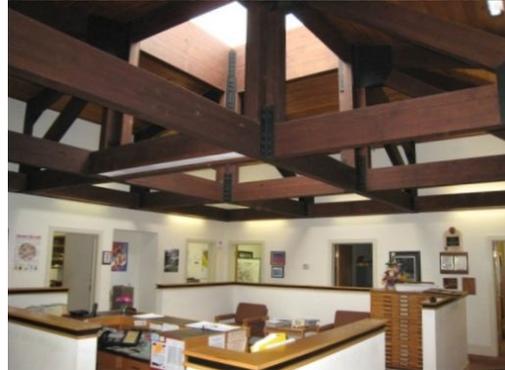




United States Department of Agriculture Sustainable Buildings Plan



left to right, top to bottom:
USDA Forest Service Eastern Sierra
Interagency Visitor Center in Region 5;
Forest Service LEED Gold Sandpoint
Ranger District Office; USDA
Headquarters Whitten Building, the
People's Garden; Enoree Ranger District
Office, the first Forest Service Green
Globes building with locally sourced
wood structure; and USDA Agricultural
Research Service laboratory in Hilo, HI.



Table of Contents

I. Executive Summary.....	5
II. Introduction	6
III. Background – Executive and Legislative Branch Policies.....	6
IV. USDA Sustainable Buildings Vision, Actions, and Strategies	7
V. USDA Agency Accomplishments	9
APHIS	12
Agricultural Research Service	17
Departmental Management Office of Operations.....	21
Forest Service	22
Farm Services Agency	29
Natural Resources Conservation Service	31
VI. USDA Sustainable Buildings in the Future	32
VII. Sustainable Building Resources	32

Figures

fig. 1 - USDA Sustainable Buildings Performance and Progress	10
fig. 2 – USDA Agency performance compared to ‘15% green by 2015’ goal, percent.....	11
fig. 3 - APHIS and ARS green infrastructure collaboration, Ames, Iowa	12
fig. 4 - Built to suit APHIS Plant Inspection Station, exterior	13
fig. 5 - Built to suit APHIS Plant Inspection Station, entrance	13
fig. 6 – APHIS prairie land and periodic prairie area burning, NCAH, Ames, Iowa	14
fig. 7 - APHIS prairie land at NCAH, Ames, Iowa	15
fig. 8 - APHIS LEED-Gold Detector Dog Training Center, Newnan, Georgia	16
fig. 9 - ARS case studies and recognition.....	18
fig. 10 - ARS Laboratory in Hilo, Hawaii	19
fig. 11 - The ARS BARC 306 Laboratory, a sustainable existing building	20
fig. 12 - The USDA Whitten Building green roof.....	21
fig. 13 - USDA South Building Court 5 green roof	22
fig. 14 - The San Dimas Technology and Development Center, San Dimas, California, Pacific Southwest Region.....	23
fig. 15 - The FS LEED-Gold Sandpoint Ranger District Office, Northern Region, front elevation, featuring use of small diameter round logs, use of small diameter round wood themes	24
fig. 16 - The FS LEED-Gold Sandpoint Ranger District Office, Northern Region, exterior, featuring ground source heat pump system, clerestory windows, and use of small diameter round logs	25

Tables and Figures (cont'd)

fig. 17 - The FS Bessey Ranger District Office, Nebraska National Forest, Rocky Mountain Region	26
fig. 18 - The FS Verde Ranger District Station, Camp Verde, Arizona, Southwestern Region	26
fig. 19 - The FS Lee Ranger District Office, George Washington-Jefferson National Forest, Southern Region	27
fig. 20 - the FS Three Green Globes facility - the Enoree Ranger District Office, Whitmire, South Carolina, Southern Region, exterior	27
fig. 21 - the FS Three Green Globes facility - the Enoree Ranger District Office, Whitmire, South Carolina, Southern Region, interior	28
fig. 22 - The FSA's Green Globes third-party certified location - The Ben Hill/Irwin County Service Center, Fitzgerald, Georgia	30

Executive Summary

The United States Department of Agriculture (USDA) FY 2015 Sustainable Buildings Plan informs a wide audience about the sites, structures, and land under the department's stewardship. This audience includes USDA agency sustainable buildings subject matter experts, i.e., engineers, energy management and real property staff, and many other stakeholders, including other Federal agencies and the public. The plan updates the FY 2011 Sustainable Building Implementation Plan on the Environmental Management Division website <http://www.dm.usda.gov/emd/greening/index.htm>

The USDA activities, facilities, and land management affect the natural environment, the economy, and occupant health as well as employee productivity within the seven USDA mission areas. The primary objectives of this plan are to share information about current sustainable building policies, vision, and goals, and greening strategies, to illustrate USDA's agency and office sustainable building progress over time, and to provide examples of projects and practices. The plan also provides background information on the size and scope of USDA operations, including population, real property, and land managed, and on Federal sustainable building requirements. Sustainable building requirements are derived from multiple executive- and legislative branch-initiated policies, such as Executive Order (EO) 13693, "Planning for Federal Sustainability in the Next Decade," EO 13514, "Federal Leadership in Environmental, Energy, and Economic Performance," the Energy Independence and Security Act of 2007 (EISA), and EO 13423, "Strengthening Federal Environmental, Energy, and Transportation Management. This plan illuminates USDA's rationale for measuring, validating, and reporting on green buildings and specific USDA strategies used in meeting this challenge, e.g., building assessment tools and third party rating systems.

It gives examples of USDA sustainable building initiatives, such as standing up the USDA Facilities and Sustainable Buildings work groups reporting to the Sustainable Operations Council, and of the multiple USDA green infrastructure projects. It speaks of solutions that USDA created such as developing a USDA green building measurement system to assess facilities and report to the Federal Real Property Profile. It shares outcomes of green building research findings, for instance, based upon Forest Products Research Lab research that over the life cycle of a building material, wood is preferred for its environmental benefits. The latter finding results in a practice and an initiative for all USDA agencies to use domestically harvested wood products as the green building material. The plan illustrates internal and external Federal government wide collaborations, and shares information on solutions created.

I. Introduction

The mission of the U.S. Department of Agriculture (USDA) is to provide leadership on food, agriculture, natural resources, rural development and nutrition. USDA's array of diverse mission areas and far-reaching geographic presence are reflected in the real property portfolio. Facilities range from visitor centers to research labs and utility buildings. Currently, the Department employs 99,000 individuals throughout the country and is steward of 57 million gross square feet (GSF) in 24,212 public and private buildings. USDA manages 2,184 buildings over 5,000 GSF in size, and manages over 193 million acres of land. These sites, structures, and land affect the natural environment, the economy, and the health and productivity of employees and visitors who use the USDA buildings. USDA is taking action to reduce environmental impacts and to benefit the economy and human health and productivity, in meeting and even exceeding regulatory requirements.

