National Aeronautics and Space Administration



Our Planet is Changing. We're On It!

www.nasa.gov

NP-2015-03-013-JS

The Aswan High Dam on Egypt's Nile River from the International Space Station (Aug 2014).

NASA's Commitment to Sustainability

AGENCY POLICY STATEMENT

Worldwide, people have turned to the National Aeronautics and Space Administration (NASA) for inspiration throughout our history. It is NASA's mission "To drive advances in science, technology, and exploration to enhance knowledge, education, innovation, economic vitality, and stewardship of the Earth." NASA is an agency that leads by example and will continue to spur profound changes in our knowledge, culture, and expectations.

- ☑ Increase energy efficiency
- ☑ Increase renewable energy
- ☑ Reduce GHG emissions
- ☑ Protect water resources
- ☑ Eliminate waste
- ☑ Buy sustainably
- Build high-performance buildings
- ☑ Utilize power management
- ☑ Support economic growth

- Evaluate climate change risks
 Raise employee awareness
 Maintain environmental compliance
 Comply with internal NASA
- Comply with internal NASA requirements

NASA Centers Across the U.S.



This is a Requirement

Executive Order 13514 "Federal Leadership in Environmental, Energy, and Economic Performance" requires all Federal agencies to accomplish specific sustainability goals. (2009 – 2015)

EO 13514 also requires all Federal agencies write an implementation strategy

→ Strategic Sustainability Performance Plan (SSPP)

NEW: <u>EO 13693</u> "Planning for Federal Sustainability in the Next Decade" enhances our goals.

- Reducing scope 1, 2, and 3 GHG emissions (scope 3 is completely new because it's a hard one to track).
- Targeting net zero buildings for new construction by FY2020
- Increasing use of renewable energy to 25% by 2025.
- Reduce potable water consumption intensity by 36% by 2025.
- Fuel efficiency of fleet vehicles increased by 30% by 2025.
- Divert at least 50% of non-hazardous & C&D waste.
- Evaluate climate-resilient design & management of buildings.

Definition of Sustainability

In 1987, the United Nations World Commission on Environment and Development stated sustainability is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."



Johnson Space Center's (JSC) Sustainability Model



JSCs Sustainability Operating Rhythm

This strategy is aimed at inspiring awareness and motivation to change in the areas that are still low to moderate impact and likelihood. 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).



NASA JSC Sustainability Evolution



<u>SUSTAINING</u>: Widespread adoption; "We don't even think about it, we just do it."

<u>INTEGRATING</u>: Strong management support + Large number of volunteers

<u>BUILDING</u>: Small number volunteers + Some management

ORGANIZING: Requirements-Driven, Central Staff (JA) Paid to support

Time to Adoption

How do I find this information? Search: NASA JSC Sustainability

Back up Slides





Average Water Temperature Coming from Well Field Compare FY 2011 to FY 2014





Building 12 Renewables

Wind Turbines

4 Eddy GT vertical axis turbines by Urban Green Energy

- Each has 1kW rating at 27 mph ٠
- Cut in wind speed 8 mph
- Cut out wind speed 67 mph
- Noise 38 dB at 27 mph •
- 1 inverter for each turbine
- Projected annual production 1,250 kWh



Solar Arrays

- South and west sides of the building
- Each sunshade louver houses two MSK Suntech Crystalline Laminated glass modules rated at 25W each
- Two strings
- One 5kW and one 6kW inverter
- Projected annual production 1,181 kWh

- Over 60,000 plants of six different species were planted
- 1.2 million pounds of growing media (soil) ٠
- The growing media is developed specifically for garden roofs .
- Environmentally friendly reduces urban heat island effect •
- Green Roof study being completed by Portland State University •
- JSC will learn how to operate the roof more effectively •





Daylight Harvesting 3 Hangers & Gym Over 700,000 kWh Saved per Year





Gilruth Solar Hot Water Generation System



600 Gallon Storage Capacity





Glycol Heat Transfer Medium Heat Exchanger





Mall Pond Water Recirculation System

Solid State LED Lighting

