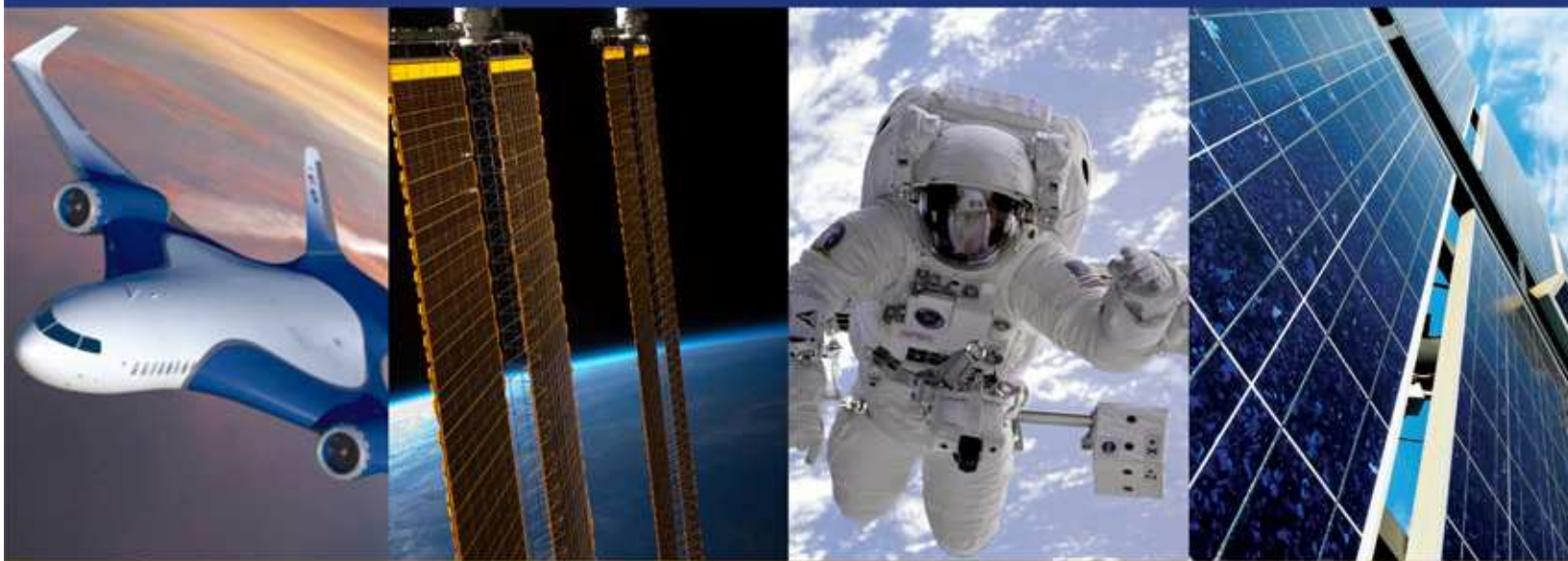




2010 Strategic Sustainability PERFORMANCE PLAN



Abridged Version – August 30, 2010

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Section 1: Agency Policy and Strategy

1.1 AGENCY POLICY STATEMENT

Worldwide, people have turned to NASA for inspiration throughout our history. We seek 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 can continue to be a source of inspiration. We know that to keep pushing for the stars, to unravel the complex science that directs our planet's processes, we must proceed in a manner that preserves, enhances, and strengthens our ability to perform our mission indefinitely.

NASA's sustainability policy is to execute NASA's mission without compromising our planet's resources so that future generations can meet their needs. Sustainability also involves taking action now to provide a future where the environment and living conditions are protected and enhanced. In implementing sustainability practices, NASA manages risks to mission, risks to the environment, and risks to our communities. To this end, NASA seeks to use public funds efficiently and effectively, promote the health of the planet, and operate in a way that benefits our neighbors.

To implement this policy, NASA commits to:

- increasing energy efficiency;
- increasing the use of renewable energy;
- measuring, reporting, and reducing NASA's direct and indirect greenhouse gas emissions;
- conserving and protecting water resources through efficiency, reuse, and stormwater management;
- eliminating waste, recycling, and preventing pollution;
- leveraging Agency acquisitions to foster markets for sustainable technologies and environmentally preferable materials, products, and services;
- designing, constructing, maintaining, and operating high performance sustainable buildings;
- strengthening the vitality and livability of the communities that surround NASA Centers and facilities;
- raising employee awareness and encouraging each individual in the NASA community to apply the concepts of sustainability to every aspect of their daily work to achieve these goals;
- maintaining compliance with all applicable Federal, state, local or territorial law and regulations related to energy security, a healthy environment, and environmentally-sound operations; and
- complying with internal NASA requirements and agreements with other entities.

When managing efforts and activities needed to achieve NASA's sustainability goals, requirements, and targets and to support mission, NASA will:

- (1) prioritize actions based on full accounting of mission, economic, and social benefits and costs, and environmental impacts;
- (2) extend or expand projects (e.g., capital projects, energy projects, maintenance projects) that have net benefits, and revise or discontinue under-performing projects;
- (3) develop and integrate methods for obtaining reliable performance data required to measure progress, evaluate results, and improve performance; and
- (4) enhance transparency by communicating NASA's progress and results within the NASA community and the broader community of stakeholders on publicly accessible NASA websites or through other communication tools.

To implement policy and meet requirements, NASA will foster sustainability and integrate sustainable practices in a practical manner. NASA will integrate sustainability concepts into our existing management systems, processes and decision-making, to influence both long-term planning and short-term actions.

NASA's Strategic Sustainability Performance Plan is a planning document by which sustainability and sustainable practices will be integrated into NASA efforts, activities, and culture. NASA's SSPP has three areas of emphasis:

- (1) to set forth NASA's overarching strategy and framework for achieving the long-term sustainability goals contained in existing statutory requirements and executive orders;
- (2) to describe the management methods and approaches that integrate external requirements related to national prosperity, energy security, and a healthy environment into a single framework for aligning NASA activities, processes, and resources to achieve NASA's sustainability goals and targets; and
- (3) to describe the approach for annually reporting process, successes, and challenges, and evaluating performance to drive continuous improvement.

NASA has an unwavering commitment to the intent of Executive Order 13514. We look forward to this next phase in NASA's proud history, in which we accomplish our space exploration, aeronautics and earth science research, and applied technology mission while attaining goals that ensure the long term sustainability of our Agency, our country, and our planet.



Olga M. Dominguez

NASA Senior Sustainability Officer

NASA's Strategic Sustainability Performance Plan (SSPP) follows and aligns with the template provided by the Office of the Federal Environment Executive (OFEE), dated April 6, 2010. Any deviations will be noted.

1.2 SUSTAINABILITY AND THE AGENCY MISSION

NASA has made numerous, celebrated advances in science and technology in space exploration, earth science and aeronautics that have directly benefited the Earth and our Nation. The science and engineering behind the durable solar photovoltaic panels that power our satellites and the International Space Station are also applied to land-based photovoltaic systems that provide clean, renewable sources of energy. There are no gas stations, water fountains or grocery stores in space. NASA continually strives to design and engineer closed systems which function optimally and keep astronauts healthy, all without harming the planet's resources that provide essential inputs to engineered systems and the humans who operate them. While we still have yet to design the perfect closed system for exploration, our space-bound experiences are a powerful reminder about why this is critical for terrestrial systems.

Since its very beginning, NASA has used space-based science to help improve life on earth in areas such as weather forecasting, forest fire tracking, natural disasters prediction and monitoring, and resource identification and mapping. One of the most important areas in the broad category of Earth Sciences deals with the observation, measurement, and modeling of climate change. Going forward, NASA will continue to enable society to see, understand, respond to, and manage our ever-changing world. With this increased understanding and awareness comes greater public concern about the health of the planet, coupled with increased stakeholder expectations for NASA and the entire Federal Government to continuously improve and enhance environmentally-sound operations, energy conservation, renewable energy, and sustainability.

For sustainability to be truly successful, it must permeate everything we do, just as the safety culture impacts every aspect of NASA's work environment today. NASA personnel, our most valuable resource, will play an integral part in establishing a sustainability culture at NASA. For some employees, this will involve a paradigm shift; for others it will be a natural, continual integration of their personal values into their daily work. NASA will utilize the creativity, experience and initiative of its personnel to integrate sustainability into the NASA work ethic and enable the Agency to meet goals and targets set forth in this SSPP.

To a large extent, existing communities of practice and teams of NASA personnel have been on the path to achieve long-term sustainability goals for many years. Many existing communities of practice and functional areas including energy, water, transportation, pollution prevention and waste elimination, design and construction, maintenance and operations, master planning, electronic stewardship, and others fall under the umbrella of sustainability. Synergies that optimize the use of scarce resources and enhance mission are frequently discovered through coordination and communication between these various communities. Additionally, NASA is currently establishing new teams and communities to meet the challenges associated with climate change impacts and adaptation, and greenhouse gas (GHG) management. For the past two years, NASA staff has co-chaired an interagency group which holds informal discussion, shares data, approaches, scenarios and expertise relative to forecasting climate change impacts and adaption methods to these impacts.

Increasing the focus on sustainability will enhance NASA's missions, increase employee productivity and satisfaction through a healthier work environment, protect resources needed by NASA Centers and their local communities, and mitigate environmentally-driven risks experienced by many NASA programs and projects—all while maintaining sound environmental stewardship, management of environmental responsibilities, and compliance with applicable legal and other requirements.

Environmental factors inherent in NASA programs, projects, and other activities are considered throughout the life cycle, including planning, development, execution, and disposition activities¹. Examples of environmental factors include consideration of environmental impacts as required by: the National Environmental Policy Act; the National Historic Preservation Act; the proposed use of hazardous materials; the potential for waste generation; the need to acquire necessary permits, waivers, and authorizations; and the use of environmentally preferable materials and processes wherever practicable. The benefits associated with environmentally-sound project planning and execution include improvements in overall employee health, protection of natural or cultural resources, maintaining positive relationships with regulators, increasing flexibility and robustness of institutional capabilities, and enhancing NASA's reputation with the public and other stakeholders. Furthermore, industry-best practices of sustainable design, maintainable design, building commissioning, and safety and security are incorporated, to the maximum extent possible, into the planning and execution of facility projects. The use of best practices ensures that facility projects are delivered with the most economical life-cycle cost, least environmental impact, and maximum benefits to the occupants' health, safety, security and productivity. These best practices relating to building design and management are detailed in NASA policy documents².

¹ NASA Policy Directive 7120.4 and related documents, such as NASA Interim Directive for NASA Procedural Requirements 7120.5d.

² NASA Policy Directives 8820.2C and 8831.1E, and associated NASA Procedural Requirements 8820.2F and 8831.2E.

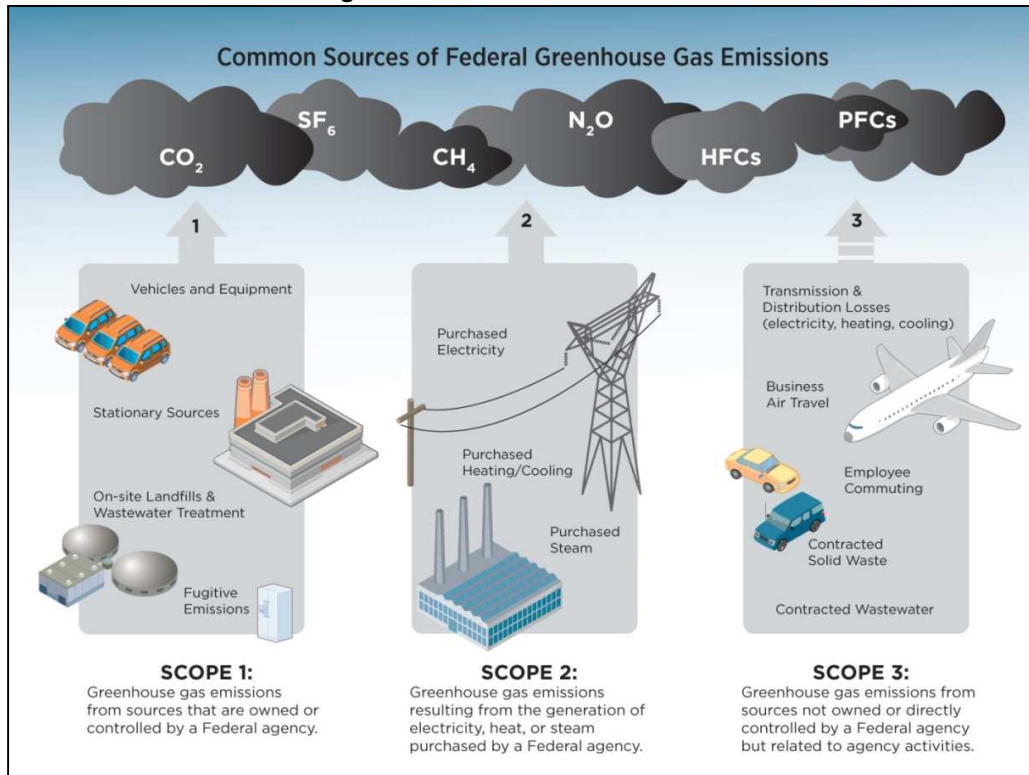
Achieving energy goals and targets will allow funds that pay high energy bills to be re-directed to the mission and reduce NASA’s GHG emissions. Although NASA has been reducing energy use over the past years, costs have been increasing due to sharp increases in the unit cost of energy. In Fiscal Year (FY) 2009, NASA paid \$179M for facility energy and water consumption – this is the equivalent cost of a small science mission or aeronautics test program. Meeting the goals and targets from existing statutory and EO requirements will drive NASA to intentionally seek out solutions that save resources that can be re-directed to mission accomplishment. The holistic nature of sustainability is evident in the fact that the reduction of GHG emissions is a direct result of reductions in energy use.