The main objective of the USDA FY 2015 Sustainable Buildings Plan is to communicate departmental and individual agency sustainable building progress, policies and the variety of strategies and practices used to green USDA agency buildings. The plan gives examples of agency successes and challenges for the benefit of USDA staff, other federal agencies, and the public.

II. Background – Executive and Legislative Branch Policies

Setting the stage for future Executive Orders signed between 2006 and 2015, in January 2005 the Office of Management Budget (OMB) and the Office of the Federal Environmental Executive established Federal government sustainable building performance measures, areas of attainment within which buildings could achieve green objectives, namely the *Five Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings* (Five Guiding Principles). The Five Guiding Principles require agencies to employ integrated design, optimize energy performance, protect and conserve water, enhance indoor environmental quality, and reduce environmental impacts of materials in new construction, major renovation and existing buildings.

In the Energy Independence and Security Act of 2007 (EISA) Section 438, Federal agencies are required to protect watersheds by managing stormwater runoff from federal development and redevelopment projects. Federal agencies comply by green infrastructure or low impact development (LID) stormwater management practices. These practices replace impervious surfaces with permeable surfaces and vegetative cover. Green infrastructure technologies include porous pavements, cisterns, and green roofs.

In October 2009, President Obama signed Executive Order (EO) 13514, "Federal Leadership in Environmental, Energy, and Economic Performance," requiring Federal government environmental stewardship. EO 13514 mandated that the Federal government lead by example to create a clean energy economy, promote energy security, and safeguard the environment. This EO required sustainable practices in Federal building planning, design, construction and

operations and maintenance, building on the requirements of the previous administration's 2007 EO 13423, "Strengthening Federal Environmental, Energy, and Transportation Management."

In March 2015, the President signed EO 13693. EO 13693, "Planning for Federal Sustainability in the Next Decade," orders Federal agencies to lead by example in the nation's work of building "a clean energy economy that will sustain our prosperity and the health of our people and our environment for generations to come." In EO 13693, the President requires Federal agencies to lead in energy, environmental water, fleet, buildings, and acquisition management, in order to continue to reduce greenhouse gas emissions and to prepare for the impacts of climate change.

Specifically, agencies are to achieve net zero energy in new buildings, to identify a percentage of existing buildings above 5,000 gross square feet intended to be energy, waste, or water net-zero buildings by fiscal year 2025, and to put actions in place that allow those buildings to meet that target. Agencies are required as in the earlier EO 13423 and EO 13514, to make annual progress toward 100 percent conformance with the Five Guiding Principles in their building inventories. Using energy efficiency, renewable energy, water efficiency, and green infrastructure technologies, Federal agencies must make annual progress towards the fiscal year 2025 goal to measure at least 15 percent of existing buildings and building leases above 5,000 GSF as meeting the Guiding Principles. Each of EO 13423 and EO 13514 are revoked under EO 13693.

III. USDA Sustainable Buildings Vision, Actions, and Strategies

Vision

USDA strives to build, operate, maintain, and lease facilities that are environmentally sound and that enhance occupant health and productivity. The department meets or exceeds the sustainable buildings commitments stated in its current Strategic Sustainability Performance Plan.

Actions - Sustainable Building Work Groups

Under the Sustainable Operations Council, USDA formed the Facilities and Sustainable Buildings work groups. The work groups are forums for learning and sharing information laterally across the department's agencies; within them, program managers take responsibility to share OMB and Council on Environmental Quality (CEQ) direction, and to solicit expert input on executive branch policy under development.

The main objectives of the work groups are to set goals, collaborate, organize, manage policy and practice actions, and share challenges and accomplishments among USDA agencies. Each agency is given the opportunity to independently form its own sustainability team identity to assess facilities and improve building performance. USDA agencies independently gather data in the field to validate meeting performance goals. Through the sustainable buildings work groups, agencies have the opportunity to share their successes, challenges, and lessons learned.

Strategies

USDA follows sustainability strategies for design and construction, leasing, repairs, alterations, and operations and maintenance, including:

- following green procurement methods and using green contract language;
- requiring that projects meet criteria for Leadership in Energy and Environmental Design (LEED[®]) Silver and the Five Guiding Principles in all new leasing actions;
- achieving greater efficiencies in energy and water consumption, by using resource conservation measures in offices, laboratories, and farm and forest buildings;
- refining internal systems to track sustainability characteristics and develop new systems with increased capabilities;
- measuring, recognizing, and rewarding positive sustainable building performance;
- measuring and validating that existing buildings meet the Five Guiding Principles;
- raising awareness of sustainable building practices within USDA with training presentations and tools available on the Sustainable Buildings SharePoint site;
- collaborating with energy conservation program areas, the Biopreferred Program, environmental management system (EMS), and sustainable acquisition program to reach environmental objectives. Examples include showcasing biobased products in USDA sustainable buildings and gathering facility environmental management data for sustainable building reports;
- forming interest groups and conducting research to implement pilot projects in sustainable sites/ sustainable land management, alternative energy, and water conservation technologies;
- implementing LID technologies; and
- incorporating green materials and systems into the technical construction specifications to ensure that buildings meet the Five Guiding Principles.

Sustainable Building strategies follow the Five Guiding Principles in all life-cycle stages:

- siting and programming,
- design,
- construction,
- operations and maintenance, and
- disposal and deconstruction.

USDA's Property Management Division encourages agencies to enhance building condition through financial decisions weighted towards those that provide the greatest return on investment (ROI). Investment decisions affect all real property over the Capital Asset Threshold¹.

Initiatives to secure the greatest ROI on agency resources in sustainable buildings practices include:

- using known data and characteristics to select potentially sustainable buildings, and creating a survey to evaluate and assess all USDA existing buildings, and measure and validate the extent to which these buildings meet the Five Guiding Principles;
- promoting and adhering to sustainable practices by writing solicitations to include the Five Guiding Principles; and
- using third-party certification, such as the Green Building Initiative's Green Globes and the U.S. Green Building Council's LEED[®] systems, to measure sustainability.

USDA also encourages all agencies to use domestically harvested wood products as the preferred construction material for all buildings, and seeks to promote this sustainable practice. Wood products are, ideally, locally sourced and originated in National Forest System lands. A preference for wood stems from its environmental life cycle benefits, such as reduced energy consumption and greenhouse gas (GHG) emissions. Life cycle assessment informs decision-makers on wood and wood products' lower environmental impacts when compared to functionally equivalent products. USDA Forest Service (FS) life cycle research assessing environmental impacts of wood versus those of other building materials such as steel and concrete reveals that fossil fuel consumption, potential contributions to GHG emissions and quantities of solid waste are less in manufacturing and using wood and wood products than in manufacturing and using competing materials and products.

