, reducing environmental impact and providing a healthy workplace by enhancing compliance. The ESS provides bi-directional communication between the JSC Environmental Office and JSC organizations on environmental issues that affect the Center and cross organizational lines.

Please contact the JSC Environmental Office to get added to the distribution list.

Engage More Leaders Within and Outside of our Community

The Green Team is a group of JSC employees and contractors that seek to motivate and educate the JSC community to be more sustainable at work and at home. The Green Team arranges educational lectures and tours regarding recycling, energy conservation, green living and more.

Learn more at the internal JSC Green Team website.

Brainstorm, Design, and Build Advanced Sustainability Technologies

Since 2004, the **JSC Sustainability Partnership Team (SPT)** combines space technology and technical ideas with solutions to terrestrial problems. The SPT strives to improve environmental sustainability at JSC and increase JSC's exposure to 'dual use' technologies, while engaging the technical workforce in solving JSC's institutional (a.k.a. terrestrial) sustainability problems.

Please contact Mr. Mike Ewert to be part of the JSC Sustainability Partnership.

Collaborate and Find Common Solutions Leveraging Different Perspectives

The **Contractor Environmental Partnership (CEP)** is a group of contractor volunteers from onsite and offsite that work together to find successful practices that address common sustainability and environmental problems. Collaborating with JSC personnel, the CEP collects success stories shown to have benefit to JSC contractors and collaborate on how to implement the solutions onsite. Having multiple perspectives creates better solutions to problems and results in benefits to JSC and local communities.

To find out more about our ongoing efforts, such as the Coffee to Compost Program, please contact Ms. Jeni Morrison.

Questions, Ideas, Suggestions, or Success Stories?
E-mail JSC-Sustainability@mail.nasa.gov