1.3 GREENHOUSE GAS REDUCTION GOALS

NASA is reinforcing its commitment to energy reduction and more sustainable infrastructure by establishing Scopes 1 and 2 GHG emission reduction targets by FY 2020 from its 2008 baseline. NASA identified GHG reductions as a significant step toward developing sustainable infrastructure in 2007 when it implemented an annual GHG inventory tracking system, based on existing energy and transportation fuel data.

In addition, NASA is establishing initial Scope 3 GHG reduction targets by FY 2020 from its 2008 baseline. Initially, this will be achieved primarily through reductions in purchased electricity (Transmission & Distribution losses) and solid waste generation and disposal. With the advent of newly detailed and clarified guidance NASA plans to implement an expanded GHG emission tracking, assessment and reporting program to ensure integration within the larger sustainability effort. Figure 1 depicts the common sources of GHG emissions, most of which provided data for NASA’s baselines and emission reduction targets.

Figure 1 - Greenhouse Gas Sources



Source: Office of the Federal Environmental Executive; “Scope 3 Greenhouse Gas Emissions” presentation, 3/30/10

NASA GHG targets reflect: identified reductions in energy use and intensity; reduced use of fossil fuels and increased use of alternative fuels in fleet vehicles; increased application of green building applications and sustainable design; and innovative energy technologies and funding strategies which promote conservation and renewable energy use.

The Agency uses its NASA Environmental Tracking System (NETS) to track Center activities and up to date information to enable Agency reporting such as the annual Energy Scorecards provided to the Office of Management and Budget (OMB). By examining existing Center NETS data, NASA set targets for Scopes 1 and 2 GHG emissions to mirror required energy intensity reductions and other regulatory or policy requirements.

NASA plans to track emerging GHG and energy requirements and compile needed data from NASA Centers within NETS. As the GHG requirements evolve and increase, NASA plans to regularly update the NETS system to ensure timely access to data for decision making, prioritization, identification of risks and opportunities, reporting, and overall program evaluation. This is

needed for the development of reliable, stable baselines (NASA's baselines will evolve as more external requirements are imposed and guidance becomes available) and requires continued coordination and integration of activities related to energy, transportation, and GHG management.

1.4 PLAN IMPLEMENTATION

NASA is fortunate to have talented, dedicated people who plan and execute extraordinarily complex missions. The NASA team of civil servants and contractors recognize their great responsibilities and are accountable for the work entrusted to them. They strive to achieve the highest standards of technical excellence in a healthy and safe environment – inside and outside the NASA fence line. Every NASA employee understands that mission success is a natural consequence of their commitment to fundamental values - safety, integrity, teamwork, and excellence. Our daily actions – which promote environmentally-sound missions and the health of the planet – align with our shared values and enhance our ability to achieve yet to be imagined missions in the future.

1.4.1 Internal Coordination and Communication

NASA has laid a sound foundation for achieving NASA's sustainability goals, requirements, and targets through numerous projects and efforts. Some have been in operation for years and many of these fall under the umbrella of 'sustainable practices'. In the coming years, NASA will strive to emphasize sustainability principles in its decision-making processes. Utilizing existing and some newly formed teams will greatly aid in the endeavor. Several of these communities and practices are described below.

1.4.1.1 NASA Environmental Management System

NASA Policy Directive (NPD) 8500.1B, *NASA Environmental Management*, requires that NASA maintains an Environmental Management System (EMS) at all appropriate organizational levels and incorporates sustainable practices to the extent practicable throughout its programs, projects and activities. NASA Procedural Requirement (NPR) 8553.1B, *NASA Environmental Management System*, is the procedural document that implements the NPD and establishes internal requirements for an EMS at all NASA Centers and NASA Headquarters. The NPR requires the consideration of sustainable practices and an annual review and update of the EMS. NASA has implemented EMSs at all appropriate organizational levels and is currently maintaining the EMSs as required by NPR 8553.1B and Executive Order (EO) 13514.

When identifying aspects and impacts during the EMS planning process, the areas covered by EO 13514 (and prior EOs) are often identified as high priority aspects and fall within a sustainability-related category. In this way, each EMS assesses the potential impacts, benefits, and associated risks of its activities on mission accomplishment, environmental stewardship, and community support. For high priority aspects, e.g., GHGs, the EMS process requires establishment of objectives, targets, and programs to meet the goals for that aspect. The goals and associated objectives and targets are reviewed at least annually by senior management. All other goals established by EO or by this SSPP, are captured by the EMS since they are considered "Legal or Other Requirements." They are also reviewed annually to determine whether they are being met, and are re-evaluated for priority status if the review indicates further action is required or Agency activities change sufficiently to affect the sustainable practice.

To ensure Center EMSs are maintained, the NASA Headquarters Environmental Management Division (EMD) conducts an external Environmental Functional Review (EFR) that includes an EMS audit and compliance audit of each Center every three years. In addition, NASA's Senior Sustainability Officer (SSO) conducts an annual review of the status of NASA EMSs during the Headquarters EMS Management Review and submittal of the annual EMS report.

1.4.1.2 NASA's Sustainability Principles

The ambitious and challenging nature of our mission makes it necessary that every employee, civil servant and contractor work efficiently and effectively every day. For this reason, sustainability activities and efforts need an approach that is practical, efficient, and effective.

To facilitate the integration of sustainability goals, requirements, and targets into ongoing NASA activities such that sustainable practices become the norm within NASA culture, we will adhere to the following principles. We will:

- a) Ensure that every individual in the NASA community understands their role in the success of this SSPP.
- b) Utilize established teams, working groups, and communities of practice familiar with the functional area to get work done.
- c) Advise existing management, boards, panels, working groups, etc. to ensure that sustainability principles are incorporated into decisions for functional areas.
- d) Revise existing reports and planning documents generated for the different functional areas to reflect the larger sustainability objectives.
- e) Define and frame NASA's sustainability approach in a way that blends with NASA culture.
- f) Define the initial scope of NASA's sustainability focus through existing policy such as statutes and Executive Orders.

- g) Link all sustainability goals, requirements, targets, and activities to the NASA Strategy.
- h) Identify and communicate both strategic and tactical components that are needed for sustainability planning.
- i) Adjust existing travel to manage and meet NASA's sustainability goals, requirements, targets, activities, etc.
- j) Create opportunities within NASA's existing activities and projects to meet existing and emerging sustainability goals, requirements, and targets by supplementing with additional funding, additional requirements, etc.
- k) Maintain and enhance trust between NASA Centers and Headquarters, and between NASA and external stakeholders.
- l) Recount stories of success and provide detail on current NASA activities, efforts, and initiatives that have already contributed to meeting the President's sustainability goals, objectives, and targets and the spirit of EO 13514.

The intent of the principles above is to use current available resources and infrastructure in an efficient and effective manner in support of NASA's sustainability approach.

1.4.1.3 NASA Strategic Sustainability Working Group

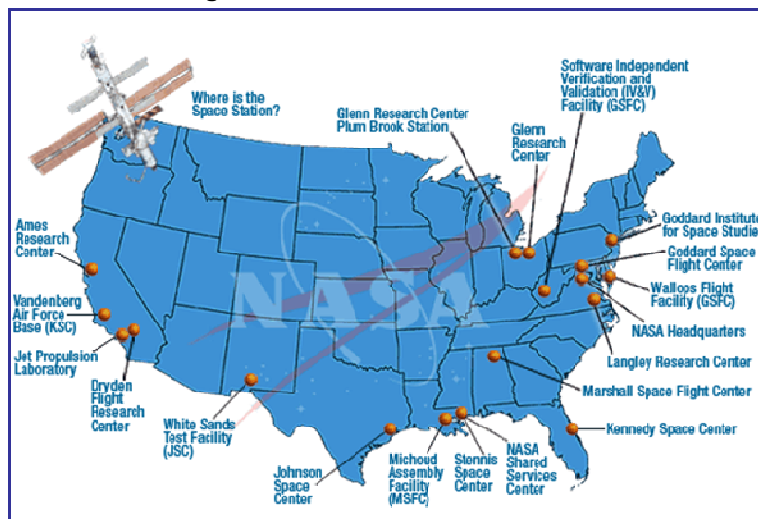
In the fall of 2009, NASA Headquarters formed the Strategic Sustainability Working Group (SSWG). The SSWG supports the development and coordination of consistent Agency policy, practice, and tools to further sustainability within NASA. This effort applies to NASA Headquarters programs, projects, and organizations that contribute to meeting specific sustainability goals, requirements, and targets established by the President, the NASA Administrator, and NASA's SSO. The goal of the SSWG is to ensure an integrated strategy towards sustainability across the Agency, leveraging existing programs and teams. This team is led by NASA's SSO and is composed of the Headquarters leads from each appropriate community of practice.

Within the next year, the SSO and designated SSWG Chair will investigate the merging of the SSWG and the Headquarters EMS Team. This will make more effective use of staff time since most personnel on the Headquarters EMS Team and SSWG attend meetings for both groups. This aligns with one of NASA's sustainability principles referenced in Section 1.4.1.2 - to utilize established teams, working groups, and communities of practice familiar with the functional area to accomplish tasks.

1.4.1.4 NASA Teams and Communities of Practice

NASA Centers and facilities, as illustrated in Figure 2, are geographically dispersed across the country. One method NASA has successfully used to strengthen shared practices on the institutional support side has been the creation of teams and communities of practice. Many diverse disciplines and functional areas are needed to achieve all of the goals, requirements, and targets associated with sustainability. To execute, NASA has well established teams and communities of practice—energy, water, transportation, pollution prevention and waste elimination, design and construction, maintenance and operations, master planning, electronic stewardship, and others. Sustainability and the pursuit of more sustainable practices require the integration and coordination of these teams and communities of practice. NASA is forming new teams and communities of practice to coordinate, plan, and execute requirements of recently promulgated statutes and EOs such as EO 13514. Several Centers have initiated meetings and formed groups to better understand climate change and address its impacts to the Centers that will occur in the coming decades. A desired outcome from this activity is the development and implementation of appropriate adaptation strategies.

Figure 2 - NASA Centers & Facilities



These teams and communities of practice are composed of one or more staff members from each Center or facility. Center personnel split their time between their multiple responsibilities within the Center's overall mission support activities. A common example is for a Center energy manager to have additional duties in water management. The same individual could

also have part time duties in operating their Center’s EMS. The Headquarters Facilities Engineering & Real Property Division (FERPD) has several committees with Center representation that meet monthly via video conference:

- The Planning and Real Estate Branch meets with the Center Real Property Accountability Officers to identify, assess and resolve real property and master planning issues, establish measurements, and foster and share new ideas and ways of doing business.
- The Facilities Engineering Branch meets with the Design and Construction Managers via the Engineering Construction Innovations Committee (ECIC) and with the Operations and Maintenance staff via the Operations & Maintenance of Facilities Innovations (OMFIT) Team, each of which is chartered to: aggressively improve the process of delivering high quality facilities projects to its customers; improve the entire life cycle of facility ownership; promote sustainability concepts; identify, assess, and advance new practices, processes, and technologies; establish measurements; and foster and share new ideas and ways of doing business.

The lead for each community of practice is located at NASA Headquarters and the team comprises one or more members from each Center or facility. Each community of practice engages through face-to-face meetings, telecons, video teleconference, and WebEx. Since the NASA Centers and facilities are dispersed around the Nation, electronic means (e.g., telecons and video teleconferences) are used weekly or monthly. Face-to-face meetings occur once or twice annually and are often held concurrent with other meetings or conferences. NASA’s EMD sponsors NASA’s Environmental & Energy Conference every two years for NASA’s civil servants and contractors. Most of these communities use this opportunity to meet for a half a day to discuss ongoing issues and share lessons learned.

Table 1 shows the interface between NASA teams and communities of practice with the ten EO 13514 sustainability goals (listed in Section 2 of this SSPP). While each team and community of practice will engage as necessary to help achieve all the sustainability goals, this table lists each team’s primary areas of concentration.