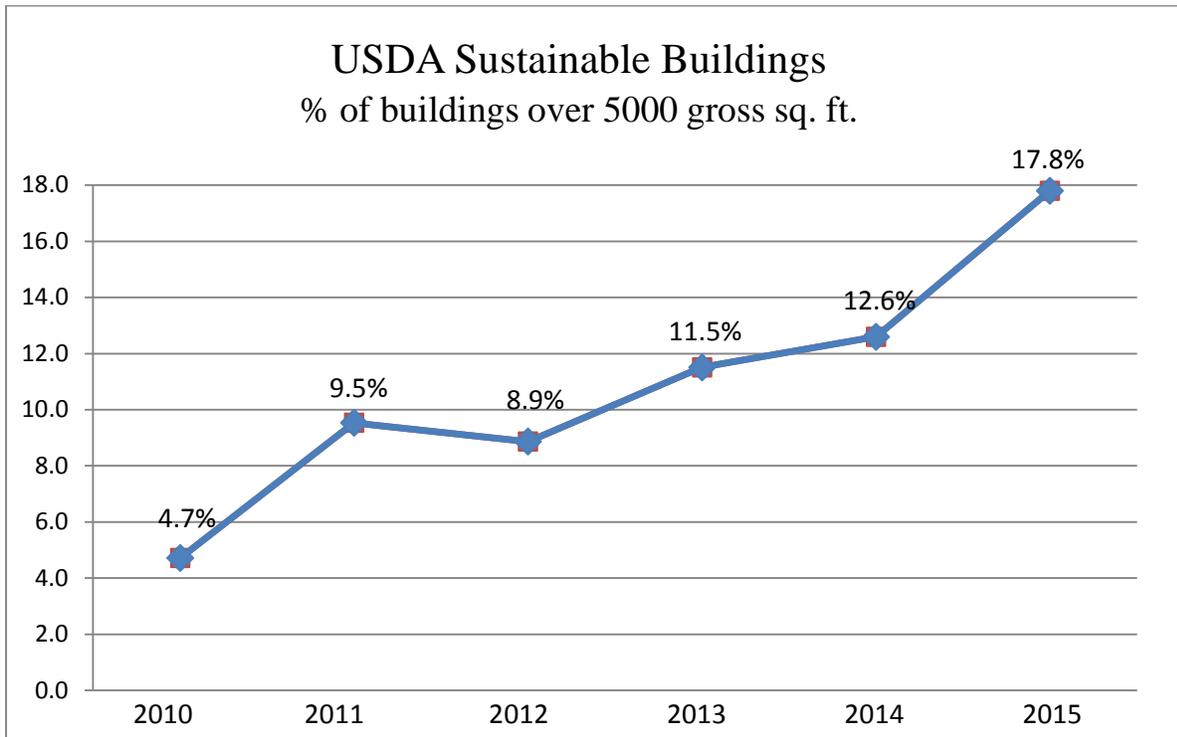
IV. USDA Agency Accomplishments

The USDA continues to make sustainable buildings progress in FY 2015. The USDA Environmental Management Division (EMD), on behalf of agencies, gathers information and reports on agency assessment of sustainable buildings via a point-based system with five sets of evaluation criteria along with technical guidance to evaluate all sustainable existing buildings over 5,000 GSF in size. Using this metric, USDA reports annually on sustainable building performance, whereas, following USDA's assessment system, agencies and offices, e.g., Agricultural Research Service (ARS), Departmental Management's Office of Operations (DM/OO), FS, Animal Plant Health Inspection Service (APHIS), and Natural Resources Conservation Service (NRCS), as well as Farm Services Agency (FSA), Grain Inspection,

¹ Capital Asset Threshold definition: from DR 2200-002, December 24, 2003: " This regulation revises Departmental Regulation 2200-002, Capitalization and Depreciation of Real and Personal Property, dated February 28, 1994. The Internal Use Software (IUS) capitalization threshold is \$100,000, effective fiscal year (FY) 2002 and forward. Effective FY 2003 and forward, personal property (other than IUS) shall be capitalized at \$25,000. Also, effective for FY 2003 and forward, the real property capitalization and accountability threshold is \$25,000."

Packers and Stockyards Administration (GIPSA), and Rural Development (RD) develop and follow agency-specific guidance and design standards.

Diverse agency missions and an extensive geographic presence are challenges in assessing and rating the USDA building portfolio. USDA meets the challenges by carrying out strategies to achieve Federal green buildings goals. Overall, USDA has 12.6 percent sustainable buildings. Over 80 percent of the 2,184 buildings larger than 5,000 GSF are assessed for sustainability.



**Figure 1 - USDA Sustainable Buildings Performance and Progress
Percent Sustainable over five fiscal years**

Agencies consider sustainability in the siting, design, and construction of new facilities; new building construction projects are managed by integrated design teams and commissioning is integrated into design and construction phases. Indoor environmental quality specifications are included in the design of all new building construction. Furthermore, any new construction contract must include services to abate hazardous materials and hazardous substances, while giving preference to reused and recycled materials. See Figure 1 above and Figure 2 below for USDA agency sustainable building percentages² from FY 2010 through FY 2014.

² USDA agencies illustrated include Agricultural Research Service (ARS), Animal Plant Health Inspection Service (APHIS), Forest Service (FS), Farm Services Agency (FSA), Grain Inspection, Packers and Stockyards Administration (GIPSA), Departmental Management Office of Operations (DM/OO), Natural Resources Conservation Service (NRCS), and Rural Development (RD)