Table 1 - NASA Teams & Communities of Practice and Interface with Sustainability Goals

Agency Team or Community of Practice	NASA Organization Responsible for Team or Community of Practice	SSPP Goal									
		1	2	3	4	5	6	7	8	9	10
Strategic Sustainability Working Group	OSI	1	2	3	4	5	6	7	8	9	10
Greenhouse Gas Management (1)	EMD	1	2	3							
Design and Construction	FERPD	1	2		4						
Maintenance and Operations	FERPD	1	2		4						
Climate Change Impacts and Adaptation (1)	FERPD and EMD					5					
Supply Chain Management (1)	Logistics Management		2	3					8		
Procurement	Office of Procurement	1	2	3				7	8	9	
Fleet Management	Logistics Management	1	2	3							
Recycling and Sustainable Acquisition (RSA)	EMD							7	8	9	
Energy Management	EMD and FERPD	1	2	3	4						
Center Chief Information Officers	Chief Information Officer									9	
Water Management	EMD						6				
Master Planning	FERPD and EMD			3	4	5					
Natural Resources	EMD					5					
Environmental Assurance and Green System Design	EMD										10
Materials and Processes	EMD										10
Numerous teams support innovation for a sustainable society	OSI										10

(1) – community is new in 2010

1.4.2 Coordination and Dissemination of the Plan to the Field

NASA’s overarching strategy and framework for achieving the long-term sustainability goals outlined in NASA’s SSPP is to present and discuss the SSPP through various media in multiple groups. Discussions are envisioned between NASA

Headquarters leads and their specific team or community of practice through face-to-face meetings, telecons, video teleconferences, and WebEx. This makes goals, requirements, and targets (provided in the SSPP and other plans) known to the Center personnel who manage them for their Center. Several of these efforts are described below.

1.4.2.1 NASA Management Panels

NASA has several panels that meet once a year to discuss Agency strategy, policy, processes, resources, and activities associated with NASA's overall environmental, energy efficiency, and cultural resources programs. These panels have representation from all ten Centers and most facilities. Two of these panels will meet during the week of June 14, 2010 and discuss NASA's overarching strategy and framework for achieving long-term sustainability goals, the prioritization and distribution of needed resources, and associated statutory and EO requirements.

NASA's **Environmental Management Panel** is chaired by the Director, EMD, includes the Center environmental managers, and coordinates Agency environmental activities. The panel advises the Director on environmental policy, planning, pollution prevention, compliance, sustainable practices, and restoration activities.

NASA **Energy Efficiency Panel (EEP)** is chaired by the Director, EMD, includes the Center energy managers, and coordinates Agency energy and water activities. The EEP advises the Director on energy efficiency activities, including energy and water conservation, GHG reduction, and use of renewable energy sources.

NASA **Cultural Resources Management (CRM) Panel** was established in 2006. It is chaired by the Director of EMD and membership includes the Historic Preservation Officers from each Center and facility, NASA's Chief Historian, and representatives from the Office of General Counsel, FERPD and Space Shuttle and Constellation programs. The CRM Panel is charged with overseeing the development of NASA's CRM program to enable NASA to address regulatory obligations, issues and initiatives related to historic properties and cultural resource management and identifies and discusses program needs to support field implementation of the CRM program.

1.4.2.2 NASA Principal Centers

In addition to Agency-wide teams and communities of practice, NASA has Principal Center Initiatives. These are ongoing Agency-wide projects that are initiated by EMD, then contracted through and implemented by Centers. Principal Center Initiatives require a formal Memorandum of Agreement between the implementing Center and the NASA Headquarters Office of Strategic Infrastructure (OSI). Center personnel managing Principal Center Initiatives develop annual task plans to ensure that project services, procedures, and practices support the Agency's mission, commitment to compliance with applicable regulations, and protection of human health and the environment.

Regulatory Risk Analysis and Communication (RRAC) Principal Center—EMD established the RRAC Principal Center to provide regulatory support to the Agency through: a) a weekly update of Federal environmental laws and regulations; b) a monthly update of state environmental laws and regulations; and c) Regulatory Alerts when new requirements are issued that may result in significant impact to NASA. The reviews include requirements associated with sustainable practices.

Technology Evaluation for Environmental Risk Mitigation (TEERM) Principal Center—EMD established the TEERM Principal Center to identify and validate environmental technologies through joint activities that enhance mission readiness and reduce risk while minimizing duplication and associated costs. TEERM projects commonly involve two or more NASA stakeholders in the planning and execution of laboratory or field testing of commercially available replacements for hazardous materials currently used by NASA.

Recycling and Sustainable Acquisition (RSA) Principal Center—EMD established the RSA Principal Center to provide technical resources and program implementation support for waste prevention, recycling, and sustainable acquisition. The RSA Principal Center supports NASA in excelling within the Federal Government by achieving a waste diversion goal of 35% by the year 2010 and striving to maintain 100% compliance in sustainable acquisition. Sustainable acquisition is a program that requires Federal agencies to buy recycled-content, biobased content and other environmentally preferable products. Environmentally preferable purchasing benefits the environment and demonstrates our commitment to environmental stewardship.

1.4.2.3 NASA Intranet Portals

NASA is currently developing a set of online, intranet portals for each team and community of practice. The online portals are "one-stop shops" for users to quickly obtain information that will help them complete their work more efficiently. These portals are accessible to NASA civil servants and contractors who are inside the NASA firewall and have general content (e.g., Energy Conservation 101, OMB Scorecards, reports) of interest to the entire NASA community.

The overarching goal is to promote energy and environmental awareness throughout NASA and assist in the development of new content by energy and environmental communities across the Agency. Obviously, these communities are also focused on sustainability. These portals are being developed within NASA's Spacebook environment which is a secure, online space for groups to work better together through the use of workgroups, wiki functionality, and other collaboration tools. One desired

outcome is to integrate the transfer of knowledge with existing work processes while not adding additional burden to the workforce. For each team, the portal provides additional information, updates, and alerts which supplements information provided at weekly or monthly telecons and face-to-face meetings.

Along with content specific to the operations of a team, the intent is to make information available for the casual reader who wishes to better understand a specific topic related to sustainability. This approach also makes it easier for new members to quickly obtain current and historical information on successes, challenges, and obstacles for on-going efforts and activities.

1.4.2.4 Enhancing Coordination between Headquarters and the NASA Centers

Before the release of NASA's 2011 SSPP in June 2011, the Headquarters SSWG, under the leadership of NASA's SSO, will evaluate the formation of Center Sustainability Working Groups (CSWG) or Center Green Teams (CGT) for each NASA Center and facility. The structure and membership composition will be determined by Center leadership to best fit that particular Center. Centers could use the Headquarters SSWG as a model and include team members who lead various Center functional areas and manage existing statutory and EO requirements for energy, environment, and facilities. Just as the function of the SSWG is to assist in aligning activities, processes, and resources needed to achieve goals, requirements, and targets for the Agency, the CSWG or CGT would perform this function for its Center or facility.

The intent is for these groups to be led by a senior leader from the Center. An appropriate title is Center Sustainability Officer (CSO). The CSOs could periodically meet with the SSO (through electronic means and face-to-face) to discuss broad Agency goals, challenges, and direction for sustainability. In these meetings, the CSOs would discuss and escalate their Center's challenges, risks, and opportunities associated with achieving specific Center goals requirements, and targets. One possible forum for discussing this concept and its feasibility is at NASA's Administrative Solutions Conference discussed in Section 1.4.4.

1.4.3 Leadership & Accountability

NASA's Assistant Administrator (AA) for the OSI was chosen on November 5, 2009 to be NASA's SSO. The OSI provides executive and functional leadership, policy, technical expertise, and oversight for Agency infrastructure including facilities engineering and real property, environmental management, logistics management, aircraft management, strategic capabilities assets program, and integrated asset management. The Office's mission is to ensure that the right infrastructure assets and capabilities are available in the timeframe needed by reducing current and future infrastructure-related risks to the Agency. The AA's role, responsibility, and authority as senior leader of the OSI are well aligned with duties as NASA's SSO.

As mentioned previously, each community of practice or team contributes to achieving more than one goal and each goal requires the support of many communities of practice and teams. This point is highlighted in Table 1. For the purposes of planning and reporting in NASA's SSPP, we have identified an Agency Official and a 'Goal Manager' for each of the ten goals. These persons and their parent organizations were determined based on the goals, requirements, and targets managed by their organization. Coordination with other functional offices, communities of practice, and teams frequently occurs.

Divisions within the OSI—EMD and FERPD—manage the efforts for seven of the ten individual goals in Section 2 of this SSPP. Division Directors within the OSI are assigned as 'Agency Lead' in Section 2 for each of these seven goals. A staff member within the mentioned divisions will manage day-to-day efforts and coordination; this person is the designated 'Goal Manager.' Due to the close organizational relationship of many of these goal managers within NASA Headquarters, effective communication is possible and occurs frequently. For effective management of each goal, frequent communication is necessary due to the cross-cutting nature and overlap of many of these goals.

The Agency Official for Goal 8 is NASA's AA for the Office of Procurement. Due to the heavy emphasis on data center operations and consolidation, NASA's Chief Information Officer was identified as the Agency Official for Goal 9. Both have chosen staff members to manage their respective goals.

Periodically, NASA's SSO will report status to the NASA Mission Support Council (MSC). This council is an essential component of NASA's Agency governance and is used to develop recommendations for senior level decisions for institutional plans and implementation strategies, including human capital, Agency operations, infrastructure, environmental, and technical capability investments. The council determines and assesses mission support requirements to enable the successful accomplishment of the Agency's mission. The briefing will include progress and performance with respect to achieving the goals and metrics specified in this plan.

In this same forum, Center Operations personnel report to NASA senior leadership on specific issues at the individual Centers. As determined by NASA's SSO, this could become the forum for CSOs to report status on progress towards Center sustainability goals, requirements, and targets.

To best align personnel and organizational activities and resources needed to achieve sustainability goals and targets within the OSI, Division Directors and their staff members have included specific goals and targets from existing statutes and EOs (e.g., EO 13423) for several years in their annual performance plans.

1.4.4 Agency Policy and Planning Integration

NASA sees its recently formed SSWG, NASA's Administrative Solutions Conferences, and the future formation of CSWGs or CGTs as critical methods for greater policy and planning integration.

SSWG membership is composed of Agency leads for various functional areas and communities of practice. The SSWG supports the development and coordination of consistent Agency policy, practice, and tools to further sustainability within NASA. This effort applies to NASA Headquarters programs, projects, and organizations that contribute to meeting specific sustainability goals and targets established by the President, the NASA Administrator, and NASA's SSO. The objective of the SSWG is to ensure an integrated strategy towards sustainability within NASA, leveraging existing programs and teams. The SSWG's responsibilities do not include the management of activities and efforts for achieving goals, requirements, and targets. These activities are managed by the appropriate mission support organizations.

The SSWG has several functions:

- Scope NASA's initial sustainability effort through analysis of existing Federal policy and statutes, and determine which policies, handbooks, guidance documents, MOAs, and MOUs can be utilized to help establish NASA's baseline set of external goals, requirements, and targets related to sustainability.
- Develop and coordinate policies, processes, standards, and tools, in order to facilitate an integrated strategy towards sustainability in NASA.
- Identify and manage opportunities which expand and extend efforts and activities beyond compliance to meeting external goals, requirements, and targets. Sustainability opportunities are based on goals and targets determined by the NASA Administrator, Deputy Administrator, and SSO.
- Facilitate the sharing of information (lessons learned, best practices, etc.) between SSWG members, NASA leadership, and NASA personnel.
- Provide recommendations to the SSO for coordination between Headquarters and the Centers, and between the Centers. Coordinate activities, tasks, and initiatives between different organizations. Establish ownership of specific requirements, goals, and objectives.

Many of the organizations responsible for the plans and reports listed in Table 2, Critical Planning Coordination Table, are represented in the SSWG. NASA will evaluate expanding the SSWG membership or will periodically meet with representatives from the remaining NASA HQ organizations. This should contribute greatly to the updating, implementation, and maintenance of these existing plans, policies and internal systems.

In past years, the AA for the OSI (duties now include Agency SSO) and the Deputy Administrator have held a NASA Administrative Solutions Conference to discuss cross-cutting issues, risks, and opportunities for NASA's mission support functional areas. The Administrative Solutions Conference brings together senior officials from Center administrative, functional and institutional organizations and representatives from the Headquarters Staff Offices, Mission Directorates and Mission Support Offices. The conference is unique for NASA as it provides a forum for the presentation and discussion of current activities and issues, and the development of solutions to issues affecting multiple administrative, institutional and business management and operations areas including sharing of lessons learned and the interchange of ideas between Centers and Headquarters. These meetings provide an important forum for exchange of information between Mission Directorates and Institutional (Mission Support) staff.

Senior leaders, owners of plans listed in Table 2, and the goal managers for SSPP goals will be attending the next Administrative Solutions Conference, scheduled for Fall 2010. The proposed focus of this workshop will be to: 1) discuss strategies and policy for achieving long-term sustainability goals; 2) discuss NASA's emerging framework for managing existing environmental and energy statutory and EO requirements; 3) discuss methods to align Agency activities, processes, and resources to achieve goals, requirements, and targets, and 4) identify opportunities for further integrating sustainability requirements into existing NASA planning documents. Lessons learned, comments, and insightful suggestions from the broad cross-section of NASA staff will be used for planning and integration into NASA's 2011 SSPP development.

As mentioned previously, NASA will investigate the formation of CSWGs or CGTs for each Center and facility. As CSWGs and CGTs are formed, NASA will consider and select appropriate forums for the SSO to meet with CSOs to discuss ways of aligning Headquarter and Center activities, processes, and resources to achieve desired goals, requirements, and targets.

1.4.5 Agency Budget Integration

NASA recognizes that planning is already underway for the federal FY12-FY16 budget cycle and is focused on integration for the subsequent year submissions. NASA’s SSO has identified the individuals, offices, and budget planning cycles that would greatly benefit from this integration. The SSO has already engaged the Chief Financial Officer and the Mission Support Directorate Associate Administrator to review the goals, requirements, and targets associated with EO 13514 and other statutes. The SSO has expressed the desire to continue a dialogue with these entities to better align data requirements and resources for SSPP goal achievement with NASA’s budgeting process.

NASA’s Strategic Planning Guidance is typically released in the 2nd quarter of the government fiscal year, followed shortly by Programmatic Resource Guidance that provides Headquarter Directorates and NASA Centers greater detail on what areas, programs, and projects to emphasize in future budget plans. Many of the SSPP goals fall under the purview of the Mission Support Directorate, which oversees the Agency management and operations, institutional investments, and Center management and operations budgets. The Mission Support Directorate can therefore play an important role in budget alignment as its purpose is to integrate decision-making processes, identify and resolve issues that cross programmatic and institutional lines, and provide independent leadership and decision making for selected cross-cutting initiatives. NASA’s SSO reports to the Mission Support Directorate Associate Administrator.

Our intent is to continue interaction between NASA’s SSO and the SSWG Chair with staff from the Mission Support Directorate office and the Office of the Chief Financial Officer to discuss known and emerging resource requirements associated with achieving Agency sustainability goals, requirements, and targets, and associated implementation plans. Further coordination will occur throughout the year to identify the linkage between SSPP goals, planned activities, and NASA budget items. The details of this linkage will be highlighted at NASA’s annual meeting with OMB. Table 2 illustrates the relationship between particular Agency plans and reports and the EO 13514 sustainability goals.

Table 2: Critical Planning Coordination

(“Yes” indicates that the Plan goal is relevant and incorporated into the report or plan; “No” indicates relevance but that it has not yet been incorporated; “N/A” means the goal is not relevant to the report or plan; and “FAN” means further analysis necessary to determine relevance.)

	Scope 1 & 2 GHG Reduction	Scope 3 GHG Reduction	Develop and Maintain Agency Comprehensive GHG Inventory	High-Performance Sustainable Design / Green Buildings	Regional and Local Planning	Water Use Efficiency and Management	Pollution Prevention and Waste Elimination	Sustainable Acquisition	Electronic Stewardship and Data Centers	Agency Specific Innovation
Originating Report / Plan	1	2	3	4	5	6	7	8	9	10
GPRA Strategic Plan	N/A	N/A	N/A	Yes	Yes (1)	FAN	FAN	FAN	FAN	FAN
Agency Capital Plan	N/A	N/A	N/A	Yes	Yes (2)	FAN	FAN	FAN	FAN	FAN
Circular A-11 300s - Capital Asset Plan and Business Case Summary	N/A	N/A	N/A	Yes	N/A	FAN	FAN	FAN	FAN	FAN
Annual Energy Data Report	Yes	Yes	Yes	Yes	N/A	Yes	Yes	Yes	FAN	No
EISA Section 432 Facility Evaluations/Project Reporting	Yes	Yes	Yes	Yes	N/A	Yes	FAN	FAN	FAN	No
Budget	Yes	Yes	Yes	FAN	Yes (2)	FAN	FAN	FAN	Yes	FAN
Asset Management Plan / 3 Year Timeline	N/A	N/A	N/A	N/A	Yes	FAN	FAN	FAN	FAN	No
Circular A-11 Exhibit 53 - Agency IT Investment Portfolio	N/A	N/A	N/A	N/A	N/A	N/A	FAN	FAN	Yes	FAN
OMB Scorecards on Energy, Environmental Stewardship, and Transportation	Yes	Yes	Yes	Yes	Yes (1)	Yes	Yes	Yes	FAN	No
DOE's Annual Federal Fleet Report to Congress and the President (EPAAct)	Yes	Yes	Yes	No	FAN	N/A	FAN	FAN	FAN	No
Data Center Consolidation Plan	Yes	Yes	Yes	No	Yes (1)	N/A	N/A	FAN	Yes (3)	No
Environmental Management System	Yes	Yes	Yes	Yes	FAN	Yes	Yes	Yes	FAN	No
Sustainable Building Implementation Plan	Yes	No	N/A	Yes	Yes	FAN	Yes	Yes	FAN	No
Sustainable Acquisition, Practices: Green Purchasing, Waste Management, and Chemicals Management Report	N/A	No	N/A	Yes	N/A	FAN	Yes	Yes	FAN	No
NASA's Toxic and Hazardous Chemicals Reduction Plan (EO 13423)	Yes	N/A	Yes	FAN	FAN	FAN	Yes	Yes	FAN	No
Circular A-11 Exhibit 55 - Environmental, Energy, and Transportation Management	Yes	FAN	FAN	Yes	FAN	Yes	Yes	Yes	FAN	FAN

(1) indirect - report / plan guides and informs the specific SSPP goal

(2) new linkage for 2010; policy / plan is currently being updated

(3) Data Center Consolidation Plan is undergoing a major update.

1.4.6 Methods for Evaluation of Progress

Several existing systems and processes enable NASA to: collect data and information; monitor and evaluate progress on meeting the SSPP goals requirements and targets; extend or expand projects that have net benefits; and reassess or discontinue under-performing projects.

NASA's EMS, already described in Section 1.4.1.1, is the overarching management system which emphasizes the plan-do-check-act process. NASA's EFRs and Energy and Water Management Functional Reviews (EWMFR) are already in place to monitor and evaluate progress. NASA's NETS aids in data collection, trend analysis, and report preparation. The development and submission of OMB Scorecards also enables NASA to track its progress against various metrics and goals.

The EMD conducts two reviews on a 3-year cycle of each NASA Center and component facility: an EFR and EWMFR. The EFR evaluates Center compliance with requirements associated with recycling, pollution prevention, affirmative procurement, cultural resources, natural resources, and management practices. The EWMFR evaluates how the Center energy and water management program supports the mission by pursuing compliance with Federal energy and water reduction and conservation requirements. NASA will determine whether there are additional compliance requirements reflective of the SSPP goals that need to be incorporated into these reviews.

To manage several Agency-level reporting requirements that require data from the NASA Centers specific to sustainable practices (e.g., energy and water report), NASA developed and operates NETS. NETS is an automated application and database for Center users who provide summary level data required by existing requirements for Agency-level reporting. NETS enables Headquarters users to review Center data and prepare consolidated Agency reports, ultimately improving the quality of environmental information through single source data entry, standardized data, and adherence to specific validation criteria. NETs also reduces staff time required to generate mandatory Agency-Level reports by over 50 percent and enhances Agency-wide environmental management through improved access to performance data that identifies trends, problem areas, and improvement opportunities.

The FERPD uses several tools for projecting and tracking sustainable facility progress. The Real Property Inventory (RPI) is one method to track consolidation of facilities and reducing the overall footprint of NASA real property assets aids in the reduction of energy and water consumption. The RPI also provides identification of the sustainable building inventory baseline for tracking achievement toward the goal of 15% of the existing building inventory as sustainable by 2015.

The FERPD also utilizes the annual Deferred Maintenance Assessment (DMA) to evaluate, verify, and track the baseline inventory of sustainable facilities. This inventory is the baseline used to meet the Agency sustainable building goal by 2015 and is part of the RPI stated above.

The FERPD Sustainable Building Implementation Plan (SBIP), which was completed in 2007, was developed to prioritize and develop corrective actions necessary to meet the sustainable facility goals outlined by EO, including the identification and tracking of sustainable facility projects. In development is a Building Assessment Report and part of the revised SBIP will provide a Building Condition Scoring Criteria for tracking and measuring progress of existing buildings identified as targets to meet the "15% by 2015" sustainable facility goal. The scoring criteria will evaluate and track progress of the target existing buildings by the Five Guiding Principles for High Performance Sustainable Federal Facilities.

1.5 Evaluating Return on Investment

1.5.1 Overview

Embedding sustainability into any organization requires an understanding and respect of its culture. NASA must proceed in a manner that preserves, enhances, and strengthens our ability to perform our mission indefinitely. To do this successfully, we must address internal and external risks that challenge our ability to reach our mission goals. As a federal agency, NASA has long used risk management approaches to ensure mission success while simultaneously safeguarding critical infrastructure and other resources entrusted to NASA by the public. NASA Headquarters and NASA Centers, while including life cycle return on investment (ROI) factors, evaluate their planned and on-going operations using a risk methodology that incorporates elements of Likelihood and Impacts to Safety, Performance, Cost, and Schedule. Thus, these elements which determine risk severity are used to identify priorities for planning and funding so that the greatest, most severe risks to mission, human health, and the environment are managed and mitigated first. NASA seeks to optimize the efficient use of public funds, promote the health of the planet, and operate in a way that benefits our local, national and international communities.

Just as the institutional professionals are becoming more adept at speaking the 'language' of risk management with their Mission Directorate counterparts, we expect that in the coming year, we will be reaching out to them to integrate the considerations of sustainability, environmental, social, and climate change impacts into their planning and analysis. We have found that the principles of sustainability, especially when used as a risk management approach, provide a common language for programmatic and institutional professionals within NASA. It is common within NASA for engineers to fight for increased energy allotment and request a few more Kilowatts for their instrument to be successfully flown on a satellite. The Space

Shuttle and International Space Station are examples of the use of closed-loop systems. The concepts are there on both sides; the interchange and discussion that will occur in the coming years can only lead to more creative, sustainable solutions and marvelous achievements.

The sections that follow illustrate the prioritization factors considered during project and program investment analysis for deferred maintenance, capital energy investments and NASA's environmental compliance and restoration program. All consider life cycle cost analysis, risk factors, and other costs and benefits, as appropriate. The last section discusses climate change risks and vulnerabilities which provide another set of factors to consider during investment decisions and another opportunity for optimizing mission success by considering long-term, strategic mission interests.

1.5.2 Operations & Maintenance and Deferred Investments

NASA plans and prioritizes its operations and maintenance funding decisions, including recognizing its deferred maintenance backlog, through NPR 8831.2E, *Facilities Maintenance and Operations Management*. The Centers manage their Operations and Maintenance (O&M) Program using a risk prioritization process and assess and prioritize their maintenance tasks and repair projects in accordance with their highest risk, such as: mission requirements, health, safety, environmental requirements, and building and construction code requirements. The Centers use their Reliability-Centered Maintenance Management Program, the annual increment of their Facility Condition Assessments, the annual DMA and their risk assessment process to establish their annual work plan and five year plan. The annual condition assessment is a process that provides a facility condition index rating, a system condition index rating, and a Deferred Maintenance (DM) estimate based on a parametric estimating method. The condition assessment process is an excellent tool for tracking and trending the condition of NASA facilities.

The Centers are managing their O&M ROI decisions based upon life cycle cost estimating and cost effectiveness. Typically, within the O&M arena, NASA repairs or replaces components that are more efficient to operate, control, and maintain, based on a life cycle cost estimate. NPR 8831.2E incorporates and stresses minimizing life cycle maintenance and repair costs in all our maintenance and operations management.

NASA's deferred maintenance is estimated to increase with planned funding:

- Continue overall Revitalization Program to replace, rehabilitate, construct additions, maintain, and demolish facilities.
- Repair by Replacement when rehabilitation of facilities is not cost effective based on a life cycle cost estimate.
- Rehabilitate facilities when cost effective based on a life cycle cost estimate.
- Allocate O&M funding to cover Critical Facilities and the Highest Priority requirements before addressing more routine requirements.
- Demolish and/or deconstruct facilities that are no longer required.
- Continue to smartly shut down and mothball facilities if they are not needed in the future.

We have calculated that the impact of our currently unused or soon to be deconstructed or demolished buildings has little impact on GHG emissions. Striving to attain our High Performance and Sustainable Building Requirements will aid NASA in reducing GHG emissions as we continue our efforts to become more sustainable and reduce energy use in our existing buildings going forward.

1.5.3 Capital Energy Investments in Existing Buildings

NASA's draft report fulfilling the National Energy Conservation Policy Act (NECPA) Section 543(f) requirement established by EISA 2007 Section 434(a) to report to OMB on NASA's process for reviewing decisions on large capital energy investments in existing buildings was submitted to OMB.