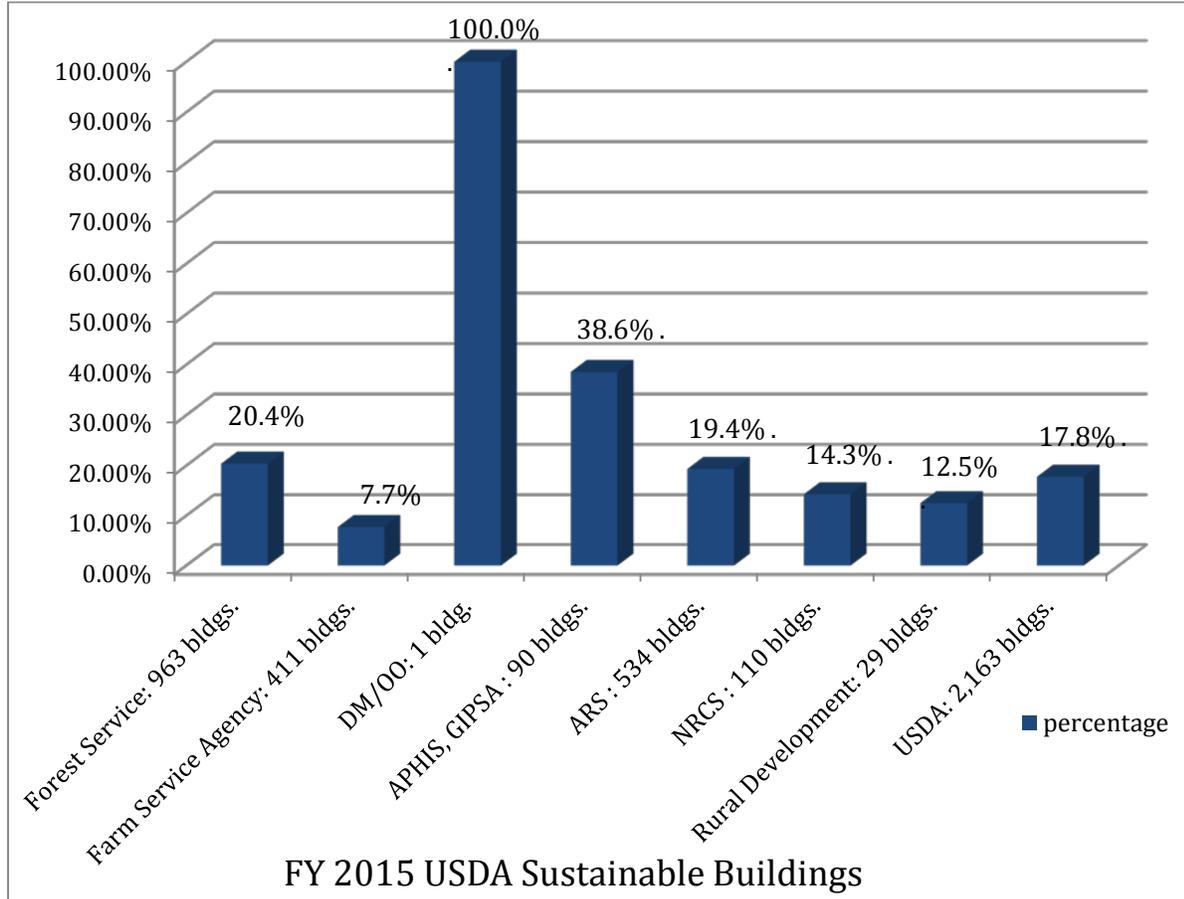


Figure 2 - USDA Agency Sustainable Buildings Performance compared to '15% green by 2015' goal, percent

Green Infrastructure at USDA

USDA agencies and offices, including the APHIS, ARS, FS and OO establish green infrastructure policies and carry out a variety of LID projects in the field. These projects yield multiple environmental and economic benefits in regions across the nation, and range from green roofs to cisterns, rain gardens, native plants, and, for arid and drought-prone locations, drought-tolerant plants, as well as Peoples' Gardens. Figure 3, next page, shows the APHIS and ARS green infrastructure courtyard collaboration.



**Figure 3 - APHIS and ARS National Centers for Animal Health (NCAH)
Courtyard Green Infrastructure, Ames, Iowa**

APHIS

APHIS incorporates the LEED principles into all solicitations for lease of the agency's build to suit projects. In 2009, APHIS achieved a LEED Gold rating for the Detector Dog Training Center in Newnan, Georgia. The center is the first LEED Gold new construction building that APHIS solicited and coordinated with the private sector. The building encompasses approximately 79,211 square feet, plus covered areas for a total of 123,737 square feet, and is a stunning example of incorporation of sustainable technologies in a highly technical building setting. APHIS renovated 14,500 square feet of space in its Gainesville, Florida office under LEED for Commercial Interiors at the sustainable level. The office was the first APHIS project under LEED for Commercial Interiors guidelines for energy and the project complies with three of the five Guiding Principles. A build to suit project was completed in 2013 for the APHIS Los Angeles Plant Inspection Station & Animal Import Center. The building is 44,000 square feet and meets the requirements for the Silver Level threshold for LEED New Construction certification.



Figure 4 – Built-to-Suit APHIS Plant Inspection Station, Los Angeles, California

APHIS Accomplishments

APHIS leads the way in setting a green leasing standard at USDA, by incorporating the Green Products guidelines and LEED requirements into solicitations for all leasing actions. The agency continues to incorporate sustainable guidelines for all leasing activities. New leases require that lessors with buildings over 5,000 GSF follow the Five Guiding Principles to meet USDA existing building sustainability requirements, and that build-to-suit lease projects meet criteria for LEED Silver certification. Furthermore, where leases may be renewed, APHIS is notifying lessors of the USDA sustainable buildings requirement, and of the criteria that must be met. An example of APHIS leased building certification is at the new Plant Inspection Station at the Atlanta Hartsfield-Jackson International Airport, where APHIS achieved the U.S. Green Building Council (USGBC) LEED Commercial Interiors certification. The Architects indicated that they achieved 41 out of the 40–49 points range for certification on the project, and that it was a great accomplishment, as the construction project is sited within an existing warehouse building.



Figure 5 - Built to suit APHIS Plant Inspection Station, Los Angeles, California entrance

APHIS completed several energy alteration projects for energy conservation and green leasing activities, including the Butler Square Building, in Minneapolis, Minnesota. Butler Square is the first historical property in Minnesota with a LEED rating; the property has held an Energy Star Label since 2010, and is also a LEED Certified historic property. APHIS completed a plant inspection station in Los Angeles, California, an Energy Star Labeled building constructed towards LEED Silver.

An example of an innovative APHIS sustainable building construction and landscaping technologies project is the APHIS and ARS collaborative National Centers for Animal Health (NCAH) sustainably landscaped courtyard in Ames, Iowa, shown in Figure 3. The landscaping uses Iowa native plants to minimize need for water; a rain garden protects the watershed as it decreases and slows down and diminishes courtyard storm water runoff to the storm sewer.

Another APHIS NCAH project is maintaining a series of prairie areas totaling ~15 acres. The NCAH Prairies utilizing plants native to Iowa are set aside to minimize use of energy resources for landscape mowing, minimize use of landscaping water, and encourage stormwater infiltration with the deep-root systems of the native prairie grasses and wildflowers. The NCAH Green Team is using recycling funds to contract for periodic burning of certain prairie areas.