As described in this draft report, NASA implements large capital energy investments in existing buildings through facility projects as part of NASA's Construction of Facilities (CoF) program. NPR 8820.2F, *Facility Project Requirements*, documents NASA's process for the planning and acquisition of facility projects. The process requires use of life-cycle cost analysis and project review with written approval prior to obligating funding. Most importantly, as described in Chapter 1, Section 1.2.c of NPR 8820.2F, is the use of life-cycle cost versus first cost to select project systems, equipment, materials, and methods.

1.5.4 Environmental Compliance and Restoration (ECR) Program

NASA is currently drafting its NPR for its ECR program (will be NPR 8590.1A). A priority is the development of an ECR Program Project Prioritization Decision-Support process designed to help NASA implement a systematic, risk-based method for prioritizing ECR Projects in a resource constrained environment. The process is not designed to supplant decision makers but to provide them with the data, information and decision-support tools with which they can make sound, risk-informed and data-centered ECR resource allocation decisions. The Principles of Prioritization embody the values of the EMD and incorporate elements of NASA Strategic Goals:

- Protection of human health and the environment
- Natural resource restoration
- Opportunity for proactive or preventive management action
- Sustainability for climate, energy or water
- Mission sustainment
- Reduction of environmental liability
- Stewardship of public trust and stakeholder concerns
- Compliance with legal requirements
- Technology transfer and Science, Technology, Engineering and Mathematics (STEM) Learning
- Partnerships for leverage

Although not rated against the Prioritization Principles, every ECR project must demonstrate linkage to one or more of the Principles. Linkage between ECR projects and the Principles of Prioritization helps assure that ECR projects conform to NASA policies and contribute to achieving NASA, OSI and SSPP goals.

1.5.5 Climate Change Risk and Vulnerability

As a research organization tasked with expanding knowledge of the Earth and its systems, NASA seeks to apply its preeminent expertise in climate science to help manage risks to mission success associated with such change. A key element in managing these risks is making appropriate adaptations to institutional systems, which are difficult to change. A long view helps minimize costs and negative impacts. Such impacts are of particular concern because a high percentage of Agency assets are located along America's coasts, where sea level rise and storm patterns are a particular concern, and in areas where temperature rise is expected to negatively impact potable water supplies.

NASA's underlying methodology as we move forward to identify, characterize and manage climate change risks is to: 1) make data and NASA's climate science experts available to institutional stewards in a series of interactive workshops and 2) maximize the opportunity for progress by using a methodology already tested by NASA with the City of New York and piloted within NASA in 2009.

The OSI is partnering with NASA's Earth Science Division (ESD) to develop and implement a systematic approach to identifying, characterizing, and managing local and regional risks associated with climate change. Using a process first piloted with the government of the City of New York, NASA climate scientists will coordinate with institutional stewards through a series of workshops. Data is now available to forecast climate change and NASA scientific expertise can help NASA Centers and their communities:

- Identify and understand climate change risks and opportunities;
- Characterize them and explore an appropriate range of responses; and
- Begin developing responsible management strategies.

NASA's ESD awarded eight internal grants to be used over 18 months to: a) identify Center representatives for a Climate Change Adaptation Science team, who will assist in the development of adaptation strategies for NASA Centers and NASA as a whole; b) contribute to the scientific advancement of relevant climate and impacts science at the Center-scale and contribute to the body of knowledge on applying Earth science in decision-making; and c) encourage student research support. This program is too new to assess what management strategies are most useful, but whatever the risks or adaptation responses, NASA will use its mission risk management systems to ensure that risks are appropriately defined, characterized, assessed, and managed.

1.6 Transparency

NASA's founding legislation, the National Aeronautics and Space Act of 1958, instructed NASA to "...provide for the widest practicable and appropriate dissemination of information..." Transparency has been embedded in NASA culture for over 50

years. In January 2009 the President instructed the Director of the OMB to issue an Open Government Directive. That Directive, issued in December 2009, directed executive departments and agencies to take specific actions to implement the principles of transparency, participation, and collaboration set forth in the President's Memorandum. NASA has embraced this Open Government challenge.

NASA's enhanced efforts to incorporate these principles recognize NASA's long-held awareness that we cannot achieve our mission alone. NASA has a long history of participation with scientific and engineering communities within the nation's industrial organizations and institutions of higher education. Through grants, contracts, scholarships, and other arrangements, NASA has extensive participation and partnerships with these communities. Additionally, NASA has a renewed commitment to education with an emphasis on STEM learning.

Transparency, participation and collaboration -- both within NASA and between NASA and the broader public -- are methods by which we achieve our mission and strengthen our scientific and engineering communities. Actively incorporating these principles makes it possible for NASA to increase accountability, make information accessible, improve the quality of its decisions, and increase employee and public participation and engagement in NASA's mission. These enhanced approaches will be used to communicate and interact with the public about NASA's strategic sustainability efforts.

1.6.1 Internal Agency Communication

As discussed previously in Section 1.4.2, several methods of information dissemination and coordination will be used to communicate NASA's SSPP and how Centers and facility employees can contribute to successful plan implementation. We will use the SSWG, existing and new communities of practice, internal portals, panels, telecons, and video conferencing to communicate progress and results towards achieving NASA's sustainability goals, requirements, and targets.

NASA's SSPP will be discussed at all community of practice meetings throughout the remainder of 2010. NASA's SSPP will be made available in electronic and hardcopy versions in coming meetings and forums. It will also be made available to NASA personnel and support contractors through NASA's environmental management intranet portal. In future releases of NASA's SSPP, goal status and implementation plans will be made available to appropriate communities of practice for review and editing through their intranet portals or other preferred means.

In the coming months, NASA's SSWG will develop a sustainability communication map to include all the organizations, teams, working groups, communities of practice, boards, and panels that discuss and manage one or more goals, requirements, and targets identified in this SSPP. After Centers identify their CSOs, NASA's SSO will meet with them to identify ways to improve internal communication, raise employee awareness, and create training as necessary.

After June 2, 2010, NASA's SSO will provide a briefing at the Mission Support Council. As mentioned previously in this SSPP, this council is an essential component of NASA's Agency governance and is a venue in which to discuss issues and make decisions which require Agency-wide integration, visibility, and approval. This briefing will include progress and performance with respect to achieving the goals and metrics specified in this plan.

NASA's SSWG will investigate providing an annual briefing from the NASA Administrator, Deputy Administrator, and SSO that will be broadcast live on NASA TV and on the Web. This broadcast will be available to all NASA personnel and contractors, and will provide an opportunity to ask specific questions regarding NASA's overall sustainability effort.

1.6.2 External Agency Communication

External communication to the public will occur through the media, the internet, and conferences which NASA supports. NASA's extensive website which is available to the public—www.nasa.gov—will provide information on efforts NASA is undertaking to enhance energy security, a healthy environment, and environmentally-sound operations at all NASA Centers. To showcase critical milestones in achieving NASA's long-term sustainability goals, the OSI will develop press releases for distribution through regular public relations channels.

NASA's Ames Research Center has developed a Greenspace Initiative (<http://www.nasa.gov/centers/ames/greenspace/>) which showcases their Center's diverse portfolio of alternative energy and environmental projects. In 2010, NASA's SSWG, with assistance from Center personnel, will investigate expanding Greenspace to include projects and initiatives from across the Agency.

In the coming months, NASA will use conferences, seminars, symposia, and other external forums to raise awareness on NASA's sustainability efforts. NASA will investigate ways to apply lessons learned from NASA's Open Government Plan (<http://www.nasa.gov/open/plan/>) to achieve greater transparency, participation, and collaboration when it comes to NASA's role in protecting the environment and creating a sustainable world.

Section 2: Goal Summaries

SUMMARY OF ACCOMPLISHMENTS

NASA draws the reader's attention to the three initiatives highlighted in Goal 10 which we feel are the best examples of initiatives that will enhance the ability of NASA and other agencies to achieve current and future sustainability goals, requirements, and targets:

- “Partnering Internally to Solve Mutual Risks – Climate Change Impacts & Adaptations”
- “Improving System Design – Getting Critical Information in the Hands of System Designers”
- “The Use of Communities of Practice and Principal Centers for Spreading Ideas Up, Down, and Across the Agency”

NASA may also be one of the few agencies that requires – and also has – an EMS at the Headquarters level. This enables the Agency to elevate high priority aspects and impacts from across the Centers to the Headquarters level.

NASA also believes that it is a leader in GHG emission inventory and tool development as it had already performed an inventory in 2007. The continued development and refinements to the tool were an asset to the entire federal government after the tool was shared with CEQ, OMB, and the Department of Energy (DOE) as part of the Scope 1 and Scope 2 GHG emissions reduction target process.

The OMB/CEQ SSPP template dated April 6, 2010 contained six subsections – 1) goal description; 2) agency lead for goal; 3) agency status; 4) positions; 5) planning table; and 6) implementation methods. NASA has included in this version subsections 1, 2, and 6 for all but Goal 3, which only contains agency lead and agency status.

2.1 GOAL 1—SCOPE 1 & 2 GREENHOUSE GAS EMISSIONS REDUCTION

NASA is reinforcing its commitment to energy reduction and more sustainable infrastructure by establishing Scopes 1 and 2 GHG emission reduction targets by FY 2020 from its 2008 baseline. This estimated 2008 baseline and projected GHG reduction target are reflective of current guidance and are based on established energy intensity reduction requirements for goal subject buildings and supporting investment in the NASA infrastructure. NASA anticipates key energy reduction efforts will contribute to both GHG emissions reductions and achievement of projected reduction targets.

2.1.1 Goal Description

a. Buildings

- 1) **Reduce facility energy intensity** – Reduce energy consumption per gross square foot of building area by 3% annually from FY 2003 baseline for FY 2006 – FY 2015 (30% Total) (EO 13423) following the per FY reductions mandated in EISA 2007.
- 2) **Increase Renewable Electricity Installation & Use**
 - i. Increase percentage of total electricity from renewable sources (3% FY 2007 – FY 2009; 5% FY 2010 – FY 2012; 7.5% FY 2013+)
 - ii. Strive for at least half of the renewable energy from new renewable sources (placed into service after January 1, 1999)

b. Fleet

- 1) **Reduce Petroleum Use in Fleet Vehicles** – Reduce petroleum use 2% annually from FY 2005 baseline for FY 2005 – FY 2020 (30% Total)
- 2) **Increase Use of Alternative Fuels in Fleet AFVs** – Increase alternative fuel use by 10% annually from 2005 baseline for FY 2005 – FY 2015
- 3) **Optimize Use of Vehicles and Right-Size Fleet.**
- 4) **Increase Use of Low Emission and High Fuel Economy Vehicles**

c. Greenhouse Gas Emissions Intensity

- 1) **Reduce Agency's GHG emissions intensity** by 1% annually or 9% by FY 2015 from FY 2003 baseline (EO 13423 Toxic & Hazardous Chemical Plan Goal) for identified goal subject buildings

2.1.2 Agency Lead for Goal

Agency Lead: Environmental Management Division
Goal Team: Environmental Management Division; Logistics Management Division; Facilities Engineering and Real Property Division

2.1.6 Implementation Methods

NASA's success will depend not only on Agency mission program success, but also on building and maintaining a strong and sustainable infrastructure and reducing petroleum fuel use. Energy and fuel costs are eroding mission funding and even though

NASA has been gradually reducing energy use over the past years, costs have been increasing due to sharp increases in the unit cost of energy.

Additionally, addressing GHG emissions at NASA requires integrative responses as the data, resources, requirements and opportunities need to be coordinated and managed by a range of offices and organizations. GHG management is often a direct result of actions and investments in NASA to address other significant requirements, thereby making it difficult to segregate GHG from the larger sustainability effort. For example, NASA anticipates gaining reductions due to the President's GreenGov initiative. On October 19, 2009, the White House launched the GreenGov Challenge to ask all Federal and military personnel to share ideas about how the federal community can lead by example, green the government, and meet the goals of EO 13514. The GreenGov Challenge generated more than 5,000 ideas and 165,000 votes from 14,000 federal employees. The top ideas were summarized in the GreenGov Final Report. NASA Headquarters asked the Centers to implement no cost/low cost initiatives to reduce energy and water consumption. Centers report monthly at the Agency Baseline Performance Review, and Headquarters presents metrics quarterly to determine progress and which Center is performing the best.

Buildings

Strategies to meet federal requirements include continued implementation of high performance sustainable building design and construction principles, improvement of management of existing building systems, and identification of alternatives to renovation that reduce existing asset deferred maintenance costs. When adding assets to Agency building inventories, opportunities are identified to consolidate and eliminate existing assets, optimize the performance of portfolio property, and reduce associated environmental impacts.

Renewable Electricity Installation & Use

NASA is planning to meet its renewable energy goals through on-site renewable generation, procurement of green power and Renewable Energy Certificates. NASA performed an Agency-wide renewable energy resource assessment and is now determining the best opportunities for renewable on-site generation.

Fleet

NASA will continue to eliminate underutilized vehicles, right-size the fleet, and increase the acquisition of low GHG emitting vehicles. These efforts are aided by the Annual Vehicle Review Boards (VRBs) at the NASA Centers which determine the optimization and right sizing of vehicles based on the mission assigned.

2.2 GOAL 2—SCOPE 3 GREENHOUSE GAS EMISSIONS REDUCTION

2.2.1 Goal Description

NASA is establishing initial Scope 3 GHG reduction targets by FY 2020 from its 2008 baseline. Initially, this will be achieved primarily through reductions in purchased electricity (Transmission & Distribution losses) and solid waste generation and disposal. With the advent of newly detailed and clarified guidance NASA plans to implement an expanded GHG emission tracking, assessment and reporting program to ensure integration within the larger sustainability effort.

2.2.2 Agency Lead for Goal

Agency Lead: Environmental Management Division

2.2.6 Implementation Methods

Scope 3 GHG emissions are generated by a range of operations in addition to the energy activities tracked under Goal 1. NASA Centers, as discussed in Goal 1, will track and report specific data into the NETS data system that will be utilized by Headquarters staff for annual reporting and prioritization.

As identified in Scopes 1 and 2 (Goal 1 discussion), the success of Scope 3 GHG emission reductions at NASA will often be a direct result of actions and investments at NASA to address other requirements, thereby making it difficult to segregate GHG from the larger sustainability effort. As additional guidance expands Scope 3 requirements, NASA plans to promote integrative responses as the data, resources, requirements and opportunities represent a range of offices and organizations.

2.3 GOAL 3—DEVELOP AND MAINTAIN AGENCY COMPREHENSIVE GREENHOUSE GAS INVENTORY

2.3.1 Agency Lead for Goal

Agency Lead: Environmental Management Division

2.3.2 Agency Status

Overarching Strategy

Several years ago, NASA developed a GHG emissions inventory tool which focused primarily on readily available data applicable to calculate NASA's Scope 1 and Scope 2 GHG emissions for multiple fiscal years. NASA's "GHG Emission

Inventory Report CY 2008” was prepared to determine status and progress on GHG emissions for the Agency and its Centers with respect to three aspects of GHG reporting: 1) a reduction goal established by NASA under EO 13423, Strengthening Federal Environmental, Energy, and Transportation Management; 2) the GHG emission inventory for FY08; and 3) the potential reporting requirement impact to individual NASA facilities of the Environmental Protection Agency’s (EPA) draft rule for Mandatory Reporting of Greenhouse Gases (MRR) and upcoming state GHG reporting policy changes. The report aligns with the GHG emissions reporting requirements laid out by International Organization for Standardization (ISO) 14064-1:2006, *Greenhouse gases – Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals*. The report also describes the methods used to develop the GHG emissions inventory in accordance with this ISO standard and World Resources Institute/World Business Council for Sustainable Development (WRI/WBCSD, or WRI) Protocol. The tool was populated with existing energy and transportation fuel data from the NASA Centers, reported into the NETS database.

In the interest of supporting the larger effort to characterize and inventory GHG emissions, NASA shared this inventory tool with CEQ, OMB and DOE during the developmental Road Test to develop Scopes 1 and 2 baselines and reduction goals. The NASA tool and supporting documentation was distributed to all federal agencies (without NASA data) during the initial Road Test to help develop the federal agency inventory guidance.

NASA actively participated in the interagency review and comment process during DOE Federal Energy Management Program (FEMP) development of the guidance for required annual GHG emissions inventory. Once this guidance is finalized, we plan to integrate this guidance and associated requirements (and any additional tracking and reporting requirements for EPA’s MRR) into our NETS database.

Milestones/Resources

NASA will, based on the receipt of final Inventory guidance, determine needed data collection changes to the NETS database to conform to the FEMP tool data requirements. As necessary once this new program is implemented and functioning, NASA will identify and integrate resources and staffing needs within future budgets. The rapidly evolving nature of the GHG management and inventory requirements make it difficult to estimate resources and milestones at this time.

Alignment with Budget Submission

NASA currently has no budget requirements to support implementation and reporting of the GHG inventory. Similar to milestones and resources (above section), NASA will identify and integrate budget requirements in the future, as needed, once final inventory guidance and requirements are provided.

Integration

NASA plans to update NETS to ensure compliance with pending GHG inventory guidance and related inventory requirements to comply with EPA’s MRR for GHG tracking and reporting. Updating also helps integrate related Center energy, solid waste, and infrastructure management data so that it will be available to Center and Headquarters decision makers. An overall update of the NETS system to address the diverse aspects of EO 13514 is under consideration to promote access to the ranges of applicable data across the Agency and support ready integration.

Methods to Obtain Reliable Performance Data

Currently, the NETS database provides Center-level data for aggregation and reporting by NASA Headquarters that supports development of credible Energy, Water, and EMS Scorecards. NASA intends to build on the existing database to address new and emerging GHG management and reporting requirements. The method for data collection at the Center level and subsequent aggregation at Headquarters for Agency-wide reporting includes quality assurance approaches performed by Headquarters staff prior to reporting. NASA plans to continue this interactive approach to ensure quality, accountability, and traceability for all underlying data.

Process for Evaluation and Revision

NASA plans to actively track evolving requirements for GHG management and specifically the annual Inventory (via the proposed FEMP database and/or EPA MRR) and reporting guidance. Due to the rapidly evolving nature of GHG management, NASA Headquarters staff, working with identified Center leads and the NASA RRAC Principal Center, will identify and disseminate new requirements through the established communities of practice and undertake updates to existing policies on an as needed basis.

2.4 Goal 4—HIGH-PERFORMANCE SUSTAINABLE DESIGN/GREEN BUILDINGS

2.4.1 Goal Description

- a. Beginning in FY 2020, NASA will require that all new buildings are designed to achieve zero-net energy by 2030
- b. All new construction, major renovation or repair and alteration of NASA buildings complies with “Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings” (Guiding Principles)

- c. At least 15% of NASA's existing buildings and building leases meet Guiding Principles by FY 2015
- d. Demonstrate annual progress toward 100% conformance with Guiding Principles for entire building inventory
- e. Demonstrate use of cost-effective, innovative building strategies to minimize energy, water and materials consumption
- f. Manage existing building systems to reduce energy, water, and materials consumption in a manner that achieves a net reduction in Agency deferred maintenance costs
- g. Optimize performance of the NASA's real property portfolio – examine opportunities to decrease environmental impact through consolidation, reuse and disposal of existing assets prior to adding new assets
- h. Ensure use of best practices and technology in rehabilitation of historic NASA properties

2.4.2 Agency Lead for Goal

Agency Lead: Facilities Engineering and Real Property Division

2.4.6 Implementation Methods

NASA NPR 8820.2F, *Facility Project Requirements*, provides the minimum requirements for the planning and acquisition of NASA facility projects. In order to provide the most current methods for implementing the cost, schedule and performance for energy efficient and sustainable facilities, NPR 8820 is thoroughly reviewed and updated every five years. This policy:

- Provides Agency best practices to ensure that the most cost-effective and optimally-performing buildings are constructed and that energy and sustainable goals are met.
- Sets up a collaborative process for the Agency to formulate its CoF program
- Provides guidance for facility project fiscal management.
- Sets up communication processes between NASA Headquarters and each Center for the purpose of reporting project status.

In order to communicate the most current federal legislation and policy related to sustainable facility design, updated goals and best practices to the Centers, FERPD provides regular sustainability training and workshops. Due to recent changes in the US Green Building Council (USGBC), Leadership in Energy and Environmental Design (LEED) standards and advances in high performance building and design methods, the FERPD-sponsored 4.5 day sustainability training has been temporarily stopped so that the training course content and structure can be reviewed and reformatted to reflect the most recent standards. The sustainable facility design and green building training will resume in the summer of 2010. The training locations will rotate between Centers on a semi-annual schedule. FERPD-sponsored bi-annual workshops continue to highlight both intra- and interagency facility developments.

2.5 GOAL 5—REGIONAL AND LOCAL PLANNING

2.5.1 Goal Description

- a. Incorporate participation in regional transportation planning (recognition and use of existing community transportation infrastructure) into existing policy and guidance
- b. Align Agency policies to increase effectiveness of local energy planning
- c. Incorporate sustainable building location into policy and planning for new Federal facilities and leases
- d. Update Agency policy and guidance to ensure that all Environmental Impact Statements and Environmental Assessments required under the National Environmental Policy Act (NEPA) for proposed new or expanded Federal facilities identify and analyze impacts associated with energy usage and alternative energy sources
- e. Update Agency policy and guidance to ensure coordination and (where appropriate) consultation with Federal, State, Tribal and local management authorities regarding impacts to local ecosystems, watersheds and environmental management associated with proposed new or expanded Federal facilities

2.5.2 Agency Lead for Goal

Agency Lead: Facilities Engineering and Real Property Division

2.5.6 Implementation Methods

- a. Develop an Agency Master Plan to provide a comprehensive framework for Agency infrastructure reduction and stewardship in support of Mission goals and objectives within available resource constraints. In support of Agency leadership, OSI staff seek to use the Agency Master plan to:
 - Align facilities strategies with NASA's strategic facilities objectives: NASA will renew and modernize its facilities to sustain its capabilities, and to accommodate those capabilities in the most efficient facilities set practical;
 - Optimize current and planned funding with facilities strategies, mindful of other Agency and Federal requirements to maximize facilities performance in a sustainable fashion (safety, security, health, accessibility, economics, energy consumption, environmental stewardship, etc.).

- b. Update relevant Agency policies including NPD 8810.2A, *Master Planning for Real Property*, and associated NPR.
- c. Review Agency systems for auditing, tracking, and monitoring and implement improvements as appropriate.
- d. Verify that component Center master plans (presented to the Agency in graphic, tabular, and summary briefing forms) are updated to integrate sustainability concerns at all Agency installations, including:
 - Reducing the economic and environmental consequences of satisfying Agency program requirements within a smaller facilities asset portfolio (10% smaller by 2020 and 15% smaller by 2055, measured in real asset value).
 - Integrating into current plans (and setting 20-year targets) for energy, water, and GHG reductions.
- e. Support and update communication tools, including training, websites, and recognition programs such as the NASA Blue Marble Awards.
- f. Advocate for funding to achieve master plan benefits as a part of NASA's integrated Programming, Planning, Budgeting, and Execution (PPBE) System.
- g. Coordinate with other organizations as appropriate to ensure that the full range of relevant communities and issues are addressed, ranging from residential, commercial, and institutional neighbors, local, State, and regional government authorities, transportation and utilities system stewards, and relevant Federal oversight organizations.

2.6 GOAL 6—WATER USE EFFICIENCY AND MANAGEMENT

2.6.1 Goal Description

- a. Reduce potable water use intensity by at least 26% by FY 2020
- b. Reduce industrial, landscaping, and agricultural water use by at least 20% by FY 2020
- c. Identify and implement water reuse strategies
- d. Achieve objectives established by EPA in Stormwater Guidance for Federal Facilities

2.6.2 Agency Lead for Goal

Agency Lead: Environmental Management Division

2.6.6 Implementation Methods

- a. Develop overall implementation strategy for a comprehensive NASA water program that includes water conservation, water reuse, water quality, and stormwater management, with input from the NASA Water Program community of practice and consideration of the completed Water Conservation Technical Assessments.
- b. Update NPR 8570.1, *Energy Efficiency and Water Conservation*, related to water conservation requirements. Anticipated completion date June 2011.
- c. Review Agency systems for auditing, tracking, and monitoring water use and implement improvements as appropriate.
- d. Verify during triennial EFRs at each Center that its EMS evaluates water program requirements, goals and targets and that the results are reviewed by Center management.
- e. Support and update communication tools, including training, websites, and recognition programs such as the NASA Blue Marble Awards.
- f. Support Center efforts to implement water conservation practices through funding advocacy, audits, and assessments.
- g. Coordinate with other organizations as appropriate to ensure water conservation measures, water reuse, and stormwater management are addressed, e.g., FERPD with respect to high-performance buildings.
- h. Evaluate methods to integrate WaterSense measures (for identification and procurement of water efficient products - similar to EnergyStar for energy-efficient products) in investment strategy.