Figure 6 - APHIS NCAH, Ames, Iowa prairie land and periodic prairie area burning



Figure 7 - APHIS NCAH, Ames, Iowa prairie land

APHIS completed many innovative sustainable building construction projects between 2011 and 2015:

- APHIS collaborated with the National Renewable Energy Laboratory (NREL) to develop a Renewable Energy Pre-Screening Report at Moore Air Base, Mission, Texas;
- APHIS completed the installation of advanced meters at the following facilities:
 - Import Station, Laredo, Texas,
 - Bird Quarantine Inspection Station, Otay Mesa, California, and
 - National Veterinary Services Lab/Center for Vet. Biologics (NVSL/CVB), Ames, IA;
- APHIS worked with a third party contractor to complete the initiative to determine the costs to bring the owned facilities up to a sustainable level, and to meet the Five Guiding Principles;
- APHIS added insulation, increasing the R-Value of the roofs, at the following facilities:
 - Bird Quarantine Inspection Station, Otay Mesa, California, and
 - Pest Survey Detection & Exclusion Lab., Otis, Massachusetts;

- APHIS installed high efficiency motors & is recouping the energy associated with the National Wildlife Research Center (NWRC) - BSL3 Laboratory upgrade, Ft. Collins, CO;
- APHIS Completed “Green Assessments” at the following facilities:
 - NVSL/CVB, Ames, IA,
 - National Plant Germplasm Quarantine Center, Beltsville, MD,
 - NWRC, Ft. Collins, CO,
 - Plant Inspection Station at John F. Kennedy Airport, Jamaica, NY,
 - Bridge II Complex, Laredo, TX,
 - New York Animal Import Center (NYAIC), Newburgh, NY, and
 - Golden Nematode Quarantine Facility, Westhampton, NY.



Figure 8 - The APHIS LEED-Gold Detector Dog Training Center, Newnan, Georgia

The ARS

The ARS is the largest agency within the USDA Research, Education and Economics mission area. The ARS sets sustainability goals, takes agency-wide actions to meet these goals, and rewards employees who achieve tangible results, using outreach and positive motivation to communicate and reward desired actions. Goals for the ARS sustainability actions include that for new construction, all design and construction staff follow the LEED criteria; that for existing buildings, alterations and operations enable that a building meet the minimum survey score, that maintenance and operations staff replace all T-12 lamps and incandescent, that engineers re-/retro-commission buildings, where cost effective, and meter utilities, and that staff select renewable and biobased products.

ARS established formal sustainability policies and practices including:

- the Facilities Design Standards Manual 242.1, guiding ARS design and construction staff in sustainable facility actions;
- the Research, Education and Economics Energy, Water and Sustainability Policy and Procedures 134.2, guiding ARS employees for operations;
- commissioning, re-commissioning, and retro-commissioning practices; assessing buildings using an existing building sustainability survey; and
- using Department of Energy contracts such as Energy Saving Performance Contracts and Utility Energy Service Contracts.

As a result of these practices, through energy conservation measures, the ARS has reduced utility costs by seven million dollars, and significantly reduced Scopes 1 and 2 greenhouse gas emissions, since FY 2008.

Specific actions that the ARS takes include:

- a green cleaning initiative, launched in FY 2010, provides for effective and cost competitive green cleaning solutions in all custodial contracts, and use of biologically compatible, biodegradable and safe products while improving indoor air quality and working conditions. The initiative includes use of entrance mats, isolated cleaning closets, and environmentally-beneficial cleaning equipment with a low impact for all of its Research, Education, and Economics facilities. See figure 9 for “Biobased Success Stories,” published by the ARS; and
- a sustainability outreach program and a communication structure for its energy managers, engineers, procurement specialists, facility managers, and the Environmental Management System (EMS)/ Safety community; ARS carries this out across its sustainability community via conference calls and a well-maintained energy management SharePoint website.

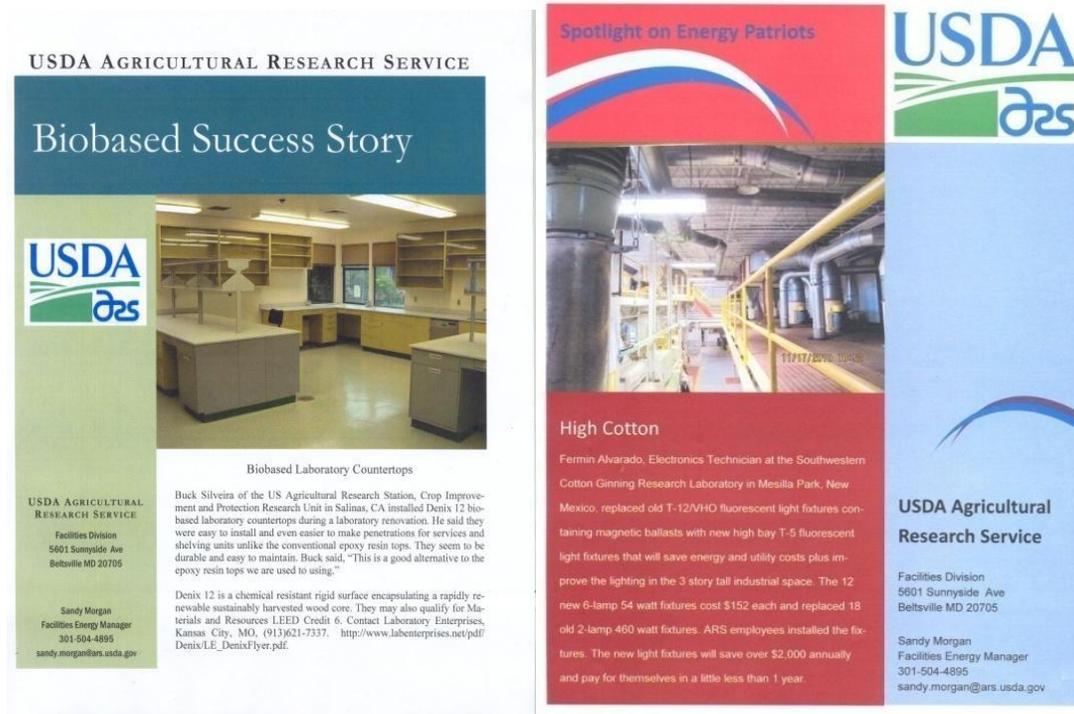


Figure 9 - ARS SharePoint site Case Studies and Recognition

The ARS' challenges include:

- a 45 million dollar level of utility expenditures annually in an ARS portfolio of 3,200 buildings;
- the energy intensity of ARS building types, primarily laboratories, office buildings, greenhouses, and animal facilities;
- the single pass air requirement for ARS buildings, of 8 to 15 air changes per hour; and
- increased energy use, following modernization, because of employee health and safety concerns.