2.7 GOAL 7—POLLUTION PREVENTION AND WASTE ELIMINATION

2.7.1 Goal Description

- a. Increase source reduction of pollutants and waste
- b. Divert at least 50% non-hazardous solid waste by FY 2015, excluding C&D debris
- c. Divert at least 50% C&D materials and debris by FY 2015
- d. Reduce printing paper use
- e. Increase use of uncoated printing and writing paper containing at least 30% postconsumer fiber
- f. Reduce and minimize the acquisition, use, and disposal of hazardous chemicals and materials
- g. Increase diversion of compostable and organic materials from the waste stream

- h. Implement integrated pest management and landscape management practices to reduce and eliminate the use of toxic and hazardous chemicals and materials
- i. Increase Agency use of acceptable alternative chemicals and processes
- j. Decrease Agency use of chemicals to assist Agency in achieving FY 2020 GHG reduction targets [See Section 2, Goals 1 and 2]
- k. Report in accordance with Sections 301-313 of the Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986

2.7.2 Agency Lead for Goal

Agency Lead: Environmental Management Division

2.7.6 Implementation Methods

NASA has implemented ambitious pollution prevention and waste diversion initiatives since the early 1990s, and continually re-evaluates and refines its processes to further eliminate the use of hazardous materials and the generation of waste. The current process involves pollution prevention and waste diversion initiatives that enable environmentally sound mission success, so NASA can continue to restore, to protect, and to enhance its mission resources. Initiatives such as waste diversion and the purchase of recycled-content, biobased content and other environmentally preferable products benefit the environment and demonstrate our commitment to environmental stewardship. The following points illustrate how NASA will achieve this goal:

- Continue NASA's RSA Principal Center, which was established to provide resources and support to help NASA excel within the federal government in waste prevention, recycling, and sustainable acquisition by achieving the former waste diversion goal of 35% by the year 2010 and maintaining 100% compliance in sustainable acquisition.
- Continue to utilize the Agency's and Centers' EMS to help obtain established goals.
- Continue to utilize the Agency's EFR to assess the effectiveness of Center systems and processes established to meet the goal.
- Improve the effectiveness of training (contract specifications, purchasing and purchase cards) programs to support the goal.
- Revise NPR 8530.1A, *Affirmative Procurement Program and Plan for Environmentally Preferable Products*, to better support the Agency's processes and procedures to meet the goal.
- More specifics on the Agency's implementation methods can be found in the Agency's NPR 8530.1A and the "2009 Sustainable Acquisition, Practices: Green Purchasing, Waste Management, and Chemicals Management Report."

2.8 GOAL 8—SUSTAINABLE ACQUISITION

2.8.1 Goal Description

- a. Ensure 95% of new contract actions, including task and delivery orders under new contracts and existing contracts, require the supply or use of products and services that are energy efficient (Energy Star or FEMP-designated), water efficient, biobased, environmentally preferable (excluding Electronic Product Environmental Assessment (EPEAT)-registered products), non-ozone depleting, contain recycled content, or are non-toxic or less toxic alternatives.
- b. Update Agency affirmative procurement plans (also known as green purchasing plans or environmentally preferable purchasing plans), policies and programs to ensure that all Federally-mandated designated products and services are included in all relevant acquisitions.

2.8.2 Agency Lead for Goal

Agency Lead: Office of Procurement

Goal Team: Office of Procurement; Environmental Management Division

2.8.6 Implementation Methods

The Federal Acquisition Regulation (FAR), Part 23 addresses policy at the Federal government level. This document is available at <https://www.acquisition.gov/far/current/html/FARTOCP23.html#wp227606>. The NASA FAR Supplement, Part 23, addresses NASA's implementation of the FAR requirements. This document is available at <http://www.hq.nasa.gov/office/procurement/regs/1823.htm>.

NASA also has a Procurement Information Circular (PIC) 01-27 to address the "Applicability of Affirmative Procurement." This document is available at <http://www.hq.nasa.gov/office/procurement/regs/pic01-27.html>. Additionally, NASA PIC 08-04, "Environmental Reporting," addresses reporting requirements and is available at <http://www.hq.nasa.gov/office/procurement/regs/pic08-04.html>.

NPR 8530.1A also provides NASA policy on implementing this goal. NASA relies primarily upon these documents to establish direction and guidance on proper procurement language in its contracts. In response to the specific requirements of EO 13514, NASA plans to:

- Follow the resolution of several outstanding FAR cases and update NASA policy as appropriate once FAR policy is finalized. (FAR Case 2010-001, a proposed change to the FAR to update federal acquisition policy for compliance with EO 13514 and another case to address bio-based procurement.)
- Charge the current community of practice group of Headquarters and Center procurement professionals with reviewing current EO 13514 requirements and NASA procurement policy. This community of practice will also assist in re-writing NPR 8530.1A to better implement EO requirements and Agency policy.
- Improve communication and training among procurement, facilities and environmental professionals at Headquarters and the Center level to further the program.

2.9 GOAL 9—ELECTRONIC STEWARDSHIP AND DATA CENTERS

2.9.1 Goal Description

- a. Establish and implement policy and guidance to ensure use of power management, duplex printing, and other energy efficient or environmentally preferred options and features on all eligible Agency electronic products.
- b. Update Agency policy to reflect environmentally sound practices for disposition of all Agency excess or surplus electronic products.
- c. Update Agency policy to ensure implementation of best management practices for energy efficient management of servers and Federal data centers.
- d. Goals should identify how the Agency intends to meet technology energy consumption reduction goals in its data centers.
- e. Discuss how the Agency is planning on meeting the technology energy reduction goals in the data centers. Include details on the investment plan, covered vs. non-covered facilities, and how the Agency identified the covered facilities.
- f. Discuss how the Agency will increase the quantity of electronic assets disposed through sound disposition practices. Include in the discussion how your Agency is using or plans to use programs such as disposal through GSA Xcess, recycling through Unicor, donation through GSA's Computer for Learning (CFL) or other non-profit organizations, and/or recycling through a private recycler certified under the Responsible Recyclers (R2) guidance or equivalent.

2.9.2 Agency Lead for Goal

Agency Lead: Chief Information Officer

2.9.6 Implementation Methods

- a. Review Agency policy and practice regarding leveraging energy efficient and/or environmentally preferred options and features of electronic products. Update policy and practice where necessary to ensure that these features are leveraged wherever possible and practical.
- b. Review Agency policy and practice regarding disposition of excess and surplus electronic products. Update policy and practice where necessary to ensure sound disposition methods are employed.
- c. Review Agency policy and practice regarding energy efficient management of servers and data centers. Update policy and practice where necessary to ensure that these practices are leveraged wherever possible and practical.
- d. Comply with the OMB Data Center Consolidation Initiative to develop a data center consolidation plan for NASA that includes a hardware and software asset inventory of data centers and a plan for how to identify opportunities for footprint reduction of data centers, consolidation and virtualization of systems, use of cloud computing, decommissioning of unused assets, and additional energy conservation.
 - Perform an enterprise assessment of NASA's data center footprint including servers, storage, network, applications, and resource utilization.
 - Based on this enterprise assessment, develop a list of applications/systems that can be eliminated, consolidated, virtualized, or can be served by using cloud computing.
 - Develop a robust data center consolidation strategy to reduce the number of data centers and carbon footprint and use efficient server and data center management practices.
 - NASA is piloting a cloud-computing platform, "Nebula", to determine the applicability of the cloud platform for NASA's applications/systems. The results from this pilot will be used to strengthen NASA's data center consolidation strategy.

- e. For energy reduction for covered and non-covered facilities, NASA will use the enterprise assessment of its data center footprint and analysis to determine applications/systems/facilities that will yield the highest energy savings. NASA defines covered facility as one that is in direct control of NASA. NASA considers leased and rented facilities to be non-covered facilities. In the case of non-covered facilities, NASA plans to provide guidance for energy savings and management of servers. NASA's OCIO will work with facilities to determine proper energy monitoring and management practices to reduce the energy usage.
- f. NASA's OCIO will partner with the property division to determine and ensure all excess and surplus electronic assets are disposed through sound disposition practices. The contracts under I3P will include the energy savings requirements including energy saving equipment and their sound disposition.
- g. Two recent statutes, EAct 2005 and EISA 2007, modified the NECPA to require electricity metering at the federal building level by the end of FY 2012; the law requires using advanced metering to the maximum extent practicable to provide at least hourly data on at least a daily basis into energy tracking systems available to facility managers. NASA plans to meter all appropriate buildings within all Centers. This effort will continue through 2012. NASA will evaluate and prioritize the metering of data centers within this larger effort.

2.10 GOAL 10—INNOVATION FOR A SUSTAINABLE SOCIETY AND A SUSTAINABLE NASA

2.10.1 Goal Description

Support innovation in NASA Programs and Institutions to protect and enhance human health and the environment.

2.10.2 Agency Lead for Goal

Agency Lead: Office of Strategic Infrastructure
NASA Senior Sustainability Officer

2.10.6 Implementation Methods

The OSI, which is run by NASA's SSO, will be the primary lead for this goal, in cooperation with OSI Divisions and other Offices within NASA such as the ESD.

NASA reviews internal and external sources for ways to advance ideas, policies, methodologies, and technology in order to identify, overcome, and properly manage our long- and short-term mission and institutional risks, and identify opportunities to successfully explore space. Three initiatives, which are currently underway, are highlighted in this plan. These initiatives will enhance the ability of NASA and other agencies to achieve current and future sustainability goals, requirements, and targets.

Partnering Internally to Solve Mutual Risks—Climate Change Impacts & Adaptations

The OSI's partnership with NASA's ESD was highlighted earlier in SSPP Section 1.5.5, Climate Change Risk and Vulnerability. It is referenced in this section to emphasize the fact that, sometimes, resources and knowledge can be found in your own organization to aid in studying and resolving a mutual interest and need. In this case, the OSI and ESMD created a simple mechanism—a workshop in the summer of 2009—that introduced the NASA climate science community and the mission support community (which includes functional organizations like environmental management and facilities operations) to one another and started an on-going dialogue. This dialog will likely continue for several years and improve NASA's resilience and capability to perform mission activities. The act of bringing together the two communities to address questions has created a wealth of learning and cross-pollination that might not have occurred otherwise. The questions were vital, such as: What is the state of climate science and how can we use it to address NASA's needs? What are potential risks to NASA institutional assets and how does NASA incorporate these risks into its risk management system? How can NASA use climate science data (produced by NASA) to determine our operational vulnerabilities and plausible scenarios by which significant failures occurs? How can the climate science and operational communities work together to enable sound decision making for asset investment? But, it was the act of bringing disparate communities together to identify mutual risks and potential impacts that sparked greater understanding and collaboration. As we move forward and develop adaptive strategies, we will gain more knowledge and experiences with external partners, such as other agencies, cities, academia, and international entities.

Improving System Design—Getting Critical Information in the Hands of System Designers

NASA space vehicle system material and process selection design decisions often lock-in costly long term environmental, safety, and health (ESH) challenges at NASA Centers and component facilities. Failure to consider material and process ESH risks early in the design life-cycle can burden end-users with cost, schedule, and performance issues. Designing space vehicle systems with a known or suspected ESH restricted substance exposes NASA to a multitude of institutional and programmatic risks, such as: 1) regulatory compliance, 2) material obsolescence, 3) toxic wastes, and 4) end-of life disposal costs. ESH regulations continuously evolve and are typically mitigated by gaining exemptions or instituting late material substitution retrofits which have detrimental impacts on cost and schedule. Reactive measures can also leave Centers and component facilities saddled with costly disposal or clean-up costs that drain current and future mission resources. Project Life-Cycle

Management (PLM) approaches and design tools that integrate ESH considerations and proactively support informed choices about restricted materials are a way to manage these challenges within the NASA design community.

MAPTIS-II is an existing NASA-wide materials database established for the purpose of recording and disseminating material information to help assure safe material selections for NASA-produced space hardware. MAPTIS-II is a secure, aerospace materials application which utilizes state-of-the-art technology to collect, catalogue, verify, and disseminate material information.

The value of improving an existing materials tool – MAPTIS-II – was recognized by NASA Headquarters, which provided SII funding in FY08 to initiate the development of an ESH enhancement to NASA's existing system. As a result, 15 United States (US) ESH regulations and ten European Union (EU) ESH regulations have been linked to MAPTIS-II materials. These regulations contain ~4200 regulated substances linked to ~33,000 MAPTIS-II materials. ESH considerations can now be implemented during material selection. When a designer is evaluating a material they will see whether the material is banned, restricted, regulated, to be used with caution or unrestricted according to ESH considerations. There are additional enhancements and improvements to several legacy systems that would make this a more robust database. Additional funding would:

- Improve the life-cycle design tools and data systems
 - Create tools to generate Bill of Materials from Computer Aided Design (CAD) drawings
 - Embed tools in CAD and PLM/Product Data Management (PDM) applications for real-time ESH evaluation
- Build in an information platform
 - Link MAPTIS-II with CAD drawings for automated Bill of Materials
 - Embed tools in CAD and PLM/PDM applications for integrated design and evaluation of ESH implications
- Improve pro-active selection decisions
 - Expand to include other US domestic ESH regulations
 - Expand to include other nations' ESH and emerging ESH regulations

This system, now and even more when the enhancements are in place, has extended application in the green design-engineering of weapon systems, aerospace equipment, mechanical systems and globally marketed products.

The Use of Communities of Practice and Principal Centers for Spreading Ideas Up, Down, and Across the Agency

NASA believes leveraging existing communities, panels, groups, and/or Principal Centers to understand and achieve requirements and disseminate information in, out, and throughout the Agency is essential. As described in Section 1.4.1.4, communities of practice will be instrumental in disseminating knowledge about the SSPP, gathering input with regard to best practices and innovations, and feedback on the best ways to spread sustainability principles throughout the Agency. As noted in Table 1, the already established communities of practice enabled NASA to quickly form a team to respond to the new EO requirements and provide input to SSPP development. The formation of new communities of practice to address new areas of interest and focus is straightforward as there is already a tradition of such groups.