**Figure 10 - ARS Laboratory in Hilo, Hawaii
a sustainable existing building**

ARS Accomplishments

The ARS Consolidated Laboratory Facility (CLF) in Ames, Iowa, has two LEED certified existing buildings. ARS built the Hilo, Hawaii facility in 2012, for the Pacific Basin Agricultural Research Center (PBARC) to LEED criteria. At the PBARC, ARS incorporates sustainable concepts from the ground up, e.g., siting orientation, natural habitat preservation, native plant landscaping, and dark-sky lighting. The Hilo facility features laboratory and office space with recycled content materials, low flow fixtures, energy efficient lights, energy saving HVAC, direct digital controls and variable air volume systems. Daylight is brought into interiors as reflected light with clerestories and angled soffits. Situated with respect for the Hawaiian island and culture, the site design allows for stormwater management using natural processes, and maximizes natural habitat. Natural light, individual controls, low-VOC materials and operable windows are part of the healthy and productive work environment at PBARC. A 40 KW photovoltaic array has been installed on the building to produce renewable energy on site. The ARS identifies sustainable existing facilities based on its survey, plus installation of advanced metering, re-commissioning surveys, and retro-commissioning surveys. ARS considers buildings sustainable after meeting the five guiding principles requirement, plus the advanced meter, re- and retro-commissioning initiatives, and no remaining discontinued lighting. These strategies work well for the ARS facilities over 5,000 GSF, and are a good example for the other USDA agencies. The ARS field survey helps identify those deemed the most sustainable or with the greatest potential, and concentrate improvement efforts. The survey, distributed with the annual energy report call for data, is based on LEED-Existing Buildings, v. 2.0. ARS established an energy intensity baseline, for all locations, in order to measure performance of the sustainable facilities. ARS uses the survey results to identify and implement cost effective, affordable and sustainable practices.



**Figure 11 - ARS BARC 306 Laboratory
a Sustainable Existing Building**

The ARS is carrying out multiple sustainable building initiatives, for example:

- The ARS currently measures ten of its 531 existing buildings greater than 5,000 GSF in size as sustainable, and the agency continues to make progress;
- From FY's 2010 to FY 2013, the ARS obtained LEED certifications for new construction at the Consolidated Laboratory Facility and its support building in Ames, IA;
- ARS sustainable existing buildings, designed and constructed by following the LEED methodology to achieve a Silver level equivalency, include facilities in Ft Pierce FL, Beltsville MD, Franklin ME, and Hilo HI;
- The ARS incorporates sustainability requirements into all of its standards and design contracts. The Five Guiding Principles are incorporated into new construction, where cost effective. The ARS is partnered with Labs 21 and uses their methodology. Where practicable, major new construction projects follow the LEED methodology; however, they are not being submitted to USGBC; and
- For the advanced electric meter initiative, the ARS completed installation of advanced electric meters at appropriate buildings in FY 2012. The agency is benchmarking metered buildings at EISA covered facilities using Energy Star Portfolio Manager. A nationwide advanced meter network is implemented that includes all advanced electric meters that are on accessible local area networks.

Departmental Management Office of Operations

The USDA Departmental Management Office of Operations sustainable building initiatives in the Washington, DC metropolitan area include:

- the USDA South Building Modernization and the green headquarters cafeterias;
- an aggressive waste minimization program with a compostable waste diversion initiative;
- the energy management and curtailment program;
- the recycling program with trash monitors;
- green housekeeping practices, such as using environmentally – friendly formulas and other green cleaning methods, keeping use of paper and misdirected mail to a minimum, and using composting containers in food preparation and consumption areas;
- green roofs on each of the Whitten and South Buildings; and
- a water conservation cistern.

Office of Operations sustainability awareness raising initiatives include:

- illustrating how staff may manage stormwater at home through a demonstration project, a garden shed with green roof and rain barrel; and
- installing interpretive displays on landscaping with a demonstration pollinator garden and an apiary, also known as a bee yard.

The USDA South Building Modernization project raised the facility’s sustainability level to LEED Gold. The modernization’s many green features include energy and water efficiency upgrades, environmentally positive construction materials, and aggressive recycling of construction and demolition debris.



Figure 12 - The USDA Whitten Building, Washington DC green roof



**Figure 13 - USDA South Building Court 5 , Washington DC
Green Roof**

The FS

On June 1, 2011, the FS added directive No. 7309.11-2011-1, to its agency sustainable buildings policy, Forest Service Handbook 7309.11 – Buildings and Related Facilities Handbook, Chapter 70. The FS is updating the policy to incorporate the recent Executive Orders and regulatory policies. This policy sets forth details on using the Five Guiding Principles and sustainable practices when designing, constructing, or renovating certain types of FS administrative buildings by:

- promoting sustainable environmental stewardship;
- providing safe, healthy, and productive built environments;
- improving energy efficiency, and water and resource conservation, and;
- reducing the total ownership cost of FS-owned facilities.

FS Net-Zero Energy



Figure 14 - The San Dimas Technology and Development Center, San Dimas, California solar array

The FS is pursuing multiple net-zero energy installations:

- At the San Dimas Technology and Development Center (SDTDC) in Southern California, FS is accomplishing zero net energy use;
- A pilot study of Net Zero Energy on the Shoshone National Forest, including detailed facility energy consumption audits; working with the Department of Energy's NREL, a plan was developed to optimize renewable energy technologies at each location in order to reach net zero energy consumption; and
- The FS Sustainable Operations Collective is establishing a ranger district net zero energy implementation model.

The FS used American Recovery and Reinvestment Act funds at the SDTDC. The center recently installed 1,288 solar polycrystalline silicon photovoltaic (PV) panels, rated at 235 Watts each, for a total projected annual energy output of 594,091 kW hours/year. In addition to installing the renewable energy sources, the SDTDC completed numerous energy efficiency projects to reduce the facilities total energy demand. Projects included motor efficiency upgrades, HVAC system replacement, energy efficient lamps, installation of occupancy sensors for overhead lighting and the installation of desk plug-load sensors. By installing PV and decreasing energy demand, the SDTDC has become the first FS net-zero facility.

The total electrical energy generated by the PV system is expected to save the FS over \$100,000 each year, and the system is projected to pay for itself within ten years. During its expected life, the FS anticipates that the PV system at the SDTDC will generate enough electricity for a minimum savings of \$1.5 to \$2 million above cost.

The development of the PV system resulted in a Net Zero Energy facility, thereby reducing the Federal government's energy consumption, and resulting in a significant cost savings to the Federal government and United States taxpayer. The kWh produced above the SDTDC's usage is credited to the SDTDC and the Angeles National Forest.

The Net-Zero Energy Project supports public laws such as the US Energy Policy Act of 2005; the Presidential Executive Orders 13423 and 13514, and the Forest Service goal to become energy neutral by the year 2020.



Figure 15 - The FS LEED-Gold Sandpoint Ranger District Office, Sandpoint, Idaho front elevation featuring use of small diameter round wood themes

The FS encourages green building certification in meeting the Five Guiding Principles for new construction. Construction projects of 10,000 GSF or greater in size must be registered and certified under either the USGBC's LEED rating system, minimum Silver level, Green

Globes, minimum of Two Green Globes, or other third-party certification system, for regional offices, supervisor's offices, district offices, visitor centers, and research offices or laboratories. FS project teams must incorporate sustainable principles as appropriate to the building type and project scope. The FS also encourages construction project offices to use domestically harvested wood products ideally locally sourced and from National Forest System lands, wherever practicable and feasible. An example of this initiative is the use of small diameter wood themes at the FS LEED-Gold Sandpoint Ranger District Office; see Figures 15 and 16.



Figure 16 - The FS LEED-Gold Sandpoint Ranger District Office, Sandpoint, Idaho exterior, featuring ground source heat pump system, clerestory windows, and use of small diameter round logs



Figure 17 - The FS Bessey Ranger District Office at the Nebraska National Forest, Chadron, Nebraska, exterior



Figure 18 - Energy Use Display, the FS Verde Ranger District Station, Camp Verde, Arizona



Figure 19 - HVAC geothermal heat pump, the FS Lee Ranger District Office at the George Washington-Jefferson National Forest, Roanoke, VA

In one example, at the Enoree office in Whitmire, South Carolina, the FS renovated and expanded an existing ranger district office to complete a consolidation of two ranger districts. Locally sourced wood was used for all new construction and renovation work. In addition to effective insulation, air-sealing, and window orientation strategies to reduce demand, energy use was reduced through the integrated design of simplified controls and high-efficiency small scale systems common to the area, allowing for ease of maintenance and operation. The building has received Three Green Globes from the Green Building Institute.



Figure 20 - the FS Three Green Globes Facility, Enoree Ranger District Office, Whitmire, South Carolina exterior



Figure 21 - the FS Three Green Globes Facility, Enoree Ranger District Office, Whitmire, South Carolina interior

The FS Buildings with potential for LEED or Green Globes certification, in planning or design phases, slated for future construction, are the following:

- Big Piney Ranger District, Intermountain Region,
- Rock Creek Barracks, Pacific Southwest Region,
- Barlow Ranger District Office Addition, Pacific Northwest Region,
- White Mountain Administrative Site, Eastern Region,
- Forest Products Laboratory Modernization, Research & Development, Madison, Wisconsin,
- Sisters Ranger District Office, Pacific Northwest Region,
- Bend-Fort Rock District Office, Pacific Northwest Region,
- Cheat-Potomac District Office, Eastern Region, and
- Vienna Ranger District Office, Shawnee National Forest, Eastern Region.

Alterations to existing FS buildings with sustainable features include:

- Photovoltaic and Solar Hot Water System, Missoula Technology and Development Center,
- Energy Savings Performance Contract (retrofit all offices with energy/water conservation measures), Region 4-Intermountain Region, and
- Office Energy Reduction (3 District Ranger Stations), Region 1-Northern Region.

The FS LEED-certified, certification pending, and green buildings not yet registered, as listed above, represent approximately 494,000 square feet.

The FS is achieving other sustainable building measures, which include:

- through the Sustainable Operations Collective, implementing a collective work plan for sustainable practices across functions and across the country;
- continuing to inventory greenhouse gas emissions at six National Forests in the Greater Yellowstone ecosystem; and
- using a micro-grant program to implement energy, water, and resource conservation activities, and an Energy Savings Performance Contract (ESPC) to complete energy and water conservation projects and to install renewable energy systems.

Farm and Foreign Agricultural Services (FFAS) High Performance Buildings

The FSA governs the largest portfolio of real estate within the USDA FFAS mission area. The FSA, on behalf of the FFAS mission area, reports many sustainability accomplishments and initiatives over the past several years. The agency, steward of 460 leased buildings larger than 5,000 GSF, is assessing the entire inventory, and identifying green buildings. FSA is leveraging the agency's influence to assess the sustainability, ascertaining the agency's intent to remain at leased locations, and requesting sustainable improvements. The agency is raising awareness through team meetings, training programs, and a multi-media approach.

The FFAS is pursuing Sustainable Buildings policies and practices by:

- Managing and tracking the transition from non-fully serviced leases to fully-serviced leases, thereby reducing the operational expenses to each lease;
- Promoting cost saving strategies as presented from Federal and private venues;
- Marketing materials such as posters, brochures, pamphlets to all FFAS mission areas; and
- Implementing and ultimately complying with the FY 2015 mandate for FFAS to become fully compliance with Executive Orders 13423, 13514, and the Presidential Memorandum of 2010. Contingent upon approval and funding, FFAS anticipates seeking a third party resource to facilitate sustainability compliance.

FFAS Assessments in Progress

The FFAS is working to certify its leased assets as meeting the Five Guiding Principles by FY 2015. The respective FFAS State Office and Real Property Leasing Officers (RPLOs), collaborating with the FSA's Sustainability Team, are identifying potentially sustainable locations nationwide. Currently, there are 430 leased USDA locations in 45 states, where FSA leads the leasing actions for facilities larger than 5,000 GSF. To meet the Executive Order 13514 requirement, 15%, or 65 locations, must be measured as sustainable by FY 2015.

In September 2013, the FFAS engaged the third party certifier Green Building Initiative (GBI) to help with sustainability assessments. The FFAS is assessing performance at each location with the GBI Guiding Principles assessment and certification methodology to quantify compliance using a 100-point scale and to provide higher levels of achievement based on the number of points a building acquires; areas of assessment include in energy conservation, water conservation, waste reduction and recycling, environmental purchasing, reduction in use and proper handling of hazardous products, and training and education in sustainability.



**Figure 22 - The FSA's Ben Hill/Irwin County Service Center, Fitzgerald, Georgia
Green Globes third-party certified building**

FFAS Sustainability Compliance

On May 9, 2014, the FSA, for FFAS, earned its first Green Globes third-party certification at the Ben Hill/Irwin County Service Center in Fitzgerald, Georgia. The facility is certified as Five Guiding Principles compliant, with 83 of 100-points. With one location certified as Five Guiding Principles compliant, FFAS anticipates certifying up to 65 locations within 24 months.

The FFAS Sustainability Team will guide FSA State Offices, FSA County Offices, FSA Realty Specialists, and Lessors in its sustainability initiative to build continued support.

The FFAS follows assessment and certification efforts in its leased assets by working with many stakeholders including the FFAS Sustainability Team, RPLOs, County Executive Directors and lessors, to ensure continued performance. Challenges in this effort include funding shortages in the current budget environment, geographically dispersed locations, and limited authority for improvements in leased facilities. The FFAS anticipates completing assessments on or about December 31, 2015. The FFAS was able to annually fund assessments for nine of the 65 locations that are identified, in order to meet the 15% goal. The FFAS expects, in the future, to fund the remaining identified locations.

FFAS Green Associate Training Awareness

The FFAS aims to offer continuous employee training on various sustainability topics to raise awareness. The first FSA LEED Green Associate all-day training session was held in November 2012 with 27 participants. The training prepares each RPLO to become a Green Associate with the U.S. Green Buildings Council (USGBC), as a prerequisite qualification to becoming a Leadership in Energy and Environmental Design Accredited Professional (LEED-AP).