In addition to communities of practice, several Principal Centers are already focused on reducing risk and increasing the performance of NASA's missions with less toxic, more energy efficient means and materials (see Section 1.4.2.2). Together these groups provide pathways from these originating sources to the Agency's mission systems, materials, and aerospace engineers and scientists and provide enabling infrastructures that enhance the infusion of these technologies in NASA missions and programs.

For example, the TEERM formulates partnerships within NASA, domestically with other Government Agencies and industry, and internationally with countries and space agencies. Through these partnerships, common environmentally-driven risks are mitigated through leveraged projects. These projects and highlighted issues are showcased through an annual international workshop which alternates location between the US and Europe. A recent addition to these workshops is University student participation to extract new ideas focused on the areas of materials management and substitution, pollution control strategies, remediation and cleanup, renewable and alternative energy systems, encroachment risk mitigation, adaptation to climate change, and sustainable development. We will continue to invite students to participate in annual international workshops sponsored by NASA.

Section 3: Agency Self Evaluation

As requested, NASA provides yes/no answers to the following questions regarding critical aspects of the Plan.

Does your plan provide/consider overarching strategies and approaches for achieving long-term sustainability goals?	Yes
Does your plan identify milestones and resources needed for implementation?	Yes
Does your plan align with your Agency's 2011 budget submission?	Yes
Is your plan consistent with your Agency's FY 2011 budget and appropriately aligned to reflect your Agency's planned FY 2012 budget submission?	Yes
Does your plan integrate existing EO and statutory requirements into a single framework and align with other existing mission and management related goals to make the best use of available resources?	Yes
Does your plan provide methods for obtaining data needed to measure progress, evaluate results, and improve performance?	Yes

NASA completes and submits its OMB Scorecard on a six-month basis with the information and milestones requested. It understands that future OMB Scorecard guidance may be different to reflect new data and metrics. NASA is already in the process of integrating the ten SSPP goals within existing efforts and activities and would prefer to keep communication with regard to the OMB Scorecard within the context of that request and delivery process. In this fashion, NASA's communication will be more consistent.

Appendix A—Acronyms and Abbreviations

AA	Assistant Administrator
AFV	Alternative Fueled Vehicle
ARM	Active Risk Management system
ARRA	American Reinvestment and Recovery Act
BTU	British Thermal Unit
C&D	Construction and Demolition
CAD	Computer Aided Design
CEQ	Council on Environmental Quality
CFL	GSA's Computer for Learning
CGT	Center Green Teams
CIO	Chief Information Officer
CoF	Construction of Facilities Program
CRM	Cultural Resources Management
CSO	Center Sustainability Officer
CSWG	Center Sustainability Working Group
DM	Deferred Maintenance
DMA	Deferred Maintenance Assessment
DOE	Department of Energy
ECIC	Engineering Construction Innovations Committee
ECR	Environmental Compliance and Restoration Program
EEP	Energy Efficiency Panel
EFR	Environmental Functional Review
EISA	Energy Independence & Security Act of 2007
EMD	Environmental Management Division
EMS	Environmental Management System
EO	Executive Order
EPA	Environmental Protection Agency
EPAct	Energy Policy Act of 2005
EPCRA	Emergency Planning and Community Right-to-Know Act
EPEAT	Electronic Product Environmental Assessment Tool
ESD	Earth Science Division
ESH	Environmental, Safety, and Health
ESPC	Energy Savings Performance Contract
EU	European Union
EUL	Enhanced Use Lease
EWMFR	Energy and Water Management Functional Review
FAR	Federal Acquisition Regulation
FAST	Federal Automotive Statistical Tool
FEMP	Federal Energy Management Program
FERDP	Facilities Engineering and Real Property Division
FTE	Full Time Equivalent
FY	Fiscal Year
gal	Gallon
GHG	greenhouse gas
GSA	General Services Administration
HVAC	Heating, Ventilating and Air Conditioning
I3P	Information Technology Infrastructure Integration Program
ISO	International Organization for Standardization
JPL	Jet Propulsion Laboratory
JSC	Johnson Space Center
KSC	Kennedy Space Center

LEED	Leadership in Energy and Environmental Design
MAPTIS-II	Materials and Processes Technical Information System II
MRR	EPA's Mandatory Greenhouse Gas Reporting Rule
MSC	Mission Support Council
mtCO2e	Metric Tons of Carbon Dioxide Equivalent
NASA	National Aeronautics and Space Administration
NECPA	National Energy Conservation Policy Act
NEPA	National Environmental Policy Act
NETS	NASA Environmental Tracking System
NODIS	NASA Online Directives Information System
NPD	NASA Policy Directive
NPR	NASA Procedural Requirement
O&M	Operations and Maintenance
ODIN	Outsourcing Desktop Initiative for NASA
OFEE	Office of the Federal Environment Executive
OMB	Office of Management and Budget
OMFIT	Operations & Maintenance of Facilities Innovations
OSI	Office of Strategic Infrastructure
PIC	Procurement Information Circular
PDM	Product Data Management
PLM	Project Life-Cycle Management
PPBE	Programming, Planning, Budgeting, and Execution
R2	Responsible Recyclers
ROI	return on investment
RPI	Real Property Inventory
RRAC	Regulatory Risk Analysis and Communication Principal Center
RSA	Recycling and Sustainable Acquisition Principal Center
SBIP	FERPD Sustainable Building Implementation Plan
SF	square feet
SII	Strategic Institutional Investment
SSO	Senior Sustainability Officer
SSPP	NASA's Strategic Sustainability Performance Plan
SSWG	Strategic Sustainability Working Group
STEM	Science, Technology, Engineering and Mathematics
TBD	To Be Determined
T&D	Transmission & Distribution
TEERM	Technology Evaluation for Environmental Risk Mitigation Principal Center
UESC	Utility Energy Service Contract
USGBC	US Green Building Council
VRB	Annual Vehicle Review Boards
WBCSD	World Business Council for Sustainable Development
WRI	World Resources Institute

Appendix B—Referenced NASA Related Documents

Title	URL
National Aeronautics and Space Act of 1958	http://history.nasa.gov/spaceact.html
NASA Online Directives Information System (NODIS Library)	http://nodis3.gsfc.nasa.gov/
NPD 7120.4D—NASA Engineering and Program/Project Management Policy	http://nodis3.gsfc.nasa.gov/displayDir.cfm?t=NPD&c=7120&s=4D
NASA Interim Directive (NID) for NASA Procedural Requirements (NPR) 7120.5D—NASA Space Flight Program and Project Management Requirements	http://nodis3.gsfc.nasa.gov/npg_img/N_PR_7120_005D_/NM_7120-81_.pdf
NPD 8500.1B—NASA Environmental Management	http://nodis3.gsfc.nasa.gov/displayDir.cfm?Internal_ID=N_PD_8500_001B_&page_name=main&search_term=%208500
NPR 8530.1A—Affirmative Procurement Program and Plan for Environmentally Preferable Products	http://nodis3.gsfc.nasa.gov/displayDir.cfm?t=NPR&c=8530&s=1A
NPR 8553.1B—NASA Environmental Management System	http://nodis3.gsfc.nasa.gov/displayDir.cfm?Internal_ID=N_PR_8553_001B_&page_name=main
NPR 8570.1—Energy Efficiency and Water Conservation w/Change 2 (4/04/08) REVALIDATED	http://nodis3.gsfc.nasa.gov/displayDir.cfm?t=NPR&c=8570&s=1
NPD 8810.2A—Master Planning for Real Property	http://nodis3.gsfc.nasa.gov/displayDir.cfm?t=NPD&c=8810&s=2A
NPR 8810.1—Master Planning Procedural Requirements	http://nodis3.gsfc.nasa.gov/displayDir.cfm?t=NPR&c=8810&s=1
NPD 8820.2C—Design and Construction of Facilities	http://nodis3.gsfc.nasa.gov/displayDir.cfm?t=NPD&c=8820&s=2C
NPR 8820.2F—Facility Project Requirements	http://nodis3.gsfc.nasa.gov/displayDir.cfm?t=NPR&c=8820&s=2F
NPD 8831.1E—Maintenance and Operations of Institutional and Program Facilities and Related Equipment (Revalidated June 16, 2008)	http://nodis3.gsfc.nasa.gov/displayDir.cfm?t=NPD&c=8831&s=1E
NPR 8831.2E—Facilities Maintenance and Operations Management	http://nodis3.gsfc.nasa.gov/displayDir.cfm?t=NPR&c=8831&s=2E
EISA 2007 (The Energy Independence and Security Act of 2007)	http://energy.senate.gov/public/index.cfm?FuseAction=IssueItems.Detail&IssueItem_ID=f10ca3dd-fabd-4900-aa9d-c19de47df2da&Month=12&Year=2007

Appendix C—Definitions

Absolute Greenhouse Gas Emissions—total GHG emissions without normalization for activity levels and includes any allowable consideration of sequestration.

Alternative Fuel Vehicle—vehicles defined by section 301 of the Energy Policy Act of 1992, as amended (42 U.S.C. 13211), and otherwise includes electric fueled vehicles, hybrid electric vehicles, plug-in hybrid electric vehicles, dedicated alternative fuel vehicles, dual fueled alternative fuel vehicles, qualified fuel cell motor vehicles, advanced lean burn technology motor vehicles, self-propelled vehicles such as bicycles and any other alternative fuel vehicles that are defined by statute.

Alternative Investment—the estimated amount of funding through ESPC, UESC, EUL, PPA, rebates, or other funding streams outside of the federal agency. This total should also include financial assistance that NASA receives from another federal agency such as FEMP or GSA technical assistance. The total amount does not include any contributions from appropriations that may contribute to these projects in the form of down payments (these are leveraged investments).

Construction and Demolition Materials And Debris—materials and debris generated during construction, renovation, demolition, or dismantling of all structures and buildings and associated infrastructure.

Device Types—electronic products listed under the Energy Star program that NASA is required to purchase or lease. "Computers and Electronics" section in the EPA Energystar site contains the list of targeted products. This includes products with stand-by power. This does not include Energy Star products that are not "Electronics" such as lighting, appliances, roof products, windows, etc.

Divert and Diverting—redirecting materials that might otherwise be placed in the waste stream to recycling or recovery, excluding diversion to waste-to-energy facilities.

Electronic Assets—electronics products owned and leased by the Agency that are disposed following any of the acceptable end-of-life practices.

Eligible Electronics Products—computers, laptops, monitors, imaging equipment (e.g., copiers, faxes, printers, scanners.) and hand-held devices (e.g., Blackberries, cell phones) that have power management and other environmental and energy features.

Energy Intensity—energy consumption per square foot of building space, including industrial or laboratory facilities.

Environmental—environmental aspects of internal Agency operations and activities, including those aspects related to energy and transportation functions.

Excluded Vehicles and Equipment—any vehicle, vessel, aircraft, or non-road equipment owned or operated by an agency of the Federal Government that is used in combat support, combat service support, tactical or relief operations, or training for such operations; Federal law enforcement; emergency response; or spaceflight vehicles (including associated ground-support equipment).

Greenhouse Gases—carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

Incremental Investment—the estimated amount of additional funding required above current budget authority necessary to meet the objectives of EO 13514. This is a new funding request to fund new projects dedicated to meeting current or future EO goals. For example, incremental funds required to update or improve facility designs that were not originally designed to meet sustainability goals and targets.

Leveraged Investment—the estimated amount of funding that contributes to the sustainability goals and goal achievement as a secondary or ancillary benefit of existing budget authority (appropriated dollars). This money is what would be requested even if EO 13514 had not been signed. It is not solely for sustainability and is not a new request. For example, O&M/MILCON money for new construction is requested regardless, but the designs are green, ARRA infrastructure projects which will meet sustainability and energy goals, capital improvement funding to replace aging equipment but will be more efficient, etc.

Renewable Energy—energy produced by solar, wind, biomass, landfill gas, ocean (including tidal, wave, current, and thermal), geothermal, municipal solid waste, or new hydroelectric generation capacity achieved from increased efficiency or additions of new capacity at an existing hydroelectric project.

Scope 1—direct GHG emissions from sources that are owned or controlled by the Federal agency.

Scope 2—direct GHG emissions resulting from the generation of electricity, heat, or steam purchased by a Federal agency.

Scope 3—GHG emissions from sources not owned or directly controlled by a Federal agency but related to agency activities such as vendor supply chains, delivery services, and employee travel and commuting.

Sustainability and Sustainable—to create and maintain conditions, under which humans and nature can exist in productive harmony, that permit fulfilling the social, economic, and other requirements of present and future generations.

Water consumption intensity—water consumption per square foot of building space.

Zero-net-energy building—a building that is designed, constructed, and operated to require a greatly reduced quantity of energy to operate, meet the balance of energy needs from sources of energy that do not produce GHGs, and therefore result in no net emissions of GHGs and be economically viable.