NRCS

The NRCS is integrating sustainable building policies into the strategies and practices at its facilities, in keeping with its resource conservation mission. The NRCS constructed a new equipment storage and shop building in Bismarck, North Dakota. By writing the solicitation for offers to direct sustainable building practices using the Federal Sustainable High Performance Buildings Five Guiding Principles, the NRCS influenced the building's envelope and indoor environmental quality. The NRCS is reviewing the applicability of the survey form used by the ARS as an initial action for evaluating sustainable buildings. The NRCS continues to survey and assess its inventory, and to rate each of the Plant Materials Centers (PMC's) for energy efficiency and sustainability.

NRCS Sustainable Building Projects

The NRCS has recently completed energy-improvement projects at its PMCs, including:

- installing high efficiency HVAC systems and a residential heat pump hot water heater at the PMC in Beltsville, Maryland;
- installing LED light fixtures and WaterSense faucets for a restroom renovation, and replacing flood-based field irrigation with a pressurized irrigation system for sprinkler and drip line irrigation efficiency, at the PMC in Lockeford, California; and
- replacing T-12 with T-8 fluorescent light fixtures at the PMC in Big Flats, New York and at the PMC in Elsberry, Missouri.

V. USDA Sustainable Buildings in the Future

USDA aligns its sustainable buildings efforts with CEQ and OMB direction. At this juncture, as CEQ prepares to issue a new set of Guiding Principles for use beyond FY 2015, USDA plans to shift its green building metric accordingly. The new principles are likely to include specific metrics in, for example, greenhouse gas emissions, renewable energy use, energy efficiency, water use, efficiency, and management, healthy environments, and sustainable procurement including the use of BioPreferred products. USDA will continue to measure sustainable building performance and to work with CEQ, OMB, and other agencies, on initiatives beyond FY 2015.

In carrying out the USDA Sustainable Buildings priorities, departmental subject matter experts are taking action in several areas: developing green building and sustainable locations policies and procedures, collaborating with other agencies to use the guiding principles in all new and existing buildings, and forming strategies. USDA continues to collaborate with subject matter experts of other agencies to report on achievements and takes steps to implement these strategies.

VI. Sustainable Building Resources

1. Whole Building Design Guide Sustainability: <http://www.wbdg.org/design/sustainable.php>
2. USDA's Environmental Management Division Sustainable Practices Team:
<http://www.dm.usda.gov/emd/greening/index.htm>
3. The USDA Greening Website -
Greening and Headquarters Sustainable Operations at <http://www.greening.usda.gov>
4. USDA's Biopreferred Program at <http://www.biopreferred.gov>
5. General Services Administration (GSA) GSA Sustainable Design webpage:
<http://www.gsa.gov/portal/content/104462>
6. Department of Energy (DOE)
 - Federal Renewable Energy training Project Implementation: From RFP to Project Closeout:
http://apps1.eere.energy.gov/femp/training/course_detail_ondemand.cfm/CourseId=64
 - Program, High Performance Buildings website at
http://www1.eere.energy.gov/femp/program/sustainable_buildings.html

- Energy Star Sustainability program: <http://www.energystar.gov/>
- DOE FEMP's Interagency Sustainability Working Group: http://www1.eere.energy.gov/femp/program/sustainable_workinggroup.html
- DOE FEMP's High Performance Federal Buildings Database: <http://femp.buildinggreen.com/>

7. U.S. Environmental Protection Agency (EPA)

- EPA Green Building website: <http://www.epa.gov/greenbuilding>
- Laboratories for the 21st Century: <http://www.labs21century.gov/>
- Energy Star: <http://www.energystar.gov>
- Environmentally Preferable Purchasing: <http://www.epa.gov/oppt/epp>
- EPA Wastes Construction & Demolition Materials: <http://www.epa.gov/wastes/nonhaz/industrial/cd/>
- Comprehensive Procurement Guidelines: <http://www.epa.gov/cpg>
- Comprehensive guidance, data, and tools for commercial buildings. <http://www.epa.gov/iaq/largebldgs/>
- Software to evaluate ventilation and humidity control performance of energy recovery ventilation systems and to calculate their cost effectiveness. at <http://www.epa.gov/iaq/schooldesign/saves.html>

8. U.S. Department of Defense (DOD)

- Defense Environmental Network and Information Exchange (DENIX): <https://www.denix.osd.mil/denix/Public/Library/Sustain/sustain.html>
- Washington Headquarters Service sustainability information at http://www.whs.mil/our-services/building-and-facilities_cfm
- U.S. Air Force (USAF) announces new rules for Sustainable Development at <http://www.afcec.af.mil/news/story.asp?id=123320258>
- Air Force Environmentally Responsible Resources Guides at <http://www.hsdl.org/?view&did=449479>

9. U.S. Department of the Interior - National Park Service (DOI/NPS)

NPS has a climate friendly parks site at <http://www.nps.gov/climatefriendlyparks/> and a sustainability information site at <http://www.nps.gov/sustain>. Each contain extensive resources and case studies. The NPS periodical *Sustainability News* features information on sustainable National Park facilities and additional resources that parks can use.

10. National Aeronautics and Space Administration (NASA)

- NPG 8570.1, Energy Efficiency and Water Conservation Technologies and Practices: <http://environmental.ksc.nasa.gov/projects/documents/npr8570.1.pdf>
- Sustainable Base: <http://www.nasa.gov/externalflash/sustainability-base/>

11. National Institute of Standards & Technology (NIST), Life Cycle Cost Assessment (LCCA):

NIST, in 2003, developed the **Building for Environmental and Economic Sustainability (BEES)** LCCA tool, to analyze and compare the environmental impacts of each material or building component, in these 12 areas: Global Warming, Water Intake, Acidification, Criteria Air Pollutants, Eutrophication, Smog, Fossil Fuel Depletion, Ecotoxicity, Indoor Air Quality, Ozone Depletion, Habitat Alteration, and Human Health; the website is at <http://www.nist.gov/el/economics/BEESSoftware.cfm>

12. The ATHENA® Institute Impact Estimator for Buildings:

- The ATHENA® Institute, collaborating with Morrison Hershfield, creates a for-cost software tool designed to evaluate whole buildings and assemblies based on life cycle assessment (LCA) methodology; the website is at <http://www.athenasmi.org/our-software-data/impact-estimator/>

13. **Building Green** sustainable buildings information at <http://www.buildinggreen.com/>

- **Building Green** publishes *Environmental Building News*, and maintains an online database of more than 1,600 screened and reviewed green building products with guideline specifications, called the GreenSpec Directory, available through subscription only.

14. The U S Green Building Council LEED® Rating System at <http://www.usgbc.org/DisplayPage.aspx?CategoryID=19>

15. The Green Globes Design Environmental Assessment for New Buildings system: <http://www.greenglobes.com/home.asp>